ECU Graduate School

East Carolina University currently offers 71 master's degree programs, through our 11 colleges and schools. In addition, we offer 13 research/doctoral programs, 6 professional doctoral programs (AuD, DMD, DNP, DPT, EdD, MD) and hold the distinction of being classified among the Doctoral/Research Universities by the Carnegie Foundation. ECU is constantly striving to meet the evolving needs of our students, the people of North Carolina, the United States, and the world by providing educational, research, and outreach programs designed to address the challenges and opportunities of the 21st century.

[https://gradschool.ecu.edu](https://gradschool.ecu.edu)
About 3MT

The Three Minute Thesis (3MT) is a research communication competition that challenges master's and doctoral students to present a compelling oration on their research endeavors in just 3 minutes to a non-specialist audience. The first 3MT was held at the University of Queensland in 2008 with 160 graduate students competing. Enthusiasm for the 3MT concept has grown and its widespread implementation by universities has led to the development of an international competition. Today, the 3MT competition has grown to over 600 universities across more than 65 countries worldwide. East Carolina University (ECU) is excited to host its sixth annual 3MT event.

3MT Rules:
Each presentation will be judged on comprehension, content, engagement, and communication. Each presentation is limited to a 3-minute maximum and competitors exceeding 3 minutes will be disqualified. Presentations are considered to have commenced when a presenter starts their presentation through movement or speech. Although a presenter is allowed to have a single static PowerPoint slide (No slide transitions, animations or 'movement' of any description are allowed), no additional electronic media (e.g., sound and video files) or props (e.g., costumes, musical instruments, laboratory equipment) are permitted. All presentations are required to be spoken word (e.g., no poems, raps, or songs) and commence from the stage. The decision of the head judge and moderator is final.

3MT People's Choice:
Each member of the audience can vote for their favorite presenter by selecting them on the ballot. Voting ballots will handed out at the beginning of the heats. We ask audience members to submit only one People's Choice ballot.

3MT Departmental Cup:
The Department Cup is given to the Department that has the three highest scoring presenters during the first round of heats.

Thank You

The 3MT Committee would like to extend a warm thank you to all who participated and attended the 2022 East Carolina University Three Minute Thesis Competition. Without your generosity and expertise, this event would not have been possible. We sincerely appreciate your time and effort in making this event a success!

Please do not forget to view out website for any information on this and future 3MT events at https://gradschool.ecu.edu/awards/3mt/
Order of Events

1:00 pm | Opening Ceremony | Ballroom A
1:15 pm – 2:30 pm | 3MT Heats
Heat 1 – Ballroom A
Heat 2 – Ballroom B
2:30 pm – 2:45 pm | Networking & Snack Break
2:45 pm | Award Ceremony | Ballroom A

People’s Choice Awards

Please use the provided ballot to select your choice for the best presentation today!

We will collect the ballots after the final presentation just before our 15-minute break!

Department Cup

This award is presented to the department whose students submissions score the highest!

Grand Champion

Our judges scores will be used to select the Grand Champion and 2nd Place award winners today!
Dental Proteomics and Sex Estimation

Presentation 1 – Heat Assignment 1
Student: Ceara Nicholson
Department: Anthropology
Mentor: Dr. Megan Perry

Abstract: Bioarcheologists face limitations when estimating the sex of skeletal remains because the morphological differences of the skull and pelvis essential to sex estimation are most accurate after the individual matures. However, sex estimation can now be estimated using dental proteomics, by which the sexually dimorphic amelogenin proteins (AMELY and AMELX) in human tooth enamel are analyzed to estimate the biological sex of the deceased. My project uses dental proteomics to assign a sex estimate to 8 control samples of known sex and 16 previously sexually indeterminant subadult individuals from a commingled burial of a 19th-century cemetery in Hisban, Jordan. Following the acid etching protocol developed by Stewart et al. (2017), dental enamel is collected and analyzed using mass spectrometry to identify the presence of amelogenin proteins. If the AMELY peptide associated with Y chromosomes is present, the individual is likely male; if only AMELX peptides associated with X chromosomes are present, the individual is likely female.

This project aims to determine if there is a greater mortality risk depending on biological sex in children in 19th-century Jordan. Previous analysis of the sample population found high rates of metabolic disease, including vitamin D and vitamin C deficiency, in subadults dying between 6 months and two years of age. I will use the proteomic sex estimation data to identify any sex-based mortality bias in this sample of infants under 2 years of age that died with evidence of active vitamin C deficiency (scurvy). Since metabolic diseases are closely tied to diet and socio-cultural practices, this project is an excellent opportunity to understand this community’s biological and social determinants of infant morbidity and mortality.

Thank You to the Many People Who Helped Us!

Judges

Susan Eckert
Director of Student Services
School of Dental Medicine

Stacy Stanford
Assistant Dean of Students and Care Team Coordinator
Dean of Students Office

Toya Jacobs
Diversity and Inclusion Program Manager
Office of Equity and Diversity

James Coker
Assistant Dean
Graduate Admissions and Enrollment Management

Jennifer Bonner
Associate Director
Student-Athlete Academic Services

Kristopher Arnold
Senior Advancement Officer
Division of University Advancement

Graduate School Support

Marquerite Bond
Tania Alvarez
Kelsey Simpson
Anja Burcak
The Graduate School
In search of the elusive Black Rail

Presentation 2 – Heat Assignment 1

Student: Bailey Kephart
Department: Biology
Mentor: Dr. Susan McRae

Abstract: The Eastern Black Rail is one of the rarest marsh birds in North America. Increased anthropogenic development and habitat fragmentation has resulted in rapid population declines for this sparrow-sized rail, which has led to its uplisting in 2020 to 'Threatened' under the Endangered Species Act. To effectively manage populations, it is critical to investigate Black Rail habitat requirements. Cryptic and secretive, they are notoriously difficult to observe directly. In this study, we combine traditional survey methods with more-recently developed passive monitoring methods to observe the effects of prescribed burn management on Black Rails breeding in Eastern North Carolina. Traditional surveys count audible responses to broadcasts of species-specific calls. Motion-sensitive trail cameras and autonomous recording units (ARUs) allow us to monitor this species during their nesting and molting periods when they are less likely to call. Prescribed burns are conducted by agency partners in managed marshlands along the Atlantic Coast. We will test the efficacy of fire management for producing suitable habitat.

Same Same but different... in Protein Function

Presentation 3 – Heat Assignment 1

Student: Gita Gajjar
Department: Biochemistry and Molecular Biology
Mentor: Brett Keiper

Abstract: Translation Initiation: Key to understanding Protein Synthesis

Germ cells contain germ granules composed of mRNA cap-binding proteins (eIF4E), their interacting proteins (4E-IP), DEAD-box helicases (VASA), RNA binding proteins, polyadenylated mRNA and miRNA that are required to regulate the synthesis of protein during gonad development. However, C. elegans hermaphrodites first produce sperm when ovum transcripts are repressed and then switch to ovum production where sperm transcripts are preserved in a state of dormancy modulating the germ cell fate. Though at present, how the germ granule mRNA dormancy is controlled on a molecular level is poorly understood. Using sucrose polysome gradient profiles, Mass-Spectrometry, Immuno-Precipitation and fluorescent microscopy, analysis of C. elegans germ granules, we find that translation is differentially regulated by the isoforms eIF4E (IFE-1 and IFE-3) by forming unique mRNP complexes each. IFEs are modulated by interaction with repressive binding proteins 4E-IPs (IFE-1 by PGL-1 and IFE-3 by IFET-1). IFE-1 is known to have an important role in spermatogenesis and IFE-3 isoform plays a role in switch from spermatogenesis to oogenesis. Phenotype analysis of C. elegans deletion mutants of IFE-1 and IFE-3 both show changes in gonad development biology. Functional analysis in translational assay show that these proteins interact with differential transcript pool during germ cell development. We are currently investigating the functional role of these cap-binding proteins together with an RNA helicase VASA (C. elegans homologGLH-1) and their interaction hierarchy for transcript binding to regulate from dormancy in the germ granule to translation activation. Given the generality of the phenomenon of granules in cells, our work provides important and novel insights into the fundamental post-transcriptional regulatory mechanism in granules for translational regulation.
**Small Acts of Commemoration**

Presentation 4 – Heat Assignment 1

Student: McClean Pink  
Department: Anthropology  
Mentor: Megan Perry

**Abstract:** A Comparative Analysis of Mortuary and Domestic Artifacts from Petra’s North Ridge  
Interpreting the use of material culture in mortuary contexts provides an intimate view of social identity of both the deceased and mourners in ancient societies. However, the material remains of mortuary practices throughout the Nabataean Kingdom in Jordan have not been systematically investigated. Comparing the material culture between contemporary mortuary and domestic contexts allows for preliminary characterization of uniquely mortuary material culture, and highlights objects that have a dual purpose within both spaces. This study focuses on portable material culture from two 2nd century BC to 1st century AD contexts within the capital city of Petra: at least three domestic complexes and five rock-cut shaft chamber tombs. Through this comparative analysis of the small finds, we found that coins, lamps, figurines, grinding stones and items of personal ornamentation are found in both mortuary and domestic contexts. However, they differed in abundance or in the case of jewelry, material. Additionally, items including game pieces and coffin studs are specific to mortuary contexts, while specific household items like spoons are only found in domestic contexts. Therefore, this research provides insight into not only formation processes of these contexts, but also a glimpse into meanings of the material objects they contain.

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**It’s time for a new adventure**

Presentation 5 – Heat Assignment 1

Student: Ashwinee Mehta  
Department: Computer Science  
Mentor: Dr. Nic Herndon

**Abstract:** While dentures contribute an important role in restoring the dental and facial structure, facial aesthetics are an equally important consideration during the restoration of a patient with missing upper, lower, or both upper and lower teeth for elevating the treatment outcomes. Each denture is tailor-made for every patient, meaning the dental technician takes the impressions and measurements of the patient to make a perfect functional fitting denture. The current denture design workflow does not systematically include the aesthetic factors, patient’s pre-treatment facial shape and in-progress denture design visualizations, instead relying on discussing mockups with the patients during appointments. This results into waiting for the final denture fitting on the patient to evaluate the final denture aesthetics. In this research, we plan to develop and validate some facial aesthetic proportion techniques that are used in the current denture design workflow. Given a frontal image of a person with missing teeth or a collapsed face, the proposed method will automatically generate an image of the patient, with teeth, while restoring the patient’s face shape. This will assist the dental technicians to choose the best aesthetically fitting denture model, its size and position based on the current state of the face. Towards this goal, the method will automatically identify several facial landmarks, classify the patient’s facial shape for easy selection of the denture model, and automatically create a three-dimensional denture design by using the patient’s frontal and side-view images, as well as images captured from inside of the mouth. The goal of the research is to streamline the denture design process by considering the facial and teeth aesthetics, to enable denture-in-progress visualizations that avoid the endmoment denture refinements, with a simple graphical user interface that is easy to use by dental technicians.
Poisonous Parents Put to the Test

Presentation 6 – Heat Assignment 1

Student: Michael Reynolds
Department: Biology
Mentor: Kyle Summers

Abstract: Among the amphibians, there are countless reproductive strategies and many degrees of parental care. The mimic poison dart frog Ranitomeya imitator invests a large amount of parental care into its offspring and is the only known monogamous frog. It raises its tadpoles in phytotelma, the small pools formed inside plants and tree hollows. Parents will feed their young with trophic eggs and defend their pools from other frogs until the tadpoles reach metamorphosis. Tadpoles are provided with protection and nourishment, but what happens if the phytotelma begins to dry? Our research is interested in the parental care response of these frogs to decreasing water levels in their breeding pools. For this lab experiment, captive breeding pairs of frogs will be separated into two experimental groups: one with breeding pools of a stable water level and one with breeding pools of a decreasing water level. We will use video cameras to record parental presence around the breeding pools and compare the amount of time parents with stable breeding pools spend feeding and attending to their tadpoles to the amount of time parents with drying breeding pools spend feeding and attending to their tadpoles. Our hypothesis is that parents with tadpoles in a breeding pool of a lower water level will spend more time caring for their tadpoles than parents with tadpoles in stable breeding pools. This research will provide a better understanding of the parental care plasticity of these unique frogs and grant us a better idea of how populations of these frogs may respond to the desiccating effects of climate change.

Biomarker discovery in multi-omics datasets using tensor decompositions

Presentation 7 – Heat Assignment 1

Student: Farnoosh Koleini
Department: Dual degree Data Science and Chemometrics
Mentor: Dr. Paul Gemperline

Abstract: In this study, we want to use our recently developed method on the colon cancer dataset to do cancer subtype classification. Our aim is to detect specific disease biomarkers (multi-omics features) in this dataset. We recently developed a powerful method, combining ANOVA simultaneous component analysis (ASCA) and Tucker3 models to explain high-dimensional data. In this strategy, we use ASCA and Tucker3 modeling to analyze a multivariate dataset with an underlying experimental design (Blue Crab dataset). By comparing the spaces spanned by different model components we showed how the two methods can be used for confirmatory analysis and provide complementary information. ASCA was used to determine the statistical significance of experimental factors and their interactions in the blue crab dataset. Also, we demonstrated the novel use of ASCA to analyze the residuals of Tucker3 models and determined that the original reported model was insufficient to fully describe the experimental factors in the dataset. Increasing the model complexity to more factors removed the last remaining ASCA detectable structure in the residuals. Bootstrap analysis of the core matrix values of the Tucker3 models showed that additional triads of eigenvectors were needed to describe the remaining structure in the residuals. Also, we developed a new simple, novel strategy for aligning Tucker3 bootstrap models with the Tucker3 model of the original data so that eigenvectors of the three modes, the order of the values in the core matrix, and their algebraic signs match the original Tucker3 model without the need for complicated bookkeeping strategies or performing rotational transformations. Additionally, to avoid getting an overparameterized Tucker3 model, we used the bootstrap method to determine 95% confidence intervals of the loadings and core values. Also, important variables for clustering were identified by inspection of loading confidence intervals. Therefore, considering that tensor decompositions are becoming increasingly important strategies for variable reduction in multiway biomarker discovery and bioinformatics studies. Figure 1 shows Tucker3 model with a sample histogram of a core element. The dataset is elemental analysis of blue crab muscle, hepatopancreas, and gill tissue by ICP-AES.
**Socio-Hydrological Modeling**

Presentation 8 – Heat Assignment 1

**Student:** Mahesh Tapas  
**Department:** Integrated Coastal Science  
**Mentor:** Randall Etheridge

**Abstract:** Climate change has unequal impacts on different parts of the world depending on geographical location. Countries with longer coastlines typically face greater climate change impacts. The coastal region of North Carolina is currently facing two anthropogenic issues: sea-level rise (SLR) and increased eutrophication in the watershed. Human actions have changed watershed characteristics by altering drainage, soil cover, groundwater, and surface water quality. To mitigate the degrading ecosystem health effects, we need better updated policies. These changes in policies might affect farmers’ land use and land management (LULM) decisions. Changes in LULM decisions and agricultural practices have the potential to further affect water quality and quantity in the watershed. This study will investigate how SLR and increased eutrophication, along with farmers’ LULM decisions, interact to affect downstream ecosystem health. These predictions will be helpful for policymakers to understand the effects of different policies on ecosystem health and implement resilient mitigation strategies to improve ecosystem health.

Making such predictions requires an integrative approach to thoroughly understand the interactions of farmers’ LULM decisions, SLR, water quality and water quantity in eastern North Carolina (ENC) through a novel socio-hydrological model. Hydrological modeling via the Soil Water Assessment Tool Plus (SWAT+) will be used to create projections of how LULM alters downstream ecosystems. This study will simulate various SLR and farmers’ LULM decision scenarios to understand how ENC’s hydrological conditions will change and what impacts these changes will have on agriculture and nutrient transport in the Tar-Pamlico River basin. This socio-hydrological model will enable us to model the spatial and temporal changes in nitrate concentration in the Tar-Pamlico watershed. The novel methodology I will develop for the model building can be used in other coastal agricultural regions to understand better spatial and temporal variations in water quality and quantity.

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**An Eighteenth-Century Archaeology of Socioeconomics at Historic Bath, NC**

Presentation 9 – Heat Assignment 1

**Student:** Chloe Scattergood  
**Department:** Anthropology  
**Mentor:** Dr. Charles Ewen

**Abstract:** Studying the consumer choices of colonial North Carolinians can indicate much about their lives and status. Archaeological excavations of two 18th c. warehouses in Historic Bath can tell us about merchants and their clientele. The material from these warehouses suggests notable wealth disparity, not unlike today, in North Carolina’s first established town.
Defining mechanisms underlying tissue fragility in AEC

Presentation 10 – Heat Assignment 2

Student: Maddison Salois
Department: Biochemistry and Molecular Biology
Mentor: Peter Koch

Abstract: Approximately 1:10 Americans are affected by a rare genetic disorder. However, most rare genetic disorders are under researched. Due to this, many patients who are affected by a rare disease do not have any treatment options available. My lab works to uncover how mutations in the TP63 gene lead to the wide variety of symptoms in two rare multisystem disorders: Ankyloblepharon ectodermal dysplasia and cleft lip/palate (AEC) and Ectrodactyly ectodermal dysplasia and cleft lip/palate (EEC). A major characteristic of these disorder is the severe skin erosions. This subjects patients to life-threatening infections and decreases patient quality of life. The pathological mechanism underlying this devastating tissue fragility is still unknown. One obstacle when investigating a rare disease is the lack of patient material. To overcome this, our lab has generated a method for differentiating patient induced pluripotent stem cells (iPSC) into keratinocytes (iPSC-K). My work aims to uncover how mutant TP63 is unable to properly regulate pathways crucial in ectodermal development and maintenance. This novel insight can contribute to the development of therapies and improve patient quality of life.

The Effect of Semantic Interference on Speech Perception in Noise Ability

Presentation 11 – Heat Assignment 2

Student: Abigail Ormond
Department: Audiology
Mentor: Dr. Andrew Vermiglio

Abstract: The goal of this study was to determine the effect of semantically meaningful masker content on speech perception. The maskers included four-talker babble and conversational maskers presented forward and in reverse. Speech perception in noise ability was determined using the AzBio sentences. Semantic interference was identified when speech perception for the reverse masker condition was better than the forward masker condition. Poorer speech perception was found for the forward masker conditions than for the same masker conditions in reverse. Greater semantic interference was found for the four-talker babble conditions as opposed to the conversational masker conditions.
What’s bugging my babies? A tale of creepy-crawlies and charismatic cavity-nesting birds in eastern North Carolina’s forested wetlands.

Presentation 12 – Heat Assignment 2

Student: Skadi Kylander
Department: Biology
Mentor: Dr. Michael Brewer

Abstract: Birds are not the only animals found in bird nests; an assembly of arthropods, particularly avian ectoparasites, are often found in bird nests, but to varying degrees based on the bird species. Understanding how these communities of insects and arachnids form and vary in bird nests provides insight into factors that determine community assembly, a topic of broad ecological interest. The Prothonotary Warbler (Protonotaria citrea) (PROW) is the only cavity-nesting species of warbler that breeds in eastern North America. Population declines in recent decades have been significant enough to place PROW on several conservation watchlists. PROW readily take to nest boxes and are known to nest multiple times in the same nest box during a breeding season; PROW may also build a new nest on top of a Carolina Chickadee (Poecile carolinensis) (CACH) nest from which nestlings recently fledged. CACH often use nest boxes as well, likely hosting a unique community of arthropods, potentially impacting the community of arthropods in subsequently constructed PROW nests. I propose to examine the arthropod communities present in PROW nests collected from six established field sites in eastern North Carolina, targeting 10 nests per comparison per site (i.e., comparison of prior CACH occupation versus unoccupied nest boxes). Within two days of nestlings fledging, nests will be transferred from nest boxes to specially designed arthropod traps for approximately three weeks. Extracted arthropods will be identified and abundances will be estimated. Plant materials in the nests will be identified and assessed for the presence of arthropod-deterring compounds. This research will identify differences among PROW arthropod communities, including those resulting from previous occupancy by CACH, and will contribute to ongoing conservation efforts of PROW and their local ecosystems.

Investigation of Storm Surge Versus Saltwater Intrusion on Coastal Aquifer Salinization in Hyde County, North Carolina

Presentation 13 – Heat Assignment 2

Student: Elnaz Pezeshki
Department: Integrated Coastal Sciences
Mentor: Stephen Moysey

Abstract: Farmers in Hyde County, NC are increasingly reporting low yields as a result of soil salinization. Understanding the cause of this salinization and how it is linked to storms and hurricanes is valuable for planning and forecasting the long-term impacts of climate change. The drivers of soil salinity in coastal regions are likely to be associated with multiple surface water and groundwater processes. For example, storm surge flooding could provide a direct source of salt to soils and groundwater storage. However, farmers anecdotaly report that if soils are already saturated prior to the surge event, the saltwater won’t be able to infiltrate into the subsurface, and lasting crop impacts will be minimal. In contrast, saltwater intrusion in surficial aquifers could be an ongoing source of salt to soils during periods with high evapotranspiration rates. To investigate these processes, we instrumented a salt-impacted farm site in Hyde County near Middletown, NC. This field is 800 m away from Middletown Creek, which discharges to the Pamlico Sound 1.5 km downstream from the study site. Three sets of nested piezometers ranging in depth from 1.1-3.4 m were installed at the farm to monitor water levels and fluid electrical conductivity, salinity, and temperature. Additional measurements of salinity were periodically made at various surface water locations in the area. The study site was flooded as a result of storm surge caused by Hurricane Florence in September of 2018. The salinity of flood waters reached 10.7 PPT with observations in Middleton Creek varying between 13-18 PPT in the month following the hurricane. Most monitoring wells did not show significant temporal changes in salinity after the storm, with only one shallow well varying between 2-8 PPT and the other two shallow wells remaining around 5 PPT. Salinities in monitoring wells at about 3 m depth were also static, but observed to have salinities as high as 9 PPT. An extensive zone of high electrical conductivity was verified at this depth using vertical electrical soundings made with a Geoprobe and electrical resistivity imaging surveys. Likewise, grain size analysis of core samples suggests the presence of a high permeability zone at this depth. Thus, it appears that storm surge did not contribute significant quantities of salt to groundwater in this case, whereas saltwater intrusion seems to be occurring via the high permeability zone.
**Seedbanks: Ghosts of Plant Communities Past**

**Presentation 14 – Heat Assignment 2**

**Student:** Skyler DeWall  
**Department:** Biology  
**Mentor:** Dr. Goodwillie

**Abstract:** Fires were historically the most important disturbance to the southeastern United states, but now they are limited by human fire suppression efforts. This activity has caused decreased diversity; however, plant communities have a way to recover from this. Dormant seeds, stored underground, the seedbank, have the potential to restore the natural plant community once disturbances are reinstated. My study will build on a 20-year experiment that has demonstrated positive effects of mowing (disturbance that mimics wildfire) on plant species diversity. I will analyze the seedbanks in the treatment plots to see if plots that have been undisturbed for decades have changed in their composition of underground seeds. I will collect samples haphazardly in the four plots at two different depths, analyzing these two soil levels to see if the seedbanks are more similar in these deeper (older) soil layers. I will be using the seedling emergence method, and as I identify the plants that have germinated, I will remove them. I will then analyze the similarities and differences between the mowed and unmowed plots’ seedbanks to determine the potential for natural plant communities to bounce back from lack of disturbance caused by human suppression.

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**Kinin B1 receptor blockade prevents hydrogen peroxide-induced oxidative stress in primary hypothalamic neurons and microglia**

**Presentation 15 – Heat Assignment 2**

**Student:** Drew Theobald  
**Department:** Biomedical Sciences  
**Mentor:** Dr. Sriramula

**Abstract:** Oxidative stress has been indicated as a major factor that contributes to chronic inflammatory pathologies and cellular injury. Excessive production of reactive oxygen species (ROS) in the brain has been implicated in the pathogenesis of neurogenic hypertension. We previously showed that the Kinin B1 receptor (B1R) expression is upregulated in the hypothalamic neurons of hypertensive mice and contributes to hypertension in part by increasing oxidative stress. However, the direct relationship between oxidative stress and B1R activation in hypothalamic neurons or microglia has not yet been explored. Exposure to hydrogen peroxide (H2O2), a known reactive oxygen species, is widely used to induce oxidative stress and inflammation in cellular models. In this study, we investigated whether H2O2 treatment can induce B1R activation using mouse neonatal primary hypothalamic neuronal and microglial cultures. The neuronal and microglial morphology was confirmed using immunofluorescence staining with a neuron specific marker MAP2 (microtubule associated protein 2) or microglia specific marker IBA1 (ionized calcium binding adaptor molecule). Primary neurons or microglia were treated with H2O2 (10 μM), and B1R expression and inflammatory markers were quantified using immunofluorescence staining. ROS production was measured using MitoSOX Red and a DHE assay after treatment with H2O2 in the presence or absence of R715 (10 μM; B1R specific peptide antagonist). Our results revealed that H2O2 treatment of neurons or microglia for 24 hours increased B1R protein expression, inflammation, and significantly increased ROS production. In contrast, pretreatment with R715 prior to H2O2 stimulation prevented these effects. Our data reveals that excessive reactive oxygen species production, in part, plays a role in the upregulation of B1R, and that B1R antagonism can prevent H2O2 induced oxidative stress. Our study suggests that B1R blockade may serve as a potential therapeutic agent in preventing reactive oxygen species induced damage in hypothalamic neurons and microglia.
**Redefining Sperm Fitness**

Presentation 16 – Heat Assignment 2

Student: Benjamin Brisard  
Department: IDPBBB  
Mentor: Dr. Cameron Schmidt

**Abstract:** Assisted reproductive technologies are used in medicine and agriculture and include a variety of strategies for fertilization success. The efficiency of these practices are the important with the high cost involved in the process. The factor of assisted reproductive technology were looking into is what is the best sperm? To better understand sperm fitness, we are looking at the micro-environments present in the oviduct and uterus to see if they have a selective pressure. Knowing how these pressures impact sperm selection will help improve assistive reproduction technologies and redefine an aspect of sperm fitness.

**Exploring Concept Representation Credibility**

Presentation 17 – Heat Assignment 2

Student: Jonathan Echerd  
Department: Mechanical Engineering  
Mentor: Dr. Brian Sylcott

**Abstract:** Product designers are constantly seeking insight into the mind of the consumer in efforts to get a better idea as to what the market demands. Feedback from consumers informs designers on changes that need to be made to a product and can provide information about what end-users expect. This process has a great deal of room for improvement. One area where it is lacking at present is the efficiency of conveying ideas to consumers. Potentially, one could under-define the product and leave too many details up to interpretation, leading to miscommunication of the final product expectations, or on the other end of the spectrum, one could overload the consumer with information so that focus is diverted, and important details are overlooked. To explore possible design process improvements, we propose a study of concept representation style and its effects on consumer preferences. Such a study will statistically test for a relationship between representation style and a preference predictability, lending insight into the best method of conveying critical information. The study described in this paper consists of conducting a series of surveys, introducing hand drawings, solid models, and realistic renderings as representations of eyeglass frames to participants, eliciting preference data from those participants, and comparing their preference ratings to the physical models of the same frames. This study will be supplemented with an eye-tracking system to establish a connection of where the effective details lie in the design representations, as well as suggest some decision-making strategies at play.