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2019 Undergraduate Research Symposium

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2019 Undergraduate Research Symposium: Full Program

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Old Dominion University Undergraduate Research Symposium
Saturday, February 2, 2019
Learning Commons, Perry Library

Sessions at a Glance

8:00 – 9:00 AM	Registration and Continental Breakfast (Learning Commons)
8:45 – 8:55 AM	Welcome and Opening Remarks (Learning Commons) David Metzger, Dean of Perry Honors College
8:00 AM – 12:30 PM	<u>Undergraduate Art Exhibit</u> (Perry Libraries Art Gallery, pp 2-8) <u>Poster Session</u> (Learning Commons, Atrium, pp. 9-22)
9:00 – 10:00 AM	<u>Oral concurrent session I</u> (pp 23-26) <i>Biological Sciences 1</i> (Rm. 1310) Chair: Dr. Holly Gaff <i>History</i> (Rm. 1311) Chair: Dr. Maura Hametz <i>Art History Session 1: Power of the Feminine through Space and Time</i> (Rm. 1306) Chair: Dr. Vittorio Colaizzi, Moderator: Holli Turner <i>ePortfolio Panel Discussion 1: Making Your Learning Visible and Marketable: ePortfolio as a High Impact Practice</i> (Rm. 1313) Chair: Dr. Megan Mize
10:15 – 11:15 AM	<u>Oral concurrent session II</u> (pp 27-31) <i>Biological Sciences 2</i> (Rm. 1310) Chair: Dr. Robert Rose <i>Humanities and Education</i> (Rm. 1311) Chair: Megan McKittrick <i>Art History Session 2: Making Meaning: Reinterpreting Art through Form and Iconography</i> (Rm. 1306) Chair: Dr. Jared Benton, Moderator: Holli Turner <i>ePortfolio Panel Discussion 2: The More You Know: ePortfolios and Reflection</i> (Rm. 1313) Chair: Dr. Megan Mize
11:30 AM – 12:30 PM	<u>Oral concurrent session III</u> (pp 32-35) <i>Chemistry</i> (Rm. 1310) Chair: Dr. Jing He <i>LGBTQA: A Queer Walk Through History: Researching Norfolk's LGBTQ Past</i> (Rm. 1311) Chair: Cathleen Rhodes <i>Art History Session 2: Ways of Seeing: Vision and Gaze in Art</i> (Rm. 1306) Chair: Dr. Anne Muraoka, Moderator: Holli Turner <i>ePortfolio Panel Discussion 2: The More You Know: ePortfolios and Reflection</i> (Rm. 1313) Chair: Dr. Megan Mize
12:30 – 1:30 PM	Lunch in Broderick Dining Commons

This program is available online through ODU Digital Commons, the university's institutional repository: <https://digitalcommons.odu.edu/undergradsymposium/> Students are encouraged to submit their final presentations, posters, and artwork to the repository. Contact Karen Vaughan kvaughan@odu.edu for more information about how to submit.

ART EXHIBIT

8:00 AM – 12:30 PM (Learning Commons, Art Gallery)

Chair: Elliott C. Jones, Art Department

Artist Statements

Michael August (Mentor: Greta Pratt)

Photography Concentration

The framed photograph, *Latent I*, belongs to my most recent series of the same name. *Latent* was fully tasked with a survey of various suburban expanses, fixtures, and facades, elaborating the notion that these common, physical spaces contain an undeveloped capacity to engage the attention for symmetry and composition and perhaps reorient the label of boring. Shot throughout Hampton Roads, the viewer is presented with man-made sites generally regarded as only the prelude to something worth seeing and knowing, yet are themselves exceptional. A photobook that contains the series in full can be found on the table. A companion series to this was *Foundation*, which sought a similar untapped quality in the very asphalt roads and walkways which interconnect and support suburban life. *Foundation* is represented by a handmade photobook in an accordion style, one that requires a rather large space to display entirely but can nonetheless be flipped through like a normal book. Important influences for me were members of the 1975 New Topographics exhibition, Robert Adams, Lewis Baltz, Stephen Shore, and Bernd and Hilla Becher. Further still, the Becher's spawned the Düsseldorf school of photography, including Andreas Gursky and Thomas Struth whom I also include as inspirations. With these series I have purposefully embarked on observing and inquiring about the "normal" and its capacity to be both constrictive and unfettered. This is a thread I want to follow to all complementary physical and thematic areas. Essentially, with my photography, I want to see, and others to know, that the real world—the basic environment we all exist in—is more than it seems, especially in those places and times when it appears to be much less than what it should.

Sarah Benedict (Mentor: Kenneth FitzGerald)

Graphic Design Concentration

My entire family has always loved game nights. We play everything from board games to card games to combinations of the two. I have had this project in mind for many months, and I jumped at the chance to create it for a class project. I wanted to create something special to each member of my family, but I also wanted something that any viewer could enjoy. The result was a deck of cards that contained specific cards representative of my individual family members. I used each of the face cards for each of the five members of my immediate family: The Ace and Jack for my two sisters, The Joker for my brother, and the King and Queen for my father and mother respectively. I created these designs, as well as each of the number cards, on my iPad using Procreate. I then transported the layers into Photoshop where I made a few final adjustments. I sent them off to a printer (You're On Deck) that specializes in playing cards. These cards ended up being my Christmas present to my family this year. The enjoyment they got from flipping through the cards and finding the one that represents each of them was wonderful to watch. I hope they encourage many more family game nights.

Brittany Brunson (Mentor: Elliott Jones, Alison Stinely)

Drawing Concentration

My intent was to create drawings that shed light on substance abuse. Perception and reality are altered and the users' identities shift. Users present a facade to the world, but we often don't understand what

led to their abuse. Nor do we know what they face in the comforts of their own space. Prescription medicine, drugstore medicine and alcohol are very common substances to abuse and are the focus of these drawings. The scenes are set with the person lying in bed indulging in substances as a part of his everyday routine. The substance starts as a solution but overtime becomes the problem. The abuser in these drawings loses himself and shields his face to illustrate the fear, disconnect, intense sadness, loneliness and anxiety he feels. The use of these substances could be for a variety of reasons. One of the reasons could be a nonverbal cry for help. He could be facing a serious battle, possibly fighting for his life. The drawings were staged, photographed, then creatively edited to create a cohesive series on substance abuse. These drawings are fully rendered in color pencil on Bristol board. Overall, there are often signs of bigger emotional and psychological issues within a user's life than just the substance.

Connor Fad (Mentor: Dianne deBeixedon, Jane Ritchie)
Metals Concentration

Nature surrounds us and needs to be cherished. It is honest and brutal, but it is where I find solace, so it is no surprise that most of my work encompasses a nature theme. I originally studied biology to be a zoologist, however, I figure there is no reason why art can't be incorporated into this field. I always have had a special place in my heart for the animals that we overlook, many of which we find unappealing, such as snakes, lizards, spiders and so on. There is beauty in all animals, be it in their aesthetics or in their adaptations, and I want to make this visible. Deep sea marine fish fascinate me. How can their swim bladder withstand depth and pressure over 100x our atmosphere? How can they live a mile down? How do parasitic males work? How do they have a symbiotic relationship with bioluminescent bacteria? The marine hatchet fish and the amalgam fish I made comprising elements from the black dragon fish as well as your standard silver hake are attempts to make the terrifying beautiful and wearable. These two broaches were made from what was originally a flat sheet of copper, then through chasing and making repousse in a pitch pot and doing a bezel stone set, you can make a sheet of copper come to life and become a broach. The lizard necklace was inspired by a love I had for looking for small lizards, amphibians, and other animals through the underbrush in the woods. I would go out with a field guide and a small terrarium and catch five lined skinks, broad headed skinks, and red back salamanders and bring them home for a few days watching how they move, how they eat and take notes. I realize now that this was maybe not the most ethical thing to do, however, since then times got hard, stress got near too much to handle, so I remember what made me happy, running through the woods looking for little creatures. I turned this idea into a necklace to keep it near to me. My large ceramic lizard on sandstone was made as a celebration of the southwestern United States. I made the lizard after the blue and yarrow's spiny lizard species on the southern desert boarder of Texas. A species that may be threatened due to a wall. If you look closely in this piece, I also made a chased copper plate that I used to make imprints of the Modocia Trilobite. Trilobites are among the most ancient complex organisms of all time as well as some of the most successful: they lived for 270 million years. They began their reign in the Cambrian period, when almost all the world was under water, including what is now a desert, 540 million years ago. I also painted traditional Hopi Native American designs depicting creation stories and celebrating their desert environment in Utah. This is a celebration of life in nearly unlivable conditions as well as a celebration of change and rebirth in the face of insurmountable obstacles. Struggling to survive in a dying ocean is a major problem for every marine organism and for us as well given that we rely on the ocean for food. The ocean determines global temperature patterns, and we swim and sail in it for fun. We clearly overfish, dump waste, and generally do not take care of our planet, so I want to make the Pacific giant octopus look like a warrior struggling to survive. Octopuses are supremely intelligent and adaptable, often communicating through their color. When they are threatened many species, especially the Pacific giant,

will change colors, turning bright red, warning of their strength and angry disposition. I want you to feel like the octopus struggling to find food, struggling through rubble to be at home.

Clay Freeman (Mentor: Elliott Jones, Alison Stinely)

Painting Concentration

As an artist I aspire to create art that has a focus on the appreciation of beauty and intrigue. I make paintings that invoke curiosity while maintaining a sense of realism through my use of detail and composition. For years I have developed my skills as an artist to enhance my ability to create images on a level of realism that complements my desire to provide fine images that also narrate a message that is relatable to the viewer. The subjects that I use vary from series to series as my imagination and focus travel along with my development and desire to try new things. Landscapes are always very beautiful images to recreate and can be manipulated to be more interesting, but portraits and the human figure hold my interest as an artist. One of the greatest motivational forces in my art is to capture the various forms and emotions that can be found in the human figure. The piece I created entitled Separation is constructed around the portrait of a young woman. I try to make the portrait as realistic and free of brush strokes as possible, so there are no distortions of the imagery. The various layers combine to complete the piece and to invite the viewer to accept the image for what they see before them. The images seen in Separation are painted to represent space between the subject and the viewer, but the space is separated by a pane of steamed glass that becomes a catalyst for communication. This steamed glass is painted to include a lot of detail and information between the viewer and the subject, enhancing the total depth of the image and providing the narrative for audience engagement. This engagement is the subtle accent to what the viewer is given and defines the emotion of the piece.

Jenna Garcia (Mentor: Elliott Jones, Alison Stinely)

Drawing Concentration

Both of these pieces are an expression of my faith story portraying a sampling of people I have learned from. My main goal was to tie together each portrait with influential quotes from the Bible, Romans 10:14-15 and Matthew 14:27-31, to convey a simple message: what it means to be the hands and feet of God. People reach other people in mysterious ways. Reflect on your life and question what you think you know. Each portrait was designed from a photograph of the people in my life: my mother and my boyfriend. The illusion of water was created freely from a reference and was established to represent the differences between the two. The portraits were drawn simplistically using pastels on Rives BFK at a large scale to add an element of grandiosity.

Kerry Kilburn (Mentor: Dianne deBeixedon, Jane Ritchie)

Metals Concentration

The three works I present here derive from my interest in the natural cycles of life, death, and renewal, both as they play out in the natural world and as they play out, metaphorically, in our own lives. "Goddess" is a full-body necklace of copper and brass with three repousse and chased pendants. Each represents one face of the goddess, or stage in the cycle of life: youth, maturity, and old age—leading, ultimately, to death, decay, and rebirth. We follow the same pattern, in many ways, throughout our own lives. Just as the sun powers this cycle for the entire earth, we also need a source of renewal to keep it turning in our everyday lives. "Elemental 1" and "Elemental 2" pay homage to my favorite source of renewal—the natural beauty of the central and northern California coast. "Elemental 1," a raised copper bowl, references the seaweed that blankets the rocks along the shoreline; "Elemental 2," a fold-forged fine silver pendant and Roman chain, symbolizes the adjacent mountains and their rich and varied forests. When I designed these pieces, one of my primary goals was to learn as many different metalworking techniques

as possible. But I gained more than just an understanding of foundational techniques. Because I am primarily a photographer, making this work required that I add new perspective to my artistic vision and stretch my creative boundaries to encompass a medium whose nature, tactility, dimensionality, shape, color, and more all need to be considered as part of the design process. I look forward to seeing how this expanded vision manifests itself, not only in future metalworking projects, but in my photography as well.

Carlie Kinzey (Mentor: John Roth)
Sculpture Concentration

My research stems from the desire to participate in performance arts, while creating an appropriate way to document the work. By definition, performance art is a time-based art form that typically features a live presentation to an audience or to onlookers (as on a street) and draws on such arts as acting, poetry, music, dance, and painting. Performance art cannot live without the artist, but I am exploring ways that incorporate sculpture and video, so that the artifacts can be solitary. Typically, artists do not document their performances because they do not believe it translates well. The genuine emotions during a performance cannot be recreated by the use of a video. For this reason, Allan Kaprow, a famous performance artist, said, “[Performance art] cannot be sold and taken home; they can only be supported.” I agree with this statement; however, I like to think of my process in three stages. The first stage is Fluxus-Style Planning, the second stage is The Performance, and the third stage includes a video recording of the performance projected onto a sculpture that is associated with stages one and two. I call stage three Sculptural Performance Documentary. Stages one and two are commonly practiced, but I wanted an artwork that can live without the artist. My influences are performance artists Allan Kaprow and Marina Abramovic. Allan Kaprow is known for his Happenings in the Fluxus Art Movement. Marina Abramovic is known for exploring the relationship between performer and audience, the limits of the body, and the possibilities of the mind. After combining all of these ideas, I am eager to continue researching Sculptural Performance Documentaries.

Beth Lowney (Mentor: Elliott Jones, Alison Stinely)
Drawing Concentration

My objective is to bring attention to the controversy that surrounds public breastfeeding in American society. I use image transfer to layer the law and research statistics about breastfeeding below the image of a mother nursing her baby. My goal is to make viewers pause to consider how they feel about women breastfeeding in public and why they feel this way. The title, *VA Code 32.1-370*, refers to the legal statute in Virginia that protects women who breastfeed in public. The mixed media diptych is made on two wood panels that separate the mother from her infant at the place where the breast should connect them. The mother’s image is drawn in black and white while the infant is brightly colored in pastels which further divides them. Beneath the image, I have printed VA Code 32.1-370, but the words are obscured. The Virginia Department of Health has a public breastfeeding card that can be downloaded and printed at home. Women are advised on the state website to carry this card with them whenever they nurse in public just in case they are harassed or threatened with arrest. These cards are seen around the frame on all sides to protect the breastfeeding mother. Other statutes printed around the mother and child include indecent exposure laws.

Krissie Moore (Mentor: John Roth)
Sculpture Concentration

Today, both men and women suffer inequalities depending on their various status quos. However, we cannot distract from the fact that women have had small say throughout much of history. It continues to unnerve me that aside from women making strides in politics and business, we are still denied control over our own bodies and undermined in our abilities. Feminist art continues to rise; some strongly representational, some abstracted. I find ways to balance abstraction and representation through my material so that it can bring light to my subject without distorting its own physical characteristics. Keeping the natural properties of the medium is important to the rawness of the concepts. The main wood frame of the sculpture is African mahogany and was chosen for the red hue to represent a womb. The inner piece is Douglas fir to stand alone as a phallic or fetal figure and was chosen to contrast the red hue of the outer layer. The copper represents the cage and tension of the obstruction from what is ours (as women) to control. Copper tubing was the best option to keep each representational line straight for a cage-like effect. The finish is intentional to allow the wood to speak for its natural self. The shape of the wood was both an additive and reductive process. Due to the height and width, there was varied trial and error in order to carve, cut, and shape the curvature. This piece was my own opinionated statement with open conceptualization. A major influence for this piece came from Barbara Hepworth's sculptures. My intention to the audience is to perceive it in their own way, agree or disagree with the concept, and find room to open their minds to different ideas. Whether the conversation that strikes comes from a negative or positive perspective, my work has completed its purpose by evoking a feeling which is necessary for us to continue to practice equality.

Danielle Page (Mentor: Kenneth FitzGerald)
Graphic Design Concentration

My mural piece, "The Sequence," was inspired by the famous pop and graffiti artist, Keith Haring. I've adopted his spontaneous style throughout the years of my art experience. However, while growing up in Richmond, Virginia, I was also inspired by various murals across the campus of Virginia Commonwealth University. My observation of these murals firsthand has also contributed to my artistic style, making it more of a contemporary representation of Haring's art. I appreciate using vibrant colors, bold lines, portraits, and combining body elements. When I design these murals, I take life traumatizing experiences and make them into a series. The reason for choosing this sensitive topic is because the audience will personally receive a glimpse of the artist's thoughts, ideas, and feelings. It also helps the audience understand the artist within her greatest expressive form. This mural is a representation of a friend who suffered through a toxic relationship that included drugs, obsession, and even abuse. I wanted the audience to experience this emotional rollercoaster vicariously. The materials I used for this mural were wood, sharpie, and acrylic paint. I chose the medium wood because it was an abstract representation of the turbulent relationship that was experienced. The reasons for choosing sharpies and acrylic paint are rational and clear. These materials stand out and show contrast. I enjoyed painting this mural tremendously, and I am grateful that my professor, Kenneth Fitzgerald, selected me to participate in this Undergraduate Research Symposium.

Alexander Prior (Mentor: John Roth)
Sculpture Concentration

Charlessley Rountree (Mentor: Greta Pratt)
Photography Concentration

I created this series to start the conversation about how we view our personal identity. It all started with my professor asking me how I view my own identity. I couldn't give a definite answer, so it got me thinking. Do other people know their own identity? The series not only affects the subjects who were questioned on their identity but also causes the viewer to question the idea of identity as well. For my process I gave my subjects a canvas and marker and asked them how they identify themselves using a word or picture. Many were confident, but others felt overwhelmed because they never thought about their own identity. The artist who inspired this series were Gillian Wearing, Diane Arbus, and Rineke Dijkstra. Every interaction with the people in this series has been interesting and has shown that identity can be just as complex as the people themselves.

Steven Rubino (Mentor: Kenneth FitzGerald)
Graphic Design Concentration

This project is meant to prove that I can create and build as many things as possible around 1 central design element or work—in this case being the apparel created. Outside of just the clothing, I have also created the advertising for this brand spanning several dozen individual graphic elements meant to accompany the clothing, as well as modeled shoots meant to mimic fashion photo shoots. And, of course, this all is presented on the brand's website as well as social media. The graphic elements used in adverts and in the apparel itself is a culmination of found imagery curated from books at thrift stores or from libraries as well as imagery found from the public domain resources at the Library of Congress. The themes of these works revolve around the need to bring attention to often neglected feelings or vices—things many people choose to ignore in their own lives or the lives of others, hence 'Focus Onpain'. My typography has a constructivist influence as does my use of imagery. However, no specific artist influences these works. Initially, this was only meant to be a school project, but there was enough interest on social media that it became apparent this apparel could be sold online. While I created these designs for just myself, the outcome was a product that others became interested in. This, I feel, is a margin of success.

Morgan Strong (Mentor: Elliott Jones, Alison Stinely)
Painting Concentration

Drawing from my childhood, I reimagined and modernized what traditional Catholics saint portraiture would look like with the unlikely and seemingly undeserving black youth as the subjects. Objectives I wished to achieve were dynamic use of light and shadow through portraiture while perfecting my painterly/impressionistic technique. Artistic influences which inspired my work were generally any and all religious portraiture of the seventeen and eighteen hundreds.

Jasmine Swift (Mentor: Greta Pratt)
Photography Concentration

Royal Mini Mart is a tiny place, but the community is loud and vibrant. I titled this series, "Thank You for Shopping Here," because that's how I attributed my experience while shooting. Photographing the daily life of the people at Royal Mini Mart allowed me to understand that I wasn't just photographing people but a community. What led me to photograph this particular store was that I originally did not see it as a welcoming, loving community but the very opposite. I knew that my mindset was one of someone casting judgement before ever stepping foot inside. As I pushed through my fear, I soon realized that this was not a place to be afraid of but rather to experience. Each person, like all people, had a story. I noticed those who I photographed. I did not have to push hard to take their photo. They all seemed curious in what I was doing and why I was doing it. I felt proud to take each photo of each person that would let me; I felt as if they were allowing me to see them as they were. The message that I wanted to convey was simple: I wanted to photograph a place where I felt there would be a strong connection with the people and the atmosphere that surrounded those people. When I first saw Royal Mini Mart I knew this was the location for my series. When you look at the faces in these photos and the interior and exterior of the store, you want to know more about these individuals and the history of this Mini Mart; I used my camera as a tool to reach that goal. I want my viewers to feel invited into the Royal Mini Mart the same way I felt.

Jazlin Washington (Mentor: Greta Pratt)
Photography Concentration

My ambition is to show the narrative of marginalized people. I want to diverge from the expected version and show themes of persistence and existence. I want to comment on the ongoing struggle of freedom that stems from slavery, Jim Crow, and a system built on inequality. I want to capture the essence that emerges amidst struggle and show that even through it all we belong. I am inspired by the photographic works of Carrie Mae Weems, Hank Willis Thomas, and Lorna Simpson. This series reflects the perseverance of African Americans throughout black history in America. Each photo was taken at a different plantation in Virginia. The contrast of the modern clothing and antebellum architecture shows the parallel of where history was and where it is now. We overcame, and we will not stop.

POSTER SESSION

8:00 AM-12:30 PM (Learning Commons, Atrium)

Visualization of Molecular Structures and Images with Augmented Reality Goggles

Angelos Angelopoulos, Timothy Baker, and Jing He (Mentor: Jing He)

Computer Science

Augmented Reality (AR) is an emerging method of visualization that has potential applications in many fields such as education, healthcare, and communication. We have created an augmented reality molecular visualization tool that allows the viewing of molecules such as proteins with the Dreamworld AR glasses. Molecules are displayed in a virtual environment in which the user can look around while wearing AR glasses. We have implemented rotation of molecules and 6 DOF camera movement for navigation. A molecule is represented using the COLLADA ISO-standardized 3D interchange format that is ported from UCSF Chimera, a popular molecular viewer. The purpose of this project is to make emerging technology accessible for K-12 STEM education.

Research in Pathogen Biology: A Course-Based Undergraduate Research Experience (CURE)

Sara Asher, Zachary Bement, Christian Blaise, Hannah Cummins, Rebecca Ferrara, Josh Moreno, Erika Parker, Anna Phan, Delonta Price, Tori Rose, Sara A. Simmons, and D. Gauthier (Mentor: David Gauthier)

Biological Sciences

Course-based Undergraduate Research Experiences (CUREs) involve classes of students in addressing real-world research questions without pre-defined outcomes. BIOL380/381, Research in Pathogen Biology, was designed as an advanced CURE for 300-level Biology students at ODU, and examines population genetics of two ticks, *Amblyomma maculatum* (Gulf Coast Tick) and *Amblyomma americanum* (Lone Star Tick) in Southeastern Virginia. This work will compare genetic connectedness of populations of these ticks within SE Virginia, as well as with their historical ranges in the US southeast. The work is of relevance to the broader scientific community and to the public, as both of these ticks harbor human pathogens.

The Perceived Health Outcomes and Values of College Climbers: Exploring Why They Climb

Chandler Berry, Eddie Hill, James Rice, Rachel Resh, Xihe Zhu, and Peter Ahl (Mentor: Eddie Hill)

Human Movement Sciences

College rock climbing programs have become increasingly popular. Yet, we have very little evidence of the outcomes and value of rock climbing college programs, or understanding the personal preferences of today's college climber. The purpose of this study was to understand the differences in perceived health outcomes and expected attributes, consequences and values among college climbers across campuses. College students from various campuses across the county completed the 32-item Perceived Health Outcomes of Recreation Scale (PHORS) and Means-end of Recreation Scale (MERS). The PHORS and MERS have been used in previous research on National Scenic Trails, and mountain biking areas across the country, but not among climbers. The link was sent to a listserv of colleges and universities outdoor recreation programs. In 2018, 149 climbers from 47 universities participated including Ball State University, University of Tennessee at Chattanooga, Cornell University, and Old Dominion University. Females represented 46% of the sample with a mean age of 22. The ANOVA revealed no significant difference between the six outcomes attained and gender, membership, or climbing type (e.g., indoors). Multiple regression analysis was used to test whether sex and any of the six outcome significantly predicted participants' monthly climbing frequency. The results of the regression

indicated consequences was the only significant positive predictor ($\beta = .30$), explaining about 12% of variances in participant monthly climbing frequency, $R^2_{\text{Adj}} = .12$, $F_{7,133} = 3.59$, $p < .01$.

Image-to-Mesh Conversion Tool (I2MTool) for Image-Driven Simulations

Joi Best (Mentor: Nikos P. Chrisochoides)

Computer Science

Grid Generation is a critical component for many (bio-)engineering and science applications. The goal of my research project is to improve upon the current Image-to-Mesh Conversion tool (I2MTool), created by the Center for Real-time Computing (CRTC), for image-driven visualization. The I2MTool could be proven beneficial in a spectrum of disciplines that spans from Nuclear Femtography and Multiscale Materials and Structures Modeling to Finite Element (FE) analysis for NASA's Computational Fluid Dynamics (CFD) 2030 Vision and Vision 2040 for Integrated Computational Structures Modeling. My project involves the development of visualization techniques to make models in simulations look and react more realistically, which will impact basic research in nuclear physics, aeronautic simulations and health care applications. In this poster, I will present my recent work on the CBC3D Slicer extension and the I2Mtool. CBC3D is one of CRTC's 3D image-driven grid generation software used in Medical Image Computing applications. The CBC3D module has been implemented as an extension within the 3D Slicer package for visualization and image analysis from Harvard Medical School. The CBC3D 3D Slicer extension can generate high quality tetrahedral meshes from brain labeled images. Some features that will be added to the Image-to-Mesh Conversion tool (I2MTool) are: (i) a feature to display a multi-material (or tissue) labeled mesh, (ii) a loading bar to increase the tool's user-friendliness, and (iii) a feature that will allow the user to cut a cross-section of a mesh to view its interior.

Data Analysis of *Myzobdella lugubris* Leech Attachment Sites Inside the Buccal Cavity of Largemouth Bass in Back Bay Wildlife Refuge

Ciara Branco and David T. Gauthier (Mentor: David T. Gauthier)

Biological Sciences

Largemouth bass currently make up a major recreational sport-fishery in Back Bay Wildlife Refuge, located on the southern east coast of Virginia and North Carolina. The Virginia Department of Game and Inland Fisheries (VGDF) has made a major investment and effort in restoring the depleted population of largemouth bass in Back Bay with supplementary stocking efforts from 2009-2014. Concerns for the continuing recovery of largemouth bass arose when the fish were found to be infested with the leech *Myzobdella lugubris*. *Myzobdella lugubris* has also been found to infest largemouth bass in the Currituck Sound, North Carolina, which is connected to Back Bay from the south. Leech attachment sites leave ulcers in the oral cavity of bass that often become infected with bacteria leaving the mouth full of wound-like red scars. After leech detachment, *M. lugubris* begins depositing cocoons on hard surfaces such as blue crabs. The lack of information involving the leech *M. lugubris* increased the concerns for the recovery of the bass as it has the potential to be detrimental to the population. Previous research has been done questioning the effect leeches have on the largemouth bass after attachment and feeding. This research found that the leeches had little to no effect on the largemouth bass; however, it left unanswered questions about the attachment and feeding period as well as the development of the leech. We performed a tag-recapture study of largemouth bass in Back Bay where fish were photographed at initial capture and at subsequent recaptures. Comparison of these photographs can and yield insight into the lifecycle of the leech, *M. lugubris*, as well as the length of time for attachment and feeding that occurs within the oral cavity of largemouth bass. The information found through the

analysis of these photographs can be utilized in determining if *M. lugubris* exploits a secondary host, such as blue crabs, during the early stages of their life cycle.

Optimizing Photon Yield and Angular Frequency Range Through the Use of RF Laser Chirping

Aaron Brown (Mentor: Dr. Balsa Terzic)

Physics

Inverse Compton Scattering occurs when an electron collides with an incident photon and transfers some of its kinetic energy to said photon. For a while now this has been an effective method of generating photons of higher angular momentum for use in many areas of physics, but it is not without its drawbacks, for example ponderomotive broadening. It has been shown that laser chirping is an effective method of mitigating the effects of ponderomotive broadening in Inverse Compton Scattering sources which causes the scattered photons to cover a range of angular frequencies, many of which are not wanted. Producing photons of a desired angular frequency in large numbers is a problem faced in a number of fields of physics. This paper will show that our chirping prescription can minimize the spectral peak width (limit the range of photon frequencies) and maximize the spectral peak height (increase the number of photons of the desired angular frequency). Additionally, this paper will demonstrate how this chirping prescription can provide marked improvement for real world applications where increasing laser intensity is cost prohibitive and ineffective.

High-Force Magnetic Pulling Cytometer for Probing Cellular Mechanotransduction Pathways

Joshua Bush and Venkat Maruthamuthu (Mentor: Venkat Maruthamuthu)

Mechanical & Aerospace Engineering

Cellular domains accrue mechanical fluctuations as a means of communication. The process by which these mechanical forces are transmitted into cellular signals is termed, mechanotransduction. To explore these mechanotransduction pathways we developed a magnetic pulling cytometer for applying localized exogenous forces to a target receptor. We coated a micron-sized superparamagnetic bead such that it will bind to the cell's integrins, the primary receptors responsible for cell adhesion to an extracellular matrix. Using the magnetic pulling cytometer a physiologically relevant force on the order of a few nanonewtons was applied to the bead and thus the cell. In order to determine the forces applied to the cell *in situ*, we utilized traction force microscopy. Cellular responses to the applied force such as the distribution of forces across the cell and changes in the cytoskeletal network or focal adhesions may now be probed further.

Modeling and Control for Agile Aircraft Development

Jarrett Caston and Oscar R. González (Mentor: Oscar R. González)

Electrical & Computer Engineering

The Modeling and Control for Agile Aircraft Development is a program that attempts to develop a model-less controller for aircraft. This work is being done in conjunction with the NASA Langley Research Center. The results of this research will be tested at NASA's 12-ft Low speed wind tunnel. The goal of this work is to initially use fuzzy logic to control an aircraft while its model is learned in flight. Once the model is learned, a controller needs to be designed to more accurately control the aircraft. My research focuses on using the MATLAB MPC toolbox to design a controller that uses the learned model to control the pitch, yaw, and roll of the aircraft. The benefit of the MPC controller over a classical PID controllers is it allows for amplitude and rate constraints to be set for multiple control surfaces. The biggest drawback to the MPC controller is the long processing time. This is accounted for in my research by converting the MATLAB code into MATLAB

executable (MEX) code. Thus far I have been able to confirm that by converting to MEX code, we can decrease processing time by 38%. As of now, the expectation is the controller for the aircraft pitch should be finished soon and the roll and yaw not long after.

Aging Study through Fin Regeneration in Zebrafish

Ashley N. Coffell, Andriana C. Zourou, Regan M. Allen, Megan A. Hept, and X. Nancy Xu (Mentor: Dr. X. Nancy Wu)

Chemistry & Biochemistry

Zebrafish (*Danio rerio*) are an emerging model for studying human aging. Zebrafish share similar senescence patterns and many homologous genes with humans. They also have extensive regeneration capacities, such as the ability to repair heart tissue and regrow entire fins. Their shared biological traits and the capacity for tissue regeneration lend promise to future biomedical research. Yet, as a novel model for gerontology, a better understanding of the relationship between Zebrafish age and the human age equivalent is needed. Zebrafish live a maximum of 66 months, but rarely make it to that age. Using the tMax formula, it may be estimated that one zebrafish year is approximately equivalent to 22 human years. This calculation is supported by anecdotal and observed evidence, however a more substantial correlation is needed. We have studied age-dependent regeneration capabilities of zebrafish by amputation of the caudal fin (tail fin) in different age groups of zebrafish and observation of the rate at which it fully regenerates. We aim to more firmly establish the major life stages of the Zebrafish and understand their unique regeneration capabilities. We will further our research to study the roles which blastema cells play in fin regeneration as well as to find genes and gene products responsible for the changes in regeneration rates and seek out human counterparts to these to design regenerative medicine.

Examining Attitudes About Autism Based on Awareness: A Program Evaluation

Kristen Conner (Mentor: Kristy L. Carlisle)

Psychology

Many people do not have a strong knowledge or general understanding of autism spectrum disorder. Research shows that knowledge of autism spectrum disorder relates to individuals' attitudes towards people with autism spectrum disorder. Specifically, if a person does not have a strong knowledge of autism spectrum disorder, then that individual is more likely to misinterpret/misunderstand behaviors of an individual with autism, which then relates to more bullying and/or social isolation of individuals with autism. Due to children with autism often being misunderstood within school systems and classrooms, raising awareness and increasing knowledge of autism on a school level will benefit the school. Increased knowledge of autism within the classroom will decrease bullying and increase positive attitudes towards individuals with autism. This presentation will focus on the evaluation of a local autism support center that aims to increase knowledge and awareness of autism spectrum disorder. The results of the evaluation show how effective their process of raising awareness and knowledge of autism is effective and what can be done to improve the process. This poster will present data collected from surveys to show that there is a need and a desire for more awareness of autism spectrum disorder. It will also draw from research done at a local middle/high school to determine if students themselves feel a need for autism awareness. The presentation provides recommendations for program improvement, including increased trainings for teachers and students.

Developing a Measure of Internalized Homophobia/Biphobia: Stage 3

Arushi Deshpande, Korena Klimczak, and Jordan Ball (Mentor: Dr. Miguel Padilla)

Psychology

Current research indicates that internalized homophobia is detrimental in sexual minorities (i.e., homo and bisexuals). This occurs when a sexual minority is uncomfortable with their sexual orientation, which impacts physical and mental health. Unfortunately, research has been hindered because of the use of inadequately validated measures of internalized homophobia. The purpose of this research is to develop a measure of internalized homophobia in sexual minorities. Based on the content analysis of the literature and focus groups, new items for measuring internalized homophobia were developed. Preliminary testing of the newly developed items indicates good statistical properties and that minor adjustments are needed. As such, the research will move forward to field testing to finalize the measurement instrument.

Molecular Strain Typing for the Tick-Borne Pathogen *Rickettsia parkeri*

Rebecca Ferrara, David Gauthier, Holly Gaff, Wayne Hynes, Sara Simmons (Mentor: David Gauthier)

Biological Sciences

Rickettsia parkeri is one of a group of bacteria that cause Spotted Fever Group Rickettsioses (SFGR) in humans. Spotted Fever Group Rickettsioses can cause fever, headaches, rashes, muscle aches, and an eschar and some, such as Rocky Mountain Spotted Fever (*R. rickettsii*) can be fatal. *R. parkeri*, which is transmitted to humans by the Gulf Coast Tick (*Amblyomma maculatum*), causes a milder SFGR. In its historic range along the US Gulf Coast and the southeastern US, *R. parkeri* has prevalence of 1-15% in *A. maculatum*. However, in the Tidewater region of Virginia, where *A. maculatum* is a recent invader, prevalence reaches 50-60%. One hypothesis for this disparity is that there are different strains of *R. parkeri* present in these separate areas. Previous studies have not been able to demonstrate strain variation in *R. parkeri*; however, most of these studies have only performed typing at single genes. In this work, we aim to identify additional genetic markers for strain typing of *R. parkeri*. To accomplish this goal, we performed comparative genomics on four complete *R. parkeri* genomes, locating variable regions between strains. This analysis yielded 14 variable intergenic spacer regions and >30 SNP loci. We are currently optimizing primers and PCR conditions for these loci and assessing their variability in *R. parkeri* infected ticks from the Tidewater area. Preliminary data from the DKS-xerC intergenic spacer locus will be presented.

Design of a Nanoparticle Transparent Coating with Selective Spectral Reflection for Building Integrated Photovoltaics

Michael Fishburn (Mentor: Dr. Hani Elsayed-Ali)

Electrical & Computer Engineering

Market appeal for photovoltaic panels in the architecture and construction industry can be improved by achieving a range of selective reflected spectra from the panel. Layers of silica nanoparticles of different sizes may be needed to achieve the range of desired colors while maintaining transparency for the remaining spectra into the photovoltaic panel. Four methods to apply these layers are being researched to include application by spray, rollers, spin deposition and dip evaporation onto microscope slides in the initial phase. Spectrophotometry tests below the ultraviolet spectrum is being used to measure the transmittance and reflected spectra. In the final phase, a variety of photovoltaic devices will be tested to test the energy produced from a standard light before and after coating application. Other successful methods exist to fabricate photovoltaic panels with a desired color; however, the architectural industry requires an approach that is economical and suitable for photovoltaic panels that are already installed. In the current

results, layers of silica nanoparticles have achieved two different colors. Spray application of nanoparticles layers onto a surface is easily achieved; however, further research is needed to refine this method and achieve uniform colors from the reflection of the coating. A Meyer rod is also used to roll on the solution of nanoparticles, ethyl alcohol and polyvinyl. The design work is performed at the Old Dominion University Norfolk campus and the Applied Research Center of Jefferson Laboratory in Newport News, Virginia. Virginia Center for Innovative Technology, Old Dominion University and Face International Corporation jointly fund this project.

The Efficacy of Tick Collection Methods in Southeastern Virginia

Jon Gonzales, Hannah Cummins, and Holly Gaff (Mentor: Dr. Holly Gaff)

Biological Sciences

Tick researchers use two most prevalent methods of collection for active surveillance, flagging and dragging. Flagging is practiced by attaching a cloth to the end of a rod resembling a “flag” and sweeping across the surface of the ground to collect ticks. Meanwhile dragging, a method most commonly used in the northern United States, is comprised of a cloth fixed onto a rod and then dragged like a sled across the ground. Our study aims to find which method is best suited for collection among different species here in Southeastern Virginia. To achieve this we conducted our study at Hoffer Creek, a wildlife preserve in Portsmouth, Virginia, which has both deciduous and non-deciduous trees with a thick understory and banked by a large lake provided us with a perfect representation of Southeastern Virginia’s ecosystem. Three 100 meter transects were set for each scenario where we varied the method (dragging with inspection on the ground, dragging with inspection in a nearby tree, or flagging), type of cloth used (narrow corduroy, wide corduroy, or denim). Each transect was equal effort and ran biweekly continuously over the course of four months from late May to August 2018.

Monarchs Maximizing Access to Research Careers: An Undergraduate Student Training Program Funded by the National Institutes of Health

Alvin Holder, Desh Ranjan, and Elizabeth A Smith (Mentor: Alvin Holder)

Chemistry & Biochemistry

*Monarchs Maximizing Access to Research Careers (M-MARC) Undergraduate Student Training for Academic Research (U*STAR)* supports eligible students' academic and research activities while they train to enter Ph.D. programs in Biomedical Sciences research. M-MARC Trainees begin the program when they are Juniors majoring in Biological Sciences, Chemistry and Biochemistry, Computer Science, or Psychology. They receive excellent financial benefits, exceptional professional training and research experiences, and participate in outreach activities. M-MARC Trainees make exceptional candidates for doctoral program admission and are very strong candidates for the NSF Graduate Research Fellowship, and other discipline specific fellowships. Information will be available about M-MARC eligibility, the application process and specific benefits of the program. Applications for the 2019-2020 academic year will be available and are due on March 1, 2019.

Synthesis, Characterization, and Topoisomerase Studies with a Novel Cobalt(III) Complex Coordinated by an Aromatic Bidentate Ligand and a Thiosemicarbazone

Alvin A. Holder, Delvin Askew, Shayna Sandhaus, Jessa Faye Arca, Michael J Celestine, Floyd A Beckford, Yuk-Ching Tse-Dinh, Stephen J Beebe, and William L Jarrett (Mentor: Alvin A. Holder)

Chemistry & Biochemistry

The need for novel antibiotic drugs is urgent. Tuberculosis (TB) is one of the top ten leading causes of death worldwide, with 1.8 million deaths per year, and the number one killer of people who are HIV-positive. As the war against bacterial pathogens continues, finding novel drugs and drug targets is essential. Topoisomerase IA is a novel and attractive drug target because it has never yet been targeted by antibiotics used clinically. Over the years, cisplatin and its analogues have been used as anti-cancer agents, but other non-platinum metal complexes (e.g., those with copper(II), ruthenium(II), ruthenium(III), vanadium(IV) metal centers, etc.) have been reported to be used in anti-cancer therapy, but not many have been used as antibacterial agents. Interestingly, biomedically relevant cobalt-containing compounds have provided promising results as antibacterial agents. In our contribution to the fight against bacterial infection, a novel cobalt(III) complex, $[\text{Co}(\text{phen})_2(\text{MeATSC})](\text{NO}_3)_3 \cdot 2.5\text{H}_2\text{O} \cdot \text{C}_2\text{H}_5\text{OH}$ **1** (where phen = 1,10-phenanthroline and MeATSC = 9-anthraldehyde-N(4)-methylthiosemicarbazone) was synthesized, characterized; then anti-cancer studies were carried out to ascertain its antitumor potential. Elemental analysis, FTIR spectroscopy, ^1H , ^{13}C , and ^{59}Co NMR spectroscopy, and high resolution electrospray ionization mass spectroscopy were used to determine the structure of complex **1**. In this study, complex **1** was tested for inhibition of bacterial topoisomerase I as well as antibacterial activities. Complex **1** was a very potent topoisomerase I inhibitor that showed an IC_{50} against MtbTopI and EcTopI of 0.8 μM . Complex **1** was able to prevent the growth of *M. smegmatis*, as well as methicillin-resistant *Staphylococcus aureus*.

Synthesis, Characterization, and Topoisomerase Studies with a Novel Cobalt(III) Complex Coordinated by an Aromatic Bidentate Ligand and N-(3,5-bis(trifluoromethyl)phenyl)pyridine-2-thiocarboxamide

Alvin A. Holder, Jasmine Clark, Jimmie L. Bullock, Shayna Sandhaus, Nicholas Evaristo, James A. Knarr, Benjamine Legere, Michael J. Celestine, Yuk-Ching Tse-Dinh, and Stephen J. Beebe (Mentor: A. Holder)

Chemistry & Biochemistry

The need for novel antibiotic drugs is urgent. Tuberculosis (TB) is one of the top ten leading causes of death worldwide, with 1.8 million deaths per year, and the number one killer of people who are HIV-positive. The emergence of multidrug-resistant TB (roughly 20% of new cases in 2015) and even extensively drug-resistant TB is a major cause for concern. As the war against bacterial pathogens continues, finding novel drugs and drug targets is essential. Topoisomerase IA is a novel and attractive drug target because it has never yet been targeted by antibiotics used clinically. Since the clinical success of cisplatin as an anticancer drug in the early 19th century, there has been substantial effort to discover novel metal-based therapeutics. In our contribution to the fight against bacterial infection, $[[\text{Co}(\text{phen})_2(\text{PCA}-\text{CF}_3)_2](\text{PF}_6)_2 \cdot 1.25\text{H}_2\text{O}$ **1** (where phen = 1,10-phenanthroline and $\text{PCA}-(\text{CF}_3)_2 = N-(3,5\text{-bis(trifluoromethyl)phenyl)pyridine-2-thiocarboxamide}$) was synthesized with $\text{PCA}-(\text{CF}_3)_2$ as a mixed ligand. Elemental analysis, FTIR spectroscopy, ^1H , ^{13}C , and ^{59}Co NMR spectroscopy, and high resolution electrospray ionization mass spectroscopy were used to determine the structure of complex **1**. Complex **1** was tested for inhibition of bacterial topoisomerase I as well as antibacterial activities. Complex **1** had an MtbTopI relaxation inhibition IC_{50} value of 55.5 μM when compared to an IC_{50} value of 0.8 μM for $[\text{Co}(\text{phen})_2(\text{MeATSC})](\text{NO}_3)_3 \cdot 2.5\text{H}_2\text{O} \cdot \text{C}_2\text{H}_5\text{OH}$ **2** (where MeATSC = 9-anthraldehyde-N(4)-methylthiosemicarbazone). Complex **1** was able to prevent the growth of *M. smegmatis*, with an MIC value of 0.89 μM when compared to an MIC value of 6.25 μM for complex **2**.

Analysis of Host-Tick Interactions in Virginia

Kelsey Jones (Mentor: Holly Gaff)

Biological Sciences

Ticks are arthropods that require blood from a wide range of vertebrates in order to complete development and reproduction. Some species of ticks will only feed on a specific type or even a single species, while others feed on a wide variety of hosts. Understanding tick host dynamics gives us a better understanding of dynamics of tick populations. This study was designed to identify the average tick abundance and typical tick species found on medium and large sized animals in Virginia. For this study, ticks were collected from a wide variety of animals through donations from hunt clubs, wildlife rehabilitators, pest control professionals, veterinarians, and individual animal owners. Additionally, the ODU Tick Research Team collected ticks from all roadkill found serendipitously. All ticks were frozen and then identified morphologically using standard keys. The results show that ticks from dogs were most likely to be collected during the 8-year study, but deer and black bear had the largest number of ticks per animal. Future research will test these ticks for pathogens and assess the potential role these hosts play in tick-borne disease cycles.

Modulation of BMPR1 α Function for Cancer Immunotherapy

Zuri Jules-Carver, Lauren Browning, Caroline Miller, Colin Simms, and Piotr Kraj (Mentor: Piotr Kraj)

Biological Sciences

Despite increased understanding of how the transforming growth factor- β (TGF- β) regulates T cell functions, the immunomodulatory roles of other members of the TGF- β cytokine family, especially bone morphogenetic proteins, remain largely unknown. We have found that Bone Morphogenetic Protein Receptor 1 α (BMPR1 α , Alk-3) expressed by activated effector and regulatory CD4 $^{+}$ T cells, modulates functions of both of these cell types by promoting generation of adaptive T_R and inhibiting generation of Th17 cells from naive CD4 $^{+}$ T cells. Mice where BMPR1 α is deleted in T cells (BMPR1 α $^{-}$ mice) had a decreased proportion of thymic derived T_R cells. Activation of BMPR1 α deficient (BMPR1 α $^{-}$) CD4 $^{+}$ T cells leads to generation of Th1/Th17-like effector cells expressing high levels of inflammatory cytokines, including IFN- γ , IL-17 and TNF family proteins. Immunization of BMPR1 α $^{-}$ mice induced vigorous inflammatory response and mice were able to better control B16 melanoma tumors. Tumor infiltrate had very few T_R cells and higher proportion of CD8 $^{+}$ T cells compared to tumors in wild type mice. These data demonstrate that TGF- β mediated immunosuppression in the course of tumor growth can be bypassed by inhibition of BMPR1 α signaling. Transcriptome analysis of wild type and BMPR1 α $^{-}$ CD4 $^{+}$ Th cells revealed differential expression of transcription factors, cytokines and cytokine receptors and signaling molecules essential to establish regulatory networks supporting Th17 or T_R cells. This suggests that BMPR1 α is a potential target to augment effector Th cell responses. Effector CD4 $^{+}$ T cells activated by dendritic cells (DCs) expressing BMP inhibitors expressed lower levels of PD1. To block BMPs from acting on T cells, we will use DCs expressing noggin or gremlin that bind BMPs and prevent them from binding cellular receptors. Using DCs modified for immunotherapy to deliver BMP inhibitors will ensure that inhibitors are secreted in close proximity to T cells being activated; moreover, DCs are likely to persist longer than purified proteins. Both noggin and gremlin proteins are not produced by naive and activated T cells and are not produced by RM-1 prostate cancer cell lines. In a complementary approach, we will use a small molecule inhibitor of BMPR1 α – LDN193189 (much more specific than dorsomorphin). The proposed experiments will provide a proof of principle that BMPR1 α can be targeted to modulate immune response and we will determine the sensitivity of effector and T_R subsets to treatment.

Test and Evaluation of Autonomous Vehicles Using Simulated Environments

Thomas Laverghetta and Cierra Hall (Mentor: Jim Leathrum)

Modeling, Simulation & Visualization Engineering

Test and evaluation (T&E) of autonomous vehicles presents a challenge as the vehicles may have emergent behavior and it is frequently difficult/impossible to ascertain the reason for software decisions. Requiring the need for T&E during the complete lifecycle of a vehicle's development and fielding, requiring T&E after deployment due to emergent behavior and software updates. A software framework has been developed to support the development of autonomous software such that it can be tested during the complete lifecycle, migrating through the virtuality/reality spectrum. The paper demonstrates the application of simulated/virtual reality/augmented reality/physical environments to test and evaluate the sense, plan, and act phases of an autonomous system to ensure proper operation with little to no physical activity from the system allowing for safe testing of the system without endangering either the system or the environment. The demonstrations consist of the processes of constructing models for simulating the physical world through various sensors to transpose onto the autonomous software from a virtual environment. The autonomous software cannot distinguish between physical and simulated data; allowing for more fidelity in the testing of the autonomous software in a simulation environment. Then a process for various levels of simulation can be introduced, such that, the testing of the software goes from a fully virtual environment to a fully physical environment ensuring proficient results without compromising safety. Development of VR/AR testing is demonstrated using an autonomous rover at Old Dominion University's Autonomous Modeling and Simulation Engineering Lab.

Immersive Exploration of Large Volume Vector Data

Sean Leonard and Zhanping Liu (Mentor: Zhanping Liu)

Modeling, Simulation & Visualization Engineering

Flow (data) visualization plays a crucial role in a wide variety of areas such as *oceanographic-atmospheric modeling* (for studying ocean currents, hurricanes, tornados, and climate changes), *computational fluid dynamics simulation* (for designing aircrafts, space shuttles, and submarines), and *diffusion tensor imaging analysis* (for exploring numerous neural fibers of human brain and cardiovascular structures), to name only a few, by providing deep insight into the pattern underlying massive *vector* data. There have been many methods for visualizing flows ranging from steady to unsteady and from planar to surface and further to volume, while streamlines (i.e., field lines or flow lines that are point-wise tangent to the flow) remain a straightforward and efficient approach for investigating large steady flows. Dependent on seed positions, streamlines tend to result in either a coarse view or a cluttered image unless effective control is imposed. The latter case particularly incurs poor depth-cueing and view occlusion problems in 3D settings, overwhelming the user with an ocean of information instead of revealing high-level patterns and salient features. Streamline placement seeks to lay out streamlines in such a way that flow structures are sufficiently covered, but with visual cluttering and spatial ambiguity minimized, for ease of perception and understanding. In addition, virtual environments such as 4-wall CAVE, Microsoft HoloLens, HTC Vive, and Oculus Rift may be exploited to enhance the look and feel of a volumetric scene for realistic exploration and interactive analysis of data toward scientific discovery.

Hydrothermal Carbonization of Municipal Solid Waste

Tina Nida, Kameron Janay Adams, and Sandeep Kumar (Mentor: Sandeep Kumar)

Civil & Environmental Engineering

In 2014, the EPA reported that Americans generated over 254 million tons of trash; 57% (landfilled), 16% (incinerated), and 27% (recycled/composted). HTC is observed as a scalable technique to convert wet biomass (e.g. MSW) to carbon-rich solid fuels. HTC offers many advantages as the most efficient process for carbon fixation in solid fuels for a wet feedstock in a short residence time; however, heat recovery and liquid phase (which is 34-45% with organic carbon) recycling are essential to its waste to energy feasibility. Hydrothermal carbonization was conducted on a mixed municipal solid waste feedstock; that which is typically landfilled. Qualitative and quantitative testing was done on liquid and solid phases for the conditions of 280 °C and 10 minutes. Liquid phase will be used in anaerobic digestion for biogas production.

Optimizing Jamming Attacks in Cyber Electronic Warfare Based on Real Time Situational Awareness

Michael Nilsen (Mentor: Sachin Shetty)

Modeling, Simulation and Visualization Engineering

Developing of capability to launch attacks based on situational awareness of the communication environment. Specifically, the capability will corrupt control messages exchanged between base station and mobile device to impair mobile communications. This capability will allow the development of cross-layer attack solutions which leverages and extracts intelligence from communication protocol messages to selectively and stealthily impair mobile communications with low power. The capability will implemented in an integrated SDR and embedded system environment that is portable, ruggedized and mobile. The cross-layer attack capability will involve a passive sniffer which can eavesdrop on the communication between base station and mobile device to extract data link and network layer messages. The messages will be analyzed to extract communication and network information needed to launch low-power attacks on multiple mobile devices. We have instrumented a SDR testbed to fit in a backpack capable of passively sniffing mobile communication and networking protocol messages. The proposed approach will automate the process of extracting communication channels, hopping parameters, network topology by analyzing cross-layer messages. The testbed is equipped with cross-layer attack capability will be delivered. The testbed primarily comprises of four SDRs, four embedded computing devices and associated software. The SDRs would be instrumented with the ability to detect control channels in the region where it is deployed and transmit low power messages to impair the communication between the mobile device and base station.

Toward Unraveling the Mechanisms of “Green” Mechanochemical Reactions

Richard Chen, Mehmet Kerem, and Silvina Pagola (Mentor: Silvina Pagola)

Chemistry & Biochemistry

The mechanical processing of solids, such as milling or grinding powders, often leads to mechanochemical reactions. Mechanochemistry affords “green” synthetic routes avoiding or reducing the use of solvents, thus providing environmentally friendly and cost-effective synthetic alternatives for many materials. The solid-state reactants are usually ground together with small quantities of organic solvents, called “liquid assisted grinding” (LAG). LAG increases the reaction rates, it can yield products from otherwise unreactive mixtures, it increases the products crystallinity, and it selectively leads to crystal structures (polymorphs) of the products, depending on the quantities and physicochemical properties of the liquids used in LAG. Mechanochemistry has been increasingly used in academia during recent years. However, the overall features of the mechanochemical reaction mechanisms are poorly understood, and only starting to be unraveled

often by using in-situ synchrotron X-ray powder diffraction and Raman spectroscopy measurements. In particular, the reasons underlying the above liquid roles in LAG are unknown. Our objectives are: (1) To test an experimental procedure to study the kinetics of two – four mechanochemical reactions for the synthesis of organic charge transfer complexes, using laboratory X-ray powder diffraction. (2) To determine the rate laws and the orders of the reaction with respect of each reactant and the LAG liquid. (3) To determine whether polar LAG liquids must be present in the rate laws for the conditions leading to ionic charge transfer complexes, or not; and (4) To provide research experience to two undergraduate students as part of a PURS project.

Insulin Mediated Blood Flow Response during Pregnancy

Kayla Powell, Leryn J. Reynolds, and Hannah Twiddy (Mentor: Dr. Leryn Reynolds)

Human Movement Sciences

Pregnancy elicits an insulin resistant like state, which appears to be independent of pre-pregnancy health status. The vasculature within skeletal muscle is insulin responsive and insulin mediated vasodilatation of these vessels has been shown to account for up to 40% of glucose uptake. However, it is unknown if impaired insulin mediated vasodilation is a mechanism regulating insulin resistance during pregnancy. Thus, we examined the femoral artery blood flow response via Doppler Ultrasound during an oral glucose tolerance test (75 grams) in 3 pregnant (pre-pregnancy BMI: 26.2 ± 1.7) women and 2 non-pregnant women (BMI: 23.1 ± 4.8). The femoral artery blood flow response was not significantly different between the non-pregnant and pregnant women when examining absolute and percent change to peak blood flow ($p > 0.05$). Thus, in this small pilot study, it appears that insulin mediated blood flow is not regulating the impaired glucose tolerance in pregnant women. However, given that currently in this study we have only recruited 3 pregnant and 2 non-pregnant women, future studies aim to bolster these numbers.

Parenting Styles Moderate the Relationship Between Exposure to Violence and Acceptance of Aggression Among Children

Brooke Puharic, Sarah Ehlke, and Michelle L. Kelley (Mentor: Michelle L. Kelley)

Psychology

Consistent with social learning theory, previous research has shown that exposure to violence predicts children's acceptance of aggression. In addition, parenting styles influence children's acceptance of aggression. Specifically, ineffective paternal parenting style is positively associated with a child's acceptance of aggression. To expand on previous research, the current study examined if mothers' and fathers' parenting styles moderated the relationship between exposure to violence and acceptance of aggression among children. It was hypothesized that children with mothers and fathers who engage in more ineffective parenting styles who are exposed to more violence will report greater acceptance of aggression. Couples ($N = 89$) and their child between the ages of 5 to 18 (Mage child = 11.07, $SD = 3.88$) were selected for the current study. Participants were part of a larger study that examined the longitudinal outcomes of couple's therapy in families in which one or both parents met criteria for a substance use disorder. Each partner completed the Parenting Scale that assessed typical discipline strategies where higher scores indicate more ineffective parenting strategies. The child completed the Exposure to Violence questionnaire (ETV) that measured exposure to community and interparental violence where total higher scores indicated witnessing more violent incidents; children also completed the Normative Beliefs about Aggression Scale that examined the total general and retaliation acceptance of aggression. Hierarchical regression models were conducted to determine if there was a significant interaction between ETV and parenting strategies on acceptance of aggression, controlling for child age. Children who reported more lifetime ETV were more likely to approve of

aggression ($r = .44$, $p < .001$). Fathers' parenting strategies significantly moderated the relationship between ETV and approval of aggression, $F(4, 80) = 10.11$, $p < .001$, $R^2 = .30$). Specifically, children who experienced more ETV and had fathers who reported higher levels of ineffective parenting strategies were more approving of aggression ($b = 3.79$, $p < .001$). However, ETV and approval of aggression were not significantly related for children with fathers who reported more effective parenting strategies ($b = -0.35$, $p = .803$). In contrast, mothers' parenting strategies did not moderate the relationship between ETV and approval of aggression. The current findings indicate that compared to mothers, paternal parenting styles may influence children's approval of aggression. Thus, family therapies should highlight the importance of improving parenting skills particularly among fathers who reside with their children as improving parenting styles may reduce the likelihood of aggression among children.

Effects of Perceptual Separability as Aid Display Format on Operator Reaction Time

Sidney Scott-Sharoni (Mentor: Yusuke Yamani)

Psychology

The current experiment examines whether perceptual separability as a means to present an automated aid's decisional recommendation influences operators' automation usage strategies in a speeded judgment task. In the experiment, participants in a production factory simulation will perform a speeded decision-making task, based on the height of a stimulus rectangle. Aid format will be manipulated using effects of perceptual separability. Perceptual separability is the ability to process properties of a stimulus independently such as color and height information simultaneously. Using a within-subjects design, the aid format will be manipulated between width, an integral property, and color, a perceptually separable property. Decision accuracy and response times will be the dependent measures. Bayesian statistics will be employed instead of null-hypothesis significance testing (NHST) because it provides quantitative information about the strength of evidence either for or against effects of interest, while NHST does not. I hypothesize that 1) performance will be better with assistance of the aid and 2) RTs will be shorter with the color aid than the width aid. Findings of the current study will help guide automation designers to optimize human-automation team performance in speeded cognitive tasks.

The Reliability of the Styku 3D Body Scanner

Blair Silver (Mentor: Patrick Wilson)

Human Movement Sciences

PURPOSE: Waist and hip circumferences are predictors of cardiometabolic health. However, measurements made with a tape measure may lead to more measurement error, especially when different technicians conduct repeat measurements. This study assessed the reliability of the Styku 3D body scanner, as well as determined the smallest change between measurements that's likely to represent real changes in circumferences. **METHODS:** Twenty-one subjects (13 female, 8 male) completed four scans over two visits. On visit one, two scans were performed to assess within-day reliability. The process was repeated on visit two, and the values obtained on the two separate visits were used to examine between-day reliability. Intra-class correlation coefficients (ICC) were used to examine the reliability between the two scans on visit one, and between the first scans on visits one and two. Minimal detectable change values at a 90% confidence interval (MDC90) were calculated: $1.645 \times SD \times \sqrt{2 [1 - ICC]}$. **RESULTS:** A high degree of reliability was observed for within-day waist circumference measures ($ICC=.997$), for within-day hip circumference measures ($ICC=.995$), for between-day waist circumference measures ($ICC=.988$), and for between-day hip circumference measures ($ICC=.987$). The corresponding MDC90 values were 0.347, 0.482, 0.694, and 0.778 inches, respectively. **CONCLUSIONS:** The Styku 3D body

scanner is a reliable method of measuring waist and hip circumferences. In practical terms, a change of at least 0.35-0.78 inches between measurements is needed to be confident that a real change has occurred.

The Effectiveness of the Alcohol Abuse Prevention Program on Young Adult Sailors

Cara Tonn (Mentor: Frank Scaringello)

Counseling & Human Services

A mixed method evaluation to determine the effectiveness of the United States Navy Alcohol Abuse Prevention (NAAP) program in decreasing the likelihood of alcohol-related incidents (ARI) among active duty service members age 18 to 24, unmarried, and without children. This cohort has the greatest number of ARIs due to a newfound autonomy and a lack of familial responsibility. The evaluation process incorporated anonymous surveys, volunteer face-to-face interviews, and quantitative data provided by the Drug and Alcohol Prevention Advisor (DAPA) to measure the success of the NAAP program at the squadron level. An analysis of the qualitative and quantitative data obtained concludes that while the program provides comprehensive training to all squadron members and has implemented specific interventions to deter ARIs, the program does not take into consideration the uniqueness of the young adult stage in the life-cycle and the challenges associated with it. During the interview process, 50% stated that while at this command they have incurred an ARI, 25% could be considered heavy drinkers, and 25% could be considered binge drinkers. A majority of interviewees also speculated that a lack of life experience is a major contributing factor to alcohol-related incidents. The challenges associated with the young adult stage of the life cycle presents a problem in tailoring the NAAP program to meet the needs of these sailors. While the DAPA has implemented the required United States Navy specific training, based on the information gathered additional interventions are needed to reduce the likelihood of ARIs within this squadron.

The Impact of Blood Flow Restrictive Exercise on Endothelial Function

Hannah Twiddy, Robbie Pittman, Leryn Reynolds (Mentor: Leryn Reynolds)

Human Movement Sciences

Blood flow restriction training (BFRT) is the occlusion of blood flow during resistance exercise to elicit greater levels of skeletal muscle hypertrophy while lifting lower weights than compared to standard resistance training. Research has shown BFR with low intensity resistance training to elicit similar results in skeletal muscle hypertrophy when compared to higher intensity resistance exercises. Although results indicate similar levels of skeletal muscle hypertrophy, no research has examined the effects of BFRT on blood vessel health. The purpose of this study is to examine the effects of blood flow restriction training on endothelial function. Subjects were 10 healthy males, 23.3 ± 1.4 years, 27.3 ± 1.2 kg/m² who regularly participate in resistance training exercises at least 2 times per week. Subjects performed 3 sets of bicep curls at 30% of their 1 repetition maximum to failure with a blood pressure cuff maintaining 80% arterial occlusion pressure in the right arm. Endothelial function was assessed by flow mediated dilation performed before, immediately after, and one hour post BFR exercise. Preliminary data indicate BFR exercise does not alter endothelial function in healthy males. Although this is a small pilot project and future studies aim to increase the sample size in this study. Further, efforts will begin to explore plasma markers of vascular health following blood flow restriction exercise.

Reconstructing Surface Water Carbonate Ion Concentration Changes in the Eastern Equatorial Pacific Using B/Ca Ratios in *Globigerina bulloides* Over the Past 25 Kyr

Lenzie Ward, Matthew Schmidt, Jennifer Hertzberg, and Franco Marcantonio (Mentor: Matthew Schmidt)

Ocean, Earth & Atmospheric Sciences

Although the eastern equatorial Pacific (EEP) is a source of CO₂ to the atmosphere today, it remains unknown how this may have varied in the past. Recently, Lovely et al. (2017) showed that dust fluxes to the EEP increased during the cold Heinrich Events of the last glacial cycle, likely due to an intensification and southward shift of the Intertropical Convergence Zone. As a result, biological productivity in the EEP increased, possibly increasing carbon burial in the deep Pacific. The goal of this project is to determine whether the increased biological productivity stimulated by dust fertilization and enhanced upwelling caused the EEP to switch and become a sink for atmospheric CO₂ during cold stadial events. To do this, we measure B/Ca ratios in the planktonic foraminifera *Globigerina bulloides* from core MV1014-17JC (00°10.83'S, 85°52.00'W; 2846 m water depth) as a proxy for past changes in seawater [CO₃²⁻]. To calculate the carbonate chemistry of EEP surface waters, we also measure Mg/Ca ratios as a proxy for sea surface temperature and δ¹⁸O as a proxy for sea surface salinity using *G. bulloides* from the same intervals. We then estimate past changes in alkalinity from the modern salinity:alkalinity relationship in the EEP. Our results provide a 25,000-year record of surface water PCO₂ and determine when the EEP acted as a source or sink for atmospheric CO₂. Increased understanding of the EEP's influence on atmospheric pCO₂ across abrupt climate events will help modelers better predict the region's response as the global climate continues to warm.

Banned Book- The House on Mango Street

Carmen Wright (Mentor: Dr. Alicia Defonzo)

English

My proposed podcast will be a further examination of the banned book "A House on Mango Street" by Sandra Cisneros. I would like to further explore the various reasons the book has been challenged specifically as it relates to race. My focus will be on the impact the book has had both negative and positive on students and parents alike, while touching on my experience as a Hispanic woman who read the book in middle school. I will explore the Arizona bill introduced in 2010 banning all Hispanic American studies and literature across the entire state of Arizona and how this impacted books such as 'A House on Mango Street'. In addition to the challenged book my research will focus on the reasons behind the Arizona bill and the effects a ban such as this can have on different groups. My podcast will examine the pros and cons of the book and why schools should either continue or discontinue "The House on Mango Street."

ORAL PRESENTATIONS

9:00-10:00 AM (Learning Commons: Room 1310)

Biological Sciences 1

Chair: Dr. Holly Gaff, Biological Sciences

Elevational Range Expansion Limitations of *Ixodes affinis* in Virginia

Michelle Bershers and Holly Gaff (Mentor: Dr. Holly Gaff)

Biological Sciences

Ixodes affinis is a hard-bodied tick known to be a vector of *Borrelia burgdorferi*, the causative agent for Lyme Disease in humans. While this tick species do not bite humans, it is similar in many ways to *Ixodes scapularis*, such as shared hosts and habitats, that can result in the amplification of shared pathogens. *Ixodes affinis* was first reported in North Carolina in 2010 and southwestern Virginia in 2011. The Old Dominion University Tick Research Team started a project in 2012 to track the movement of this species in Virginia by conducting a comprehensive annual survey of 57 counties and cities. The project ended in 2017 with the discovery of *I. affinis* across Virginia and into southern Maryland. In analyzing this survey, we found that the locations in which *I. affinis* were found were restricted to the Coastal Plain and did not extend onto the Piedmont. Our original hypothesis was that the topographic break in elevation known as the Orangeburg Scarp is serving as a barrier to the westward expansion of *I. affinis*. In 2018, samples were taken from sites along the Orangeburg Scarp along both sides and at a variety of elevations. The results obtained from 2018 however, did not show a link between elevation and the presence of *I. affinis*. Further research is needed to understand the limitations of movement of *I. affinis*.

Prevalence of *Babesia microti* in *Ixodes* Ticks in Southeast Virginia

Zachary Bement, Holly Gaff, and Wayne Hynes (Mentor: Wayne Hynes)

Biological Sciences

Human babesiosis is a disease caused by an infection with the protozoan pathogen, *Babesia microti* (*Ba. microti*). In the USA, *Ba. microti* is primarily transmitted through the bite of an infected *Ixodes scapularis* tick. *Ixodes scapularis*, as well as the related vector, *Ixodes affinis*, are well established in southeastern Virginia. Though *Ixodes affinis* are not reported to bite humans, it is possible that they play an important role in maintaining pathogens like *Ba. microti* in their sylvatic cycles. This study examines the prevalence of this pathogen within Ixodid ticks collected in southeastern Virginia. Questing *I. scapularis* and *I. affinis* were collected by flagging various field sites from 2010 to 2017. The prevalence of *Ba. microti* in the ticks was determined by screening extracted DNA from the collected ticks, using real-time PCR. Positive results were then confirmed by sequencing mitochondrial 18S rRNA. This study shows that *Ba. microti*-infected ticks are present in Virginia, where human babesiosis is considered a rare disease. In addition, *Ba. microti* was detected in *I. affinis*, where it has not previously been reported. The interactions between the two tick species that share hosts may be driving an increase in the natural reservoir of tick-borne pathogens like *Ba. microti*. Further research and active surveillance is needed to understand the contribution of *I. affinis* to the ecology of *Ba. microti*.

Prevalence of *Borrelia miyamotoi* in *Ixodes scapularis* and *Ixodes affinis* in Southeastern Virginia

Anna Phan (Mentor: Dr. Wayne Hynes)

Biological Sciences

A recently characterised bacterium, *Borrelia miyamotoi*, has potential to become a major issue in Virginia as it is not endemic to the commonwealth. This bacterium is transmitted through the bite of an infected *Ixodes scapularis* and causes *Borrelia miyamotoi* disease. Another related vector, *Ixodes affinis*, have not been reported to bite humans, but they may play a role in maintaining *B. miyamotoi* in its sylvatic cycle. Both *I. scapularis* and *I. affinis* are well established in southeastern Virginia, and this study determines the prevalence of *B. miyamotoi* within these ticks. Questing *I. scapularis* and *I. affinis* were collected by flagging various field sites from 2010 to 2017. The presence of *B. miyamotoi* in the ticks was determined by performing real-time PCR on DNA extracted from the collected ticks. This study shows that *B. miyamotoi* is present in low densities within both *I. scapularis* and *I. affinis*, especially in recent years. Host sharing between the two ticks may lead to an increase in *B. miyamotoi* infections due to increased reservoirs of the pathogen. Further research is needed to continue the active surveillance of *B. miyamotoi* in *I. scapularis* and *I. affinis* and sequencing of *B. miyamotoi* positive tick DNA to confirm positives.

9:00-10:00 AM (Learning Commons: Room 1311)

History: World War I and "Ordinary" Americans

Chair: Dr. Maura Hametz

Personal lives and concerns are often at the core of popular interest in history. Students in the Senior Seminar in History in Spring 2018 explored perspectives on World War I through the lens of the experiences of participants at home and abroad. Students will present a snapshot of their research and the outlines of the overall research project, the use of archives, and the ways in which we remember and study the past will be explored in this panel.

Prohibition and World War I

James Wilkerson (Mentor: Dr. Maura Hametz)

History

Women and Mothers in Remembering World War I

Kaeleigh Farthing (Mentor: Dr. Maura Hametz)

History

9:00-10:00 AM (Learning Commons: Room 1306)

Art History 1: Power of the Feminine through Space and Time

Chair: Holli Turner, Art

New World, New Woman: Willem de Kooning

Kim Hardy (Mentor: Vittorio Colaizzi)

Art

With *Woman I* (1950-52), Willem de Kooning radically altered the depiction of the female form by aggressively applying paint and combining figurative and abstract approaches. De Kooning's contemporaries offered conflicting interpretations of *Woman I*, attributing the painting to misogyny, the influence of Gertrude Stein, Mexican sculpture and even de Kooning's femininity.

This paper considers the evolution of de Kooning's craft up to and including *Woman I* and argues that it is the product of an era of violence and instability. As WWII profoundly changed society, de Kooning re-examined the representation of the female form to reflect the precariousness of the era.

A Hidden Motive: Royal Egyptian Women Defining Power Through Art

Heather Nygaard (Mentor: Dr. Jared Benton)

Art

Art played a key role in establishing power for ancient Egyptian royalty. Their art portrayed an idealized reality, with carefully formulated imagery that fit the needs of rulers to maintain order and substantiate their right to rule. The artifacts they left behind provide insight into their lives and customs, but is it possible to glean truth from imagery based in falsehoods? Ancient Egyptian women in power as queens and kings used various approaches to their portraiture to establish their positions as rulers by stepping away from the traditional formula with an intention to fit their individual needs and ambitions.

Turning the Tide: Saint Catherine of the Wheel and Plague Intercession

Heather Nygaard (Mentor: Dr. Anne Muraoka)

Art

Many saints can be associated with art created for, during, or after the plague in the Renaissance and Baroque periods. Some saints that appear in Renaissance and Baroque imagery have obvious links to plague, such as Saint Roch while other famous plague saints have a much less direct connection, such as the martyr Saint Sebastian. Saint Catherine of Alexandria appears frequently throughout the period, but scholarship declaring her a plague intercessor is rare—if it exists at all. Nevertheless, Saint Catherine of Alexandria belongs in the narrative of plague saints, as she is undoubtedly an intercessor of plague.

Disrobing the Obscurity of *Het Pelsken*

Ireland O'Hare (Mentor: Anne Muraoka)

Art

In 1638, the Flemish artist and diplomat Peter Paul Rubens dedicated his painting *Het Pelsken* or *The Little Fur* to his second wife, Helena Fourment. This sensual, yet intimate full-length portrait captures the painter's wife in an untraditional and highly erotic manner. Many scholars tend to focus their interpretations on the sexual aspects of the painting. Instead, this paper serves to reveal the additional indicators throughout *Het Pelsken* that allude to Rubens' own response to the religious conflicts and gender ideas prevalent in Northern Europe during the late sixteenth and early seventeenth centuries.

9:00-10:00 PM (Learning Commons: Room 1313)
ePortfolio Panel Discussion 1
Chair: Dr. Megan Mize, Center for High Impact Practices

Making Your Learning Visible and Marketable: ePortfolio as a High Impact Practice

Makayla Wray, Kevin Martinez Rivera (Mentor: Dr. Megan Kathleen Mize)

Writing for College Success

As an emerging pedagogical tool and practice, ePortfolios are often at the intersection of anxieties regarding digital technology and active learning practices. Common misconceptions include accusations of ePortfolios as: just a flashy new tech thing, just "more work" to seem innovative, a distraction from "real" course content, and are just for assessment. However, as a high impact practice (HIP), ePortfolios offer students an active opportunity to exercise agency within the constraints of the university system, crafting for themselves a synthesized narrative of their learning experiences. Hubert, Pickavance, and Hyberger (2015) describe the active nature of ePortfolios: "When students build their e-portfolios, they also enact a shift from being a consumer to being a producer of their own education. They become learners with agency." As the "meta" HIP, ePortfolios should: set high expectations for performance, capture a diversity of experiences, offer opportunities for interaction with peers, provide a central vehicle for constructive feedback, demonstrate an investment of time and effort, capture structured reflection, showcase real-world applications of knowledge and skills, and, above all, serve as a public display of competence. Student panelists will discuss how the experience of building, maintaining, and revising their ePortfolios have exposed them to some of these opportunities, as well as the impact it has had on their learning process and preparation for life beyond ODU. As a result of this panel, the audience should have a better understanding about the active and on-going nature of ePortfolios, as well as their potential long term value for students.

10:15-11:15 AM (Learning Commons: Room 1310)

Biological Sciences 2

Chair: Dr. Robert Rose, Biological Sciences

Oral Manifestations of Lyme Disease and the Dental Community

Corey Bafford (Mentor: Dr. Holly Gaff)

Biological Sciences

Lyme disease presents through numerous oral manifestations. These symptoms are often overlooked and not well understood by many within the dental field. This study looks to identify common oral manifestations of Lyme disease in conjunction with the level of education that dentists and dental professionals receive on the disease. The study also aims to identify gaps in knowledge by assessing knowledge and perception, and highlight the need for further dissemination of educational material on oral manifestations of Lyme disease to the dental community. The study uses two techniques to reach these goals: literary review on case studies and primary peer reviewed articles, as well as a survey of local dentists in the Hampton Roads area. These techniques are intended to help gain a better understanding of the formal education experienced by dentists, as well as continuing education programs received in the dental community on the topic of Lyme disease. These efforts will establish a baseline for the degree of knowledge and formal education that the dental community receives on Lyme disease. This, in conjunction with identifying oral manifestations of Lyme disease, illustrates the need for further research and education on the topic.

Exploring Questing Behavior Differences of *Ixodes scapularis* Nymphs

Hannah Cummins, Jon Gonzales, and Holly Gaff (Mentor: Holly Gaff)

Biological Sciences

Borrelia burgdorferi is the causative agent of Lyme disease and is transmitted by the tick species, *Ixodes scapularis*. In Virginia, Lyme disease is more common in the northern and western portions of the state than in the southeastern portion. Little is known to explain this variation, but it is hypothesized that southeastern *I. scapularis* nymphs quest lower in the vegetation. In this study, *I. scapularis* nymphs from the Hampton Roads area and Northern Virginia area were placed in self-contained arenas in a wooded area and observed in the morning and evening two days per week for twelve weeks. An additional hypothesis investigated the effects of age on questing behavior of *I. scapularis* nymphs. It was found that population origin did explain variation in observed level of activity, and as hypothesized, the northern population was found more active. The old and new populations were not significantly distinct in activity. These results indicate a difference in geographic risk of Lyme disease based on *I. scapularis* behavior, and thus those who live in the western and northern portions of Virginia do have a greater risk of encountering an *I. scapularis* nymph and thus contracting Lyme disease.

Tracking Potential Hosts of *Amblyomma maculatum* through Wildlife Cameras

Amanda DeVleeschower, Alexis White, and Holly Gaff (Mentor: Holly Gaff)

Biological Sciences

In the United States, tick-borne diseases are the most common vector-borne diseases threatening both human and animal health. In 2010, established populations of *Amblyomma maculatum* were found in both Hampton Roads and Northern Virginia. Little is known about the animals that serve as hosts for *A. maculatum* ticks in Virginia, as the majority of these ticks collected by researchers have been collected by flagging. To identify potential hosts in habitats where *A. maculatum* populations are established, we set up wildlife cameras in three locations: Mutton

Hunk Fen Natural Area Preserve, Mackay Island National Wildlife Refuge, and Rappahannock River Valley National Wildlife Refuge. Two cameras were set at each location: one in *A. maculatum* preferred habitat (open grassy areas), one in a nearby habitat where *A. maculatum* are rarely found (wooded area). Wildlife camera data were collected throughout the month of June at all three locations. Using the photos from the wildlife cameras, we were able to count the frequency of animals photographed at each location. By identifying host count differences between *A. maculatum* habitat and *A. maculatum* free habitat, we can narrow down the list of potential hosts of *A. maculatum*. The most commonly found animal was the white-tailed deer (*Odocoileus virginianus*), and there were more deer in the *A. maculatum* free habitat at two of the three sites.

10:15-11:15 AM (Learning Commons: Room 1311)

Humanities and Education

Chair: Dr. Megan McKittrick

Harry Potter and the Chosen Family: A Banned Book Podcast

Erin Eckert (Mentor: Alicia DeFonzo)

English

According to the American Library Association, *Harry Potter* was number one on a list of the most banned and challenged series of books between 2000-2009 in libraries and public schools across the nation. “Occult themes” has historically been the most cited reason behind the challenges, leading to multiple instances of removal and censorship. However, this podcast pilot examines the banning of the *Harry Potter* series on the lesser known grounds of “anti-family themes”. The segments presented first considers the assumed definition of “family” and it’s relation to nuclear family ideology. With that definition established, the host continues by proposing examples in which *Harry Potter* could be read as anti-family. Conversely, examples in which *Harry Potter* exemplifies standard family values will also be presented by incorporating research into the structure of multiple family units within the series such as the Weasleys, Blacks, and Dursleys. Continuing into the length of the podcast, the host challenges the assumed definition of “family” by integrating the idea of the “chosen family”. By incorporating independent research and in-text scenes, the host proposes ways in which the novels reject their “anti-family” oppositions by choosing to focus on arching themes of “love vs. hate”, “good vs. evil”, and overcoming hardship to establish familial bonds. In doing so, the host aims to convince listeners that the learning outcomes and opportunities awarded by the *Harry Potter* series outweigh any potential harm that the novel has been claimed to cause.

Climate Change Game Communication

Ashleigh Hannah, Kate Bradley, Carl Scheider, Jakiyla Gamble, and Adam Lane (Mentor: Megan McKittrick)

English

The purpose of this study is to determine the effectiveness of climate change communication, specifically, how effective the game, *Game of Floods*, portrays the impact of coastal flooding to a general audience, namely university students, so participants are able to understand the implications and risks of climate change conditions, i.e. rising sea level resulting in coastal flooding. As a tabletop, role-playing game, *Game of Floods*, is currently used by resilience practitioners (including government and city officials) in train-the-trainer events across the nation. Participants are able to identify the key stakeholders involved in coastal resilience, the

definition of risk defined by city planning officials, and the primary adaptation strategies a city can adopt to enhance coastal resilience and protect against flooding. In completing the usability testing at Old Dominion University, it is clear that from this single introduction to *Game of Floods* and its instructional powerpoint presentation, there is a major impact on the transfer of climate change knowledge from this educational medium to each participant. According to the results of the post-test survey, *Game of Floods* is able to effectively influence climate change communication to participants, thereby expanding its potential use as an educational tool to a wider audience.

Hosting Triathlons on a College Campus: Perceived Health Outcomes and Satisfaction

Taylor McIntosh (Mentor: Eddie Hill)

Human Movement Sciences

Regardless of their tremendous growth (USA Triathlon, 2014), emerging lifestyle sports such as triathlons have received very little research attention. The Perceived Health Outcomes of Recreation Scale (PHORS) is theoretically grounded in Driver's (1998) benefits of leisure. The Means-end of Recreation Scale (MERS) reflected Gutman's (1982) means-end theory. The scales have been used in previous research on National Scenic Trails, rock climbing, and mountain biking. The current study examined the health outcomes, values, and satisfaction among participants in a college campus triathlon. This was the sixth year for this event; it is a "super sprint" triathlon including a 400-yard pool swim, a six mile bike around the campus, and a 5k run through campus. Participants completed the 26-item PHORS and Means-end of MERS online via Qualtrics. Of the 98 participants, 55 completed the survey. The sample was 57% male; 58% Married; 90% Caucasian; 33% had served Active Duty Military; and 80% employed full-time. Eighty-four percent participants indicated this event contributed to a healthy lifestyle, 84% said they would recommend this event, and 78% indicated they would do this event again. Many participants from the 2017 pilot study indicated their motivation for participation was that included their entire family. As multisport continue to grow and our society embraces health and wellness as a lifestyle, triathlon has the ability to create significant positive benefits for our youth and adults.

Game of Floods: Water Is Coming

Madison Perry, Andrew Lindren, Lily Daniels, and Michael Neczyporuk (Mentor: Megan McKittrick)

English

Through user experience testing and observation of player interactions, we examined the potential for a game to serve as a vehicle for risk communication and knowledge transmission. Our subject of study, *Game of Floods*, is a role-playing tabletop simulation game with the goal of educating participants on the threats climate change poses to coastal cities, with a specific focus on the drastic implications of sea level rise and increased rainfall. This game was originally designed by city planners in Marin County, California as a tool for public outreach regarding sea level rise adaptations (including, but not limited to seawalls, levees, and beach restoration). Currently, *Game of Floods* is used by resilience practitioners like the Urban Sustainability Directors Network and FEMA to replace traditional forms of communication in "train-the-trainer" workshops for city planners, local officials, and other professionals. Since coastal flooding is an issue which touches the lives of every member of a low-lying coastal community, every citizen is arguably a primary stakeholder, so our research explored the game's viability when played by non-professionals. Our study included brief pre-/post-gameplay surveys administered to volunteer game participants solicited voluntarily from Old Dominion University. We used grounded theory and inductive thematic analysis to draw conclusions from the data which ultimately support the use of *Game of Floods* as a tool for community education and outreach.

We also maintain that Game of Floods and other games of its kind represent a compelling new avenue for the development of literacy in topics outside the professional backgrounds of participants.

10:15-11:15 AM (Learning Commons: Room 1306)

Art History 2: Making Meaning: Reinterpreting Art through Form and Iconography

Chair: Holli Turner, Art

Gods and Goddesses in the Garden: Roman Mythology and the Iconography of Flowers

Sarah Bulger (Mentor: Dr. Jared Benton)

Art

Private gardens were central in elite Pompeian houses. Although scholars have recognized the importance of gardens and cult activity to Pompeian domesticity separately, they have overlooked the reflexive relationship between these two institutions. Through a combination of Classical texts and modern floral morphologies, I identify flowers painted in Pompeian gardens and their significance to certain deities. The flowers painted on garden walls in Pompeii are not simply decorations, but invocations of gods and goddesses important to domestic worship.

The Sacred and Profane in the Work of Michelangelo: His Ultimate Defeat and Greatest Reprisal

Kayla Everett (Mentor: Dr. Anne Muraoka)

Art

Michelangelo Buonarroti was an Italian sculptor and painter that consistently posed both sacred and profane themes within his work. These conflicting themes led to the early failure of *Bacchus*. Although scholars have acknowledged that this plagued Michelangelo throughout his life, they do not explain how this manifested visually into his art. This paper argues that Michelangelo painted *The Drunkenness of Noah* in the Sistine Chapel as a response to this loss. Michelangelo was both angry and ashamed over his *Bacchus*, which is expressed in the fresco through the examination of the artist's mental state, education, and the story of Noah.

The Kimono Connection: The Common Thread Between Fashion and Print

Deborah Moses (Mentor: Agnieszka Whelan)

Art

To many in the West, the Japanese kimono is still an alien garment viewed only through the lens of exoticism. Its representation in Edo period *ukiyo-e* prints, however, reveals a complex connection between the visual arts, textiles and commercial demand. Although scholars have recognized the relationship between the design of kimonos and pattern books of Edo artists, the role of *ukiyo-e* prints in shaping high-end kimono fashion has not been studied. This paper explores images of the kimono in the floating world, kabuki plays and erotica, and shows how they led the development of new dyes, printmaking techniques and were a spur for innovation therein.

Conduit of Earth and Sky: Tatlin's Tower

Deborah Moses (Mentor: Vittorio Colaizzi)

Art

In 1919, the newly formed Soviet Union asked Vladimir Tatlin to design its capital building. The resulting design was literally revolutionary: a revolving building that would serve as governmental headquarters, newsroom, and media center. Tatlin's *Monument to the Third International* was

deemed impossible to build and continues to elude architects to this day. While it is usually seen as a Constructivist Tower of Babel, this presentation proposes that Tatlin's Tower could be better understood as a sophisticated machine that constantly condenses, recycles, and distributes the wishes of the people through the government and back out into the populace.

10:15-11:15 AM (Learning Commons: Room 1313)

ePortfolio Panel Discussion 2

Chair: Dr. Megan Mize, Center for High Impact Practices

The More You Know: ePortfolios and Reflection

Joshua Dewar, Kayla Davis, Heather Nygaard (Mentor: Dr. Megan Kathleen Mize)

Writing for College Success

Eynon, Gambino, and Torok (2014) claim, "Learning is both an active and reflective process. Though we learn by doing, constructing, building, talking, and writing, we also learn by thinking about events, activities and experiences. ... Reflection then is the vehicle for critical analysis, problem-solving, synthesis of opposing ideas, evaluation, identifying patterns and creating meaning...". Though many educational experts advocate for the increased use of reflective practices in higher education, it is often difficult to create a consistent vehicle for such reflection to occur, repeatedly and over time. However, ePortfolios, when designed intentionally, can offer just such an opportunity for learners to reflect on what they have done, what they have learned from such experiences, and how they might apply this knowledge to future events. This reflection, which is an integral part of the integrative learning that the modern university strives to cultivate, can foster synthesis between seemingly disparate courses and extra and co-curricular activities. Furthermore, reflection can have a professionalizing impact, as it prepares students to consider how they might market their university experiences and skills to employers and graduate school committees. This presentation will offer student perspectives on their use of reflection within various genres of ePortfolios, including a course specific ePortfolio, a discipline-specific ePortfolio (Communication or World Languages), and a program-based ePortfolio (LeADERS). Thus, this panel traces the ways in which reflection can shape a student's understanding of their own experiences and the ways in which such knowledge will translate to their life beyond the university.

11:30 AM – 12:30 PM (Learning Commons: Room 1310)

Chemistry

Chair: Dr. Jing He

Deep Learning Real-Time Adaptive Physics-based Non-Rigid Registration for Accurate Geometry Representation of Brain in Modeling Deformation During Glioma Resection

Angelos Angelopoulos and Nikos Chrisochoides (Mentor: Dr. Nikos Chrisochoides)

Chemistry and Biochemistry

The Physics-based Non-Rigid Registration (PBNRR) framework allows for accurate real-time medical image registration and geometry representation of the brain in modeling deformation during glioma resection. Existing adaptive PBNRR (APBNRR) shows promise in being able to be utilized in time-constrained image-guided neurosurgery operations, but the issue of determining patient-specific input parameters to allow for optimal registration remains an open problem. We present a deep feedforward neural network that can predict sets of possible optimal or suboptimal input parameters that lead to a low Hausdorff distance of the registered image from the preoperative image. The neural network is trained on output produced by over 2.6 million retrospective APBNRR executions consisting of an almost exhaustive parameter study using cloud computing on 13 patient cases spanning from partial to excessive tumor resection. By utilizing the neural network, we can greatly reduce the parameter space that needs to be evaluated with APBNRR in order to achieve optimal results, and initial experiments have been very promising.

Separation of Sub-Image Entities in Cryo-Electron Microscopy Density Maps by Clustering

Peter Scheible, and Jing He (Mentor: Jing He)

Chemistry and Biochemistry

Cryo-Electron Microscopy (cryo-EM) is a biophysical technique to produce 3-dimensional electron density maps. Existing methods identify points involved in secondary structures of proteins from a cryo-EM density map at a medium resolution, such as 5-10Å. Due to the close proximity of multiple secondary structures in the density map, computational analysis is needed to identify and separate the secondary structure entities in such maps. We use a modified form of the DBSCAN (Density-Based Spatial Clustering of Applications with Noise) clustering algorithm to establish clusters based on spatial and non-spatial proximity. Our current method works well in regions that have clear separation between them. Our future work aims to separate structures in close proximity based on proximity in electron density values, the expected geometrical shape of secondary structures, and the spatial density. By separating the secondary structures into clusters, we can identify sub-regions of the 3-dimensional image that belong to different types of secondary structures, such as α -helices and β -sheets.

Study of Effects of Dopamine on Embryonic Cardiovascular Development in Zebrafish

Andriana C. Zourou, Megan A. Hept, Krishna Raut, and X. Nancy Xu (Mentor: Dr. X. Nancy Xu)

Chemistry and Biochemistry

Zebrafish share genetic similarities to human and have served as an effective animal model to study a wide range of biological processes in human. Dopamine is a neurotransmitter that plays a central role in brain functions. However, the role of dopamine in the development of cardiovascular system and heart function is less clear. In this study, we used a transgenic zebrafish with a cardiac protein (Flk1) fused with green fluorescence protein (GFP) that enables us to directly visualize the Flk1 cardiac protein, and developing cardiovascular system in developing zebrafish embryos, and studied the effects of their development in the presence of various concentrations of dopamine. We characterized the dependence of heart rates, hatching and

phenotypes of developed zebrafish upon the concentration of dopamine *in vivo* in real time using optical and fluorescence microscopy. Our results show the high dependence of cardiovascular development and heart function of developing embryos upon the concentration of dopamine.

11:30 AM – 12:30 PM (Learning Commons: Room 1311)
LGBTQA: A Queer Walk Through History: Researching Norfolk's LGBTQ Past
Chair: Cathleen Rhodes

It Takes a Koch to Stir Things Up: How One Man Affected Change for the LGBTQ+ Community

Krista Brant (Mentor: Cathleen Rhodes)

LGBTQ+

This presentation explores change and its importance to marginalized communities. At a time when gays and lesbians were persecuted and oppressed by the vast majority of society, James V. Koch, the sixth President of ODU, made the decision to act on his belief that all people should be treated equally by being one of the first university presidents in Virginia to include sexual-orientation in ODU's anti-discrimination policy. This was the first of many efforts he made to treat LGBTQ+ people the same as everyone else. This research focuses on the accomplishments of President Koch, on the methods and unique aspects of his position as a university president, and how those aspects enabled him to promote these changes. By conducting a thorough search of archived newspapers, obtaining President Koch's personal perspective through an interview, and consulting secondary sources I discovered connections that could further impact similar changes in the future. I will discuss how this type of research is vital to the possibility of change and even more vital to the communities these changes affect.

Blast from the Past, the Late Show of Norfolk: Researching and Understanding Local LGBTQ+ Space

Ashlyn Brown (Mentor: Cathleen Rhodes)

LGBTQ+

Queer spaces are immensely important as they offer a safe space for the LGBTQ+ community to decompress from heteronormative society. In the fall 2018 I conducted research on the Late Show, a local LGBTQ after hours club that operated in the 1990's era. The research process primarily included conducting archival research in Our Own, Norfolk's gay newspaper from 1976-1998, and collecting personal experiences from those that attended the Late Show during its run. This presentation will explore the importance of the Late Show as part of local LGBTQ+ history and examine the differences between traditional research, and the research I conducted for the Queer Walking Tour of Norfolk, a project that works to preserve local queer history by uncovering historic queer spaces.

A League of Our Own: LGBTQ+ Sports Leagues as Queer Spaces

Lexie Nobrega (Mentor: Cathleen Rhodes)

LGBTQ+

Visible queer spaces are vital to the LGBTQ+ community, providing a safe and inclusive environment for queer people to gather and express themselves. During the fall 2018 semester I conducted extensive research on the rise of LGBTQ+ sports leagues and the Mid-Atlantic Amateur Softball Association (MAASA), Norfolk's first gay softball league that was established in 1985. The process relied heavily on archival research in Our Own Community Press, Norfolk's gay newspaper which ran from 1976-1998, and an interview I conducted with Michael Holcombe, original Vice Commissioner of MAASA. I completed this research for the Queer Walking Tour of Norfolk, an

ongoing academic project that preserves Tidewater's queer history. In this presentation I will discuss my research process, the history of the league, and how LGBTQ+ sports leagues around the world have challenged homophobia and heteronormativity in major league sports.

Norfolk's Gay Information Hotline: Uncovering a Hidden Milestone in the LGBTQ+ Community

Aiyana Roll (Mentor: Cathleen Rhodes)

LGBTQ+

This presentation will explore the research methods used in examining the importance of Norfolk's Gay Information Line, a hotline that operated throughout the 1980s and 90s, as part of The Queer Walking Tour of Norfolk, an academic/community effort to uncover and preserve local queer history. Much of the information gathered for this project was found through archival research of Our Own Community Press, Norfolk's gay newspaper from 1976 to 1998. The Gay Information Line was a direct and primary source of LGBTQ+ information during its time, and is a vital piece of local LGBT history. Very little information is available to the public about the hotline; therefore, there is a lack of knowledge about the subject or analysis of its role in the community. This presentation will discuss research methods and the process of uncovering information about the hotline and will explore the importance of archival research, personal interviews and testimonies, and the role that research plays in recognizing marginalized histories.

11:30 AM – 12:30 PM (Learning Commons: Room 1306)

Art History 3: Ways of Seeing: Vision and Gaze in Art

Chair: Holli Turner, Art

A Mortal Gaze: Desco da parto Production and the Plague

Sarah Bulger (Mentor: Dr. Anne Muraoka)

Art

In early Renaissance Italy, painted wooden birth trays, or *deschi da parto*, were common gifts presented to mothers for the successful birth of a child. It is not a coincidence that the earliest known *desco da parto* dates from the 1370s following the devastating outbreak of the Black Death. Scholars have analyzed *deschi da parto* and plague imagery separately but have not examined how the symbolic and allegorical imagery on *deschi da parto* functioned as protection from the plague. In Renaissance Italy, gazing upon images painted on *deschi da parto* provided protection from the plague for mothers and their children.

In the Midst of Life We Are in Death

Madeline Keller (Mentor: Dr. Anne Muraoka)

Art

This paper argues that Peter Bruegel the Elder's *The Peasant and the Birdnester* functions as a satirical *memento mori*. Although scholars have identified the painting as a *memento mori*, they neglect to address the satirical qualities, which is the primary and most important vehicle through which Bruegel drives his message. The Peasant urges the viewer to laugh with him, as the Nest Robber is unaware of his impending death. Instead we laugh at them both, because the Peasant is also about to die. Suddenly we realize that we too are just one step from our own demise.

Edward Hopper: Putting the "Real" in Surrealism

Heather Nygaard (Mentor: Dr. Vittorio Colaizzi)

Art

Although Edward Hopper is traditionally cast as a realist painter, there are far more layers to his paintings than can be restricted to that genre. The truth is that Hopper vexes our need to classify things—he does not fit neatly into one specific movement. Edward Hopper utilized realism as a vehicle to explore surrealistic themes of subconscious thought and emotion in a way that is eerily familiar and recognizable to the audience, and in doing so, engages with a more savage surrealism that heightens the viewer's emotional experience.

Sexual Healing: Saint Sebastian During the Plague

Heather Thurston (Mentor: Dr. Anne Muraoka)

Art

Saint Sebastian's cult flourished shortly after the plague outbreaks that shook Europe in the fourteenth century. Questions abound regarding Sebastian's plague imagery: why did he become so popular, and more importantly, why is he portrayed in such an erotic way? This paper argues that the fetishization of Sebastian during the Italian Renaissance can be explained by examining his suffering during his life, his defeat of death and passionate martyrdom, and his relation to both Apollo and Christ himself.

11:30 AM – 12:30 PM (Learning Commons: Room 1313)

ePortfolio Panel Discussion 3

Chair: Dr. Megan Mize, Center for High Impact Practices

Curating Your Digital Identity: ePortfolios as a Process

Pamela Washington, Morgan Xenos, Triniti Fennell, and Dr. Megan Kathleen Mize (Mentor: Dr. Megan Kathleen Mize)

Writing for College Success

Advocates for ePortfolios often stress their ability to provide a vehicle for creating and curating learners' academic and professional identities. Yet it is vital to recognize the rhetorical nature of such digital compositions. Hubert, Pickavance, and Hyberger claim, "When students compose e-portfolios.... they build the architecture of their ideas and make decisions about how they want to represent them hierarchically. Students make connections across various assignments and courses and, more importantly, decide how those connections ought to be displayed." Yet scholarship tends to focus on the final, public facing product, obscuring the process that leads to a robust public portfolio. However, most students cannot produce a lasting, sophisticated identity in a multimedia, digital environment over night. In practice, ePortfolios are a process-driven genre; when done effectively, students are encouraged to constantly revisit and revise their presentation of self as represented in the ePortfolio. As such, this presentation will explore the scaffolded nature of ePortfolios, with students representing the spectrum of experience, from the nascent ePortfolio user beginning to develop an archive, to the intermediate ePortfolio creator beginning to hone her narrative of expertise, to the advanced ePortfolio author in the midst of restructuring her website to reflect her new graduate student identity. As a result, the audience will witness the ways in which ePortfolios can and should evolve over time, leading them to understand ePortfolios and digital identity as an on-going curation process.