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Summer Research and Creativity Grants

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The following abstracts were submitted by the students who received Research and Creativity Awards for the summer of 2006. They are not final reports, because the projects were in process when the submissions were due. Rather, they are progress reports. However, they provide a clear and wonderfully diverse picture of the broad range of scholarly activities being undertaken by undergraduates at the University of Kentucky.

Sociologists Should Hang Out With Poor People
Meredith G. Amshoff
Social Sciences

My project will be divided into two segments comprised of extensive research and a trip designed to study the real world implications uncovered in research taken from a study in Eastern Kentucky and urban poverty in the US.

I have been in New York City for the past 11 days now, and have been doing a great deal of work toward my research project. I live in community with a group of 8 nuns who work in various ministries in the surrounding area, catering to several social service-type groups. I go with them when they do their work, and meet various community organization leaders who do similar work. In the coming weeks, I will be conducting interviews with these people about their work in the community, and how they interact with those they serve. I am now doing research about ethnography and preparing to do the interview phase of my final project.

Performance Art and the Monodrama: A Summer Tour of Fringe Festivals
Daniel T. Bernitt
Theatre

“People keep telling me: ‘Jason, you’re doing too much.’ What about the people who aren’t doing anything?”

Nearly every night for two weeks I sat with Jason Bruffy, the producing director of the Cincinnati Fringe Festival and artistic director of the Know Theatre Tribe, having conversations about theatre until the bar kicked us out. From the broadest of arts administration techniques to the specifics of finding venues and performance spaces, Jason told me anecdotes about his experiences dealing with the business of theatre, summarizing each encounter in his no-nonsense way.

“The first step to starting the festival? I said I was doing it.”

“But I’m pontificating,” Jason sighed as he took another swig, lit cigarette between his fingers.

The Children of Marx and Coca-Cola
Andrew Bozio
English

In May 1968, the streets of the Parisian Latin Quarter were turned into a battlefield. The universities had been closed as a result of student demonstrations, and when the police force of de Gaulle’s France arrived to break up the trouble-makers, they found that their truncheons and tear-gas were met with a shower of cobble-stones and Marxist slogans. My research on the May Events began as the posing of an impossibly general question: what ideological forces guided the students as they demonstrated in the streets? In Paris, at la Bibliothèque publique d’information, I began to answer this question by reading the accounts of the events in Le Monde and Le Nouvel Observateur. From these articles, it became apparent that an ideological divide on the meaning of Marxism had taken hold. The French Communist Party, having recently gained a place in the National Assembly, was reluctant to lose its status in the Gaullist government and so was forced to denounce the uprisings, quibbling that the students were the children of the bourgeois power and lacked the class consciousness to bring the proletariat revolution to fruition. The students felt differently; true, they admitted their elite heritage, but at the same time they railing against the bourgeoisie mentality that they felt was being reproduced, rather than refuted, by the university system. In short, whereas the Communists defined ‘bourgeois’ in terms of economic status, the students preferred to conceive the word in cultural terms.

Currently, I’m working to determine if the origins of this distinction can be traced to the early writings of Louis Althusser, professor of philosophy at the Ecole Normale Supérieur. His texts rewrite the old Marxist...
formula of base and superstructure to include consciousness — or more broadly, ideology — as a key determinant of class relations. The students — wittingly or not — were following Althusser’s revision when they argued that they were as proletarian as any factory worker. The position of Althusser’s texts in the May Events, then, opens a broader question, that of the political significance of French philosophy in the 1960s. Can it be said that the students, in attempting to break apart the structure of bourgeois society, were a deconstruction manifest in the Parisian streets? To pursue this question, my research is now a close reading of the student manifestos and the philosophical texts that surrounded 1968.

A short history of the Events points to another discursive formation at work and, indeed, the final stage of my research. In February, 1968, some three months before the cobblestones were first flung, the government’s decision to fire Henri Langlois, founder and head of la Cinémathèque française, inspired a large student protest. It is this event that causes me to wonder, did the cinema of Jean-Luc Godard, François Truffaut, and other Nouvelle Vague figures act as an ideological counterpart to the emerging philosophies of the day? Did the slogans of the Events, dipped in a venom of wit and absurdity, find their predecessors in A bout de souffle or Week-end? In the final weeks of July, with the resources of la Bibliothèque du film, I will watch the same films that were shown in Paris in the months leading up to the Events, to determine if these cinematic texts were in some ways writing the riots before they occurred.

Localization of Defense Gene Expression in Plants

Kimberly A. Cox

Agriculture

So far in the course of my research I have been practicing the protocols on control tobacco plants. The experimental plants are currently growing up to their optimal size. I am also growing my Phytophthora ramorum <http://www.doctorfungus.org/thefungi/Phytophthora.htm> on oatmeal plates. Every week I subculture them to another set of oatmeal plates. Next week, I will start inoculating my experimental plants with the Phytophthora and carrying out the protocol as I did with the control plants.

Effect of Proteoglycan Structure on Nerve Growth Inhibition

Chris Garnett

Biology

Currently in the United States there are approximately 250,000 individuals living with spinal cord injuries (SCI). This figure underscores the need for basic research aimed at treatments to promote nerve regeneration. The complexity of the cellular environment following SCI has made the development of treatments difficult, but strategies are beginning to emerge. One factor that contributes to loss of ability for nerve cells to regenerate is a family of extracellular matrix glycoproteins called chondroitin sulfate proteoglycans (CSPGs). CSPGs consist of a protein core to which one or more glycosaminoglycan (carbohydrate) side chains are covalently attached. The mechanisms of nerve cell inhibition by CSPGs are unknown.

From examining nerve cell behavior following exposure to intact and degraded CSPGs, it is clear that nerve cell growth cones (GC), the sensing, distal ends of the nerve cells, possess the ability to discriminate between various sub-domains of the CSPG structure. An understanding of this ability of nerve cells may allow us to develop strategies and treatments to encourage nerve growth and recovery of function following SCI. Dr. Diane Snow in the UK Department of Anatomy and Neurobiology, and collaborators Dr. Thomas Hering and colleagues at Case Western Reserve University, have developed a model of the glial scar in vitro to test growth cone responses to engineered specially mutated CSPGs, called “Designer PGs.” They are using these PGs in tissue cultures to test the behavior of sensory neurons. The hypothesis of this study is, “identification and manipulation of specific inhibitory CSPG domains using ‘Designer PGs’ in combination with a novel model of the glial scar will promote plasticity and regeneration in vitro and in vivo.”

During my first six weeks in the lab, I learned and practiced basic experimental protocols, including: dissection of a population of sensory neurons (dorsal root ganglion; DRG neurons) from embryonic chickens, reagent preparation, cell culture, and image analysis. Next, I will use “Designer PGs” to begin monitoring the behavior of primary neurons in the presence of these mutated CSPGs. Using time-lapse microscopy, I will measure morphological features of GCs, such as
GC area, number of filopodia (actin-based extensions from the GC that sample the environment), filopodial lifespans, branching patterns, and degree of contact with the substratum. I will also measure behaviors of the GC, such as rate of outgrowth and GC turning. I will compare these GC characteristics between neurons encountering different CSPG structures to determine if certain portions of the GAG or protein components of CSPGs are most inhibitory.

These data will provide information that will move the research forward and allow the manipulation of the most inhibitory regions of CSPGs to render them less inhibitory, or even growth promoting. Once accomplished, the research will then move to a model in vivo to facilitate translational approaches to SCI studies.

**Efficiency Estimation of Power Plants**

**Aydin Hatemi**  
**Engineering**

The purpose of this project was to estimate the efficiency of power plants by observing the historical efficiency development of hydro-electric, nuclear, diesel, gas turbine, solar, wind, and fossil fuel burning steam power plants. The full project also includes classification of these power plants, economic analysis, theory of operation, and principles of gas turbine power plants. Although this research includes many types of power plants, gas turbine power plants were our main focus.

I obtained my data and information mostly from the United States Department of Energy–Energy Information Administration, the University of Kentucky libraries, and various Internet sources. In the first part of my research, by using these sources, I was able to determine the historical development of efficiencies of power plants and list these power plants by their efficiencies. In the second part, the main focus was the principles of the gas turbine cycle, the current situation of power production, and the economics of the combined cycle gas turbine. In the last part of my research, I focused on different power recovery methods in gas turbine power plants.

After extensive research on combined cycle gas turbine power plants, we conclude that GE’s S109H has the best performance, with 60% over-all efficiency. Also we concluded that gas turbine power plants with multiple staged compressors have the highest thermal performance.

The final results suggested high efficiency in a combined cycle gas turbine with multiple staged compressors. This conclusion leads us to plan further investigations of this specific type of gas turbine cycle.

**Performing Ceramics Analysis of Pottery Sherds Excavated from an Archaeological Site in Tres Zapotes**

**Alexander C. Conway**  
**Anthropology**

Hello from Tres Zapotes, Veracruz in Mexico. There is just enough time for me to get my feet wet before I dive into my research project on Household Craft Production in Tres Zapotes.

This first week I have spent all of my time learning the ceramics classifications. This task involves knowing the different types, forms, and decorations of the ceramics. As part of my learning, I have begun to analyze and identify the ceramics that have not yet been catalogued, with the guidance of Dr. Georgia Britt from Washington University and Dr. Chris Pool from our own University of Kentucky.

The project Dr. Pool has assigned to me for the coming weeks is to classify pottery from the excavation of a Protoclassic (C.E. 1 – 300) household that was involved in the production of pottery as well as obsidian and basalt stone artifacts. It is from an operation entitled 3-B, units 21 and 22. There are seven units and six of them were excavated.

My objective is to contrast pottery from excavations on the south side of the house, away from the areas where firing pots were excavated, to provide comparative data for the identification of household activity areas.

**Exploring the Relationship between Peer Victimization and Learned Helplessness**

**Megan Kleine-Kracht**  
**Psychology & Family Studies**

Peer victimization is an extremely important and pervasive issue for children; roughly 10% of children have described chronic victimization by peers. In fact, the American
Psychological Association has recently declared peer victimization a major public health issue of childhood. It has become essential that we learn more about this topic in order to find a way to decrease peer victimization and drastically improve quality of life for these children.

My particular interest in this research lies in examining the possible relationship between learned helplessness and victimization. Learned helplessness is the tendency to give up when encountering situations you do not believe you can control. Learned helplessness is associated with a certain attributional style, or way in which an individual explains why positive and negative events occur. For example, the typical attributional style for a negative event of someone suffering from major depressive disorder is internal, stable, and global. I am extremely interested in exploring differences in attributional style between frequently-victimized children and their not-victimized peers. I believe that children who are frequently victimized will be more likely to have the internal, stable, and global attributional style that is related to learned helplessness.

Although previous research has investigated both peer victimization and learned helplessness individually, the relationship between these two factors has not been sufficiently examined. Thus, the purpose of the current study is to see whether children with a history of peer victimization have adopted the specific attributional style associated with learned helplessness.

Currently, 120 participants aged 9-13 are being recruited from the Lexington area to take part in this study. Participants (and their parents) complete a variety of questionnaires and computer tasks, including the Children’s Attributional Style Questionnaire (Revised), and they are also interviewed about their victimization experiences with other children. These responses will be analyzed to determine the nature of the relationship between learned helplessness and peer victimization, and they will, hopefully, provide us with deeper insight into processes underlying childhood peer victimization.

Analysis of Isotopic Values in a Stromatolite Head to Interpret Micro and Macroscopic Environmental Changes

Nathan Landrum
Geology

In geological research, we study this living planet with the philosophy that the present is the key to the past and the future. By looking into the behaviors and lifestyles of modern life forms, we can find clues that help us to understand the behaviors and lifestyles of the ancestors of these organisms. Another branch of geologic research looks at isotopic ratios to study such environmental behaviors as the ocean temperature and salinity, storm patterns, and global climate changes. My research combines these aspects to learn more about organisms called stromatolites that are found in the Bahamas — a type of organism that has been around for ~3.4 billion years. Looking at isotope levels in different sections of a stromatolite sampled from Storr’s lake on the island of San Salvador, I hope to learn more about how stromatolites form, and how environmental changes affect their formation.

At this point I have taken 100 samples from a stromatolite taken from the Bahamas. The samples reflect the diverse forms of growth that have occurred during the stromatolite’s formation, specifically clotted thrombolitic growth, and linear laminar growth. I have recorded the locations of the samples on electronic and hard copy scans of the stromatolite. The samples will be tested for isotopic variations in $^{12}$C/$^{13}$C and $^{18}$O/$^{16}$O. Variations in these levels will give insight into the climate and environment in which the stromatolite formed. My hope was to have the samples tested at the E.R.T.L. lab here at the University of Kentucky, but the lab has a backlog that makes this impractical. I have contacted a Stable Isotope laboratory run by the University of California, Davis. As soon as the samples have been powdered and weighed, I will ship them to this lab to be tested.

When the results are returned I will look for any variations between the isotopic ratios of thrombolitic layers and laminar layers. I will look for any sign of uniformity or variation in layering throughout the stromatolite, which might tell me more about how changes in the environment in which the stromatolite formed — a hypersaline lake that varies in salinity and acidity — affect stromatolite growth.

Teaching English as a Second Language in Russia

Rachelle Lazarus
Russian Studies

Privyet, from Vladimir, Russia! I’m having a wonderful time here with my project of teaching English to needy children and those in orphanages. It took a while to get things off the ground
once I arrived in Russia, because most orphans are sent to various camps for the summer. I went to several different towns and villages to speak with the directors about teaching there, but everyone wanted special documents from me and a specific certification. Finally, I began working with a man who has been stationed in Russia for over 10 years and has many contacts and established relationships with people in this area.

Shortly thereafter, I visited two orphanages and spent great time with the kids there. One was a baby orphanage here in the town of Vladimir where I’m currently living, so I can’t exactly say that that I had great linguistic success there, but I feel that the time was incredibly valuable, nonetheless. The other orphanage, in a town called Suzdal, is for children ages 3 to 10. The children there were quite distracted by the beautiful sunshine and having someone to play with outside, but we had a wonderful time practicing some basic English phrases together. From this experience, I could see that even the youngest of children appreciate the ability to communicate with someone from a different language background.

Besides these orphanages, I also visited a children’s shelter for homeless children here in this town. We had a long talk together, and I asked them all about their plans for the future. I was sure to tell them over and over how much of a difference education can make in a person’s life, and that concentrating on school work now can have an significantly positive impact on their lives in the future. Afterwards, I spent some time with 3 different children in a delinquent center in the same building complex as the shelter. These children were very quiet, and not too willing to speak about themselves or their situation, but I felt that this was an appropriate time to again speak of the future and my advice concerning it.

I told them that the most important thing in the entire world is family and to have love in our hearts. I advised them not to make choices in the present that could hurt the people who love them currently, as well as future relationships. I told them that it’s better to consider the words of those who want to help them and improve their lives rather than pushing everyone away and always finding trouble. I don’t think I’ll ever know what kind of choices these kids will make from here on out, but I trust that their hearts will be touched by the kind words of someone from thousands of miles away.

After all these visits, I began working with a group of about 15 teenagers in a church building also here in Vladimir, teaching English consistently everyday, Monday through Friday, for about 2 hours each lesson. These kids make such a great group! They’re so excited to learn English, and all my lessons so far have been very successful, because of their enthusiasm to learn. We began with our A-B-C’s and 1-2-3’s, and slowly started tackling the mess of English grammar.

Tomorrow, I’m leaving Russia and travelling to Hungary for a few days in order to obtain a new visa for staying in Russia. Afterwards, my students and I have many plans together both inside and outside the classroom. Inside the classroom, we like playing games, having dialogues, listening to music with English lyrics, and so on. When I return, we plan on going bowling together and I’ll teach them how to say “gutterball!”

I’m having such a great time here in Russia, and I can see what a difference it makes to my students that someone is willing to spend the time here and teach English intensively. I’m sure we will have accomplished a lot by the end. Keep having a great summer everyone ... I know I am!

**Organic and Hybrid Solar Cells**

**Blavananda Reddy Nadimpally**

**Engineering**

I will discuss in this paper what I’ve been doing and what I intend on doing for this summer research. This is by no means a paper that focuses on the technical aspects of my research. Due to the nature of the research that I’ve been able to accomplish so far, I have not been able to come up with a constructive article that discusses the nuts and bolts of my research. I intend to do that once I get results that actually show some promise.

Dr. Vijay Singh’s research team has for the last few years been working on a variety of photovoltaic prototypes to harness solar power more efficiently. These devices can be broadly classified into two categories: organic and inorganic solar cells. They both have their own advantages and disadvantages. The efficiencies of inorganic solar cells are much higher than those of organic solar cells. However, the cost of production of organic solar cells is much lower compared to that of inorganic solar cells. This very factor has made research in organic solar cells in the past couple of years a very hot topic of research. From the two categories we can branch out to yet another category of solar cells called the hybrid solar cells. The cells are fabricated using both organic and inorganic materials. In this way, the advantages of both organic...
and inorganic solar cells can be obtained to a certain extent. My research involves understanding, fabricating, analyzing, and optimizing such devices.

The first month of this research involved me being trained for various procedures and how to use various equipment. I also got a chance to participate in meetings in which the team brainstormed different novel ideas to come up with various different approaches to understand and build better devices. The second month involved fabricating devices that have in the past given desirable results. The goal of redoing the same process is to help optimize the performance of the devices by tweaking the device parameters.

The ITO layer of the device is a transparent layer that acts as a window material. It basically allows light to pass through it and at the same time release electrons. When the photons hit the CuPC layer, excitons in that layer are broken into individual components, which recombine after they travel a certain distance. Energy can be harnessed from these excitons. The thickness of the different layers is a particularly important parameter that can be used to enhance the efficiency of the devices. This research team currently holds a world record for organic devices producing the highest voltage from solar power. The drawback to such a device is, however, the extremely low current values. My present research includes work on the same device to enhance the values of current without having to compromise on the voltage values.

For the past several weeks, I’ve been plagued by technical glitches and difficulties with the equipment I have been working on as well as results that have been far from acceptable. The data from one device is shown here. The Current-Voltage characteristic curves clearly show that the devices I fabricated are all short circuited somehow. I have been trying to troubleshoot this problem alone for the last several weeks. I am hoping to find the reason and rectify things in order to get more desirable results in the near future.

As a part of the research, we also read all of the latest papers that are published in professional journals, to be able to keep ourselves abreast of the latest happenings in the same field of research.

I hope to learn and contribute toward something that so obviously is an urgent necessity in such demanding times for energy. Solar energy is what I very definitely see as something that will soon provide a viable alternative to fossil fuels and I would like to use my experience in this field of photovoltaics to the fullest extent.

The Future of LEDs is Looking Bright: A Study on the Adaptation of Light Emitting Diodes to be Incorporated into Custom-Designed Lighting.

Kate E. Obenour
Engineering

The nature of my research has focused on the efficiency of Light Emitting Diodes (LEDs) and how they can be adapted to the decorative lighting industry to create marketable custom-designed lighting. LEDs were once merely found in flashlights, cell phones, and traffic lights, but are now being adapted to countless other applications. Among their impressive characteristics are their efficiency and color availability. These tiny bulbs packs a long life (think 10,000-100,000 hours) while producing very little heat. Available in over 10 different colors with the ability to create color gradations, they are becoming
the next big thing in the world of lighting design.

With style, construction, efficiency, and cost in mind, I first began examining the past of LEDs. Among the information that I collected, I found that their applications have been relatively limited due to the high price of semiconductors (a key component of the bulb) as well as the limitations within the bulb itself. Its narrow degree of illumination poses a large problem in trying to incorporate LEDs into the world of task, ambient, and general lighting. After gaining a good understanding of the past of LEDs, I furthered my research in the area of what the current and future development of LEDs is and will be. After reading case studies, periodicals, and analyzing current lighting design trends, I was truly able to determine how I am to create stylish, marketable, unique, and most of all efficient fixtures for the consumer using LED technology.

As I begin the design phase of two fixtures that I will construct, I hope to be able to manipulate LEDs in two very different ways. Though both fixtures will be practical and dynamic, the concepts behind the designs are very different. The first fixture will be designed with the concept of subtlety through light transmission and a sculptural quality in mind. With the help of a rheostat and varying bulb colors, an ambient glow will result. This relaxing glow will further be enhanced through the embedment of LEDs creating a state of translucence. The second fixture will be a mirror of the first in that it will convey a bolder message through the use of strong graphics and colors. The fixture will take on a more severe look with the employment of blue and white bulbs positioned in a more direct manner. With the extent of my research as well as the conceptual designs I have thus far, I am confident that my findings will speak loudly for the future of LEDs and lighting design.

**Documenting the Basque Diaspora to Argentina**

Eric Rickert

Travel

During my third year of study at UK, I spent six months living in San Sebastian, Spain, studying Spanish Basque culture and learning the Basque language. A sizeable chunk of my free time went to photographing my surroundings in an attempt to document a Western culture frequently overlooked in the bigger picture.

My time in Argentina is an extension of this documentary project. There is an interesting channel between the Basque country and Argentina: during the dictatorship of Francesco Franco throughout the latter half of the twentieth century, many Basques fled to Argentina as a means of escaping a government that forced them to silence their language and hide their customs behind closed doors. They chose
Argentina for its European leanings and its similarities to the Spanish state.

I went to Argentina to see if a Basque culture still thrives there the way it does in Europe, to see if the Basques who emigrated still fiercely protect their heritage. I wanted to see if they existed as a pocket of the larger culture, I wanted to see if they had any influence on the broader South American lifestyle.

An Examination of the Print Zine within Libraries and Academia

Shanna Sanders and Patrick Smith

English

According to the America Library Association’s Bill of Rights, library resources are intended to serve for the enlightenment of everyone within a community. In order for a library to do this “materials should not be excluded because of the origin, background, or views of those contributing to their creation” and librarians should strive to provide their patrons with “materials and information presenting all points of view on current and historical issues.” While librarians try their best to uphold these standards, some materials are often excluded from library collections. One such class of excluded materials is collectively known as “zines.” These self-published magazines are typically products of disaffected youth, awkward individuals, and members of radical subcultures. They cover a wide-range of topics from science-fiction to anarchism. Although zines have been produced since the 1930s, they are quite difficult for librarians to obtain due to their idiosyncratic nature and small print runs, and even more difficult to catalog, because they often do not contain the information (place of publication, author’s name, ISBN number) upon which library catalogs generally rely.

Despite the difficulties involved in obtaining and cataloging zines, their inclusion in UK’s libraries would provide researchers with access to important, unique materials. Although zines are by and large a non-academic medium, they can still serve as great resources to the academic community as primary sources within a multitude of disciplines. Zine authors often publish first-hand accounts ranging from experiences with incest and rape to the individuals’ relationship with a particular geographic region. Documents such as these are invaluable to research performed in the humanities and social sciences, because they allow researchers direct access to the ideas of groups within society that are underrepresented or distorted in the mainstream media. A collection of this nature would be a great distinction to add to UK’s library system, because it would make UK one of only a handful of libraries in the nation, either academic or public, with a zine collection. But most importantly, adding a collection of this controversial medium would help us as a university address the questions of what constitutes a valid academic source, who owns the information we consume, and who is considered an expert in this supposedly technocratic era.

Our research will be focused on developing a system for cataloging, preserving, and maintaining a zine collection at UK. We will achieve this by traveling to New York City to visit Barnard College, the New York Public Library, and ABC NO Rio to explore the zine collections at these institutions and interview the librarians who manage them. We will also travel to Portland, OR in August for the annual zine symposium at Portland State University, where we will be able to meet prominent members of the zine community and investigate ways for obtaining materials for the zine collection. The information and materials gathered during these trips will be used in meetings with members of the University’s Special Collections Department in order to determine the feasibility of a zine collection at the university. Furthermore, if a zine collection is created within UK’s library system, our research will be helpful in determining where the zine collection will be placed, how the materials will be cataloged and preserved, and how to go about building and promoting the collection.

After the report above was written, it was decided that a Zine Library will be located in the Breckenridge Room of the King Library.

Effects of Story Mapping on Story Comprehension of Children with ADHD

Sarah C. Sanderson

Psychology and Family Studies

Children with attention deficit hyperactivity disorder (ADHD) have significant academic problems, including difficulties effectively comprehending stories. Our research group has identified four areas of story comprehen-
sion impairment common in children with ADHD: 1) difficulty understanding the causal relations among story events, which appear to be related to problems in sustaining cognitive engagement; 2) difficulty using the goal structure of a story to build a coherent story representation; 3) difficulty recognizing the important information in a story and using this information to guide recall; and 4) difficulty making inferences about story information and monitoring ongoing understanding of the story.

Although there are many types of medication that help a child to control ADHD, these treatments do little to improve the poor story comprehension that plagues these children’s scholastic endeavors. My current research tests the effectiveness of story-mapping as a method of enhancing the ability of children with ADHD to understand and recall stories. Story mapping is a procedure employed in the educational field to help children learn to recognize the important events in a story, as well as the main characters’ goals and how these goals may be thwarted or realized. We are testing the hypothesis that training children with ADHD in the story-mapping technique will help these children recall and understand more information from stories to which they are exposed.

Right now, I am still in the beginning phases of my research, because it will be a year-long project under Drs. Milich and Lorch in the psychology department. I am currently reading background articles on similar studies that will supplement and guide my own research. Supplemental articles are important for me in understanding more about ADHD, what other kinds of treatments are in use, and how the story-mapping procedure may address the specific problems children with ADHD experience in story comprehension.

The experiment is a 2x2x2 mixed design, with the between factors of diagnostic group (ADHD vs. comparison) and training condition (story mapping vs. studying), and the between factor of time (pre vs. post assessment). The participants are children between the ages of 9 and 13, who are randomly assigned to a studying or story-mapping condition. In the experimental procedure, all children listen to a story on an audio-recording and then recall as much of the story as they can. Next, children in the studying condition are given materials with which to study the story, whereas the other children are trained in the story-mapping procedure. After this, the children once again recall the story. After a distractor task, the generalization phase begins in which the children listen to a story different from the first one and then recall it. All children are then given materials with which to study again, including the story-mapping worksheet. After an allotted amount of time, the children are again asked to recall the second story. The primary measure in the study is how much of each story the children recall.

My current activities include being trained in the experimental protocol so that I can administer it myself. I will also be working on becoming reliable in coding the children’s story recalls. In addition, I will be devising criteria with which to do my own coding, with a special emphasis on developing coding systems for the children’s behaviors during the story-mapping procedure. These criteria will allow my research to move in a separate direction from questions that have been previously explored. It is our hope that the story-mapping training will increase the comprehension of the stories, and will help to close the gap between the children with ADHD and the comparison group.

**Effect of E1 Allele on Reproductive Development in Glycine Max**

**Daniel Sheffler**

**Agriculture**

The control of flowering time is one of the most important properties governing geographic distribution of crop plants. Studies on the economically important soybean crop have found that a series of genes known as the E-gene series are important in the control of the flowering response in soybeans. Among the E genes, the E1 gene has been found to have the greatest impact on soybean phenology.

The time from vegetative development to flowering can be broken down into four phases: a photoperiod insensitive pre-inductive phase, a photoperiod sensitive inductive phase, a photoperiod sensitive floral development phase, and a photoperiod insensitive floral development phase. The objective of this study is to investigate the role of the E1 gene in how soybeans transition from vegetative to reproductive development.

Two near isogenic lines that differ for the allele at the E1 locus were grown in a reciprocal transfer experiment under short and long day conditions. The plants were observed throughout early development to determine the difference between dominant and recessive E1 alleles in terms of the juvenile period, time to floral induction and floral development, and...
the differential response to photoperiod. The pre-
inductive phase is identical for the two alleles and
under both photoperiods. Under the long-day
treatment, both floral induction and development
appear to be delayed by the dominant E1 allele.

Gene Function in Adult Skeletal Muscle

Peter S. Wulff
Biology

My Summer Research and Creativity Grant was spent
in a lab that studies skeletal muscle. The long-term goal
of this research project is to study gene function in adult skeletal muscle. The specific project developed over this summer is to have the ability to selectively knock-out (delete) a gene, in Mus musculus (the common mouse) only in skeletal muscle. To achieve this goal, the use of a recombinase (an enzyme that removes a segment of DNA) was necessary. However, the expression of the recombinase needs to be skeletal muscle-specific and able to be controlled temporally. Temporal expression is important because deleting a gene during development might be lethal. However, if done during adulthood, insight into gene function may be gained.

First, two strains of transgenic mice were obtained and bred together. One of the strains has a transgene that expresses rtTA (reverse tetracycline transactivator). rtTA is a molecule that is active only when bound by the drug doxycycline. This transgene is only expressed in the skeletal muscle because it is being driven by the muscle specific promoter Mck (muscle creatine kinase). The second strain of mouse contains a transgene that expresses Cre-recombinase only when in the presence of active rtTA. Thus, whenever expression of Cre-recombinase is wanted in these double transgenic mice, it can be induced via doxycycline. After these mice were generated, the presence of both transgenes was confirmed by genotyping. DNA was extracted and isolated from a small segment of tissue snipped from the tip of the tail.

The genotyping consisted of a Polymerase Chain Reaction (PCR) using the genomic DNA from the tail snip and primers designed to recognize both transgenes. PCR product was then run out on an agarose gel using a technique called electrophoresis. Electrophoresis is a method that relies on electrical current to separate DNA fragments by mass (indicating the number of nucleotide base pairs). The transgenes Mck-rtTA and TetO-Cre-recombinase had bands from the PCR electrophoresis at 402 bp and 199 bp respectively. This was evidence that a new generation of mice containing both transgenes was created.

To confirm that this double transgenic system will actually knock-out a gene only in skeletal muscle when fed doxycycline, these mice were breed against ROSA transgenic mice. The ROSA mouse contains a stop codon that is upstream from the LacZ gene. The stop codon in the ROSA mouse is between two DNA fragments that are recognized by Cre-recombinase. In theory, the Cre-recombinase should loop out the stop codon and allow expression of the LacZ gene. LacZ drives expression of β-galactosidase. When tissue containing β-galactosidase is stained with X-gal solution, it should stain blue. To date, there has been only preliminary data with the latest generation of transgenic mice. Unfortunately, there was no blue in the skeletal muscle as predicted. However, further genotyping of the triple transgenic mouse revealed there were no flanking markers in the ROSA mouse. Therefore, we received the wrong strain of ROSA mouse and will need to breed our double transgenic mouse against the correct ROSA strain. Further testing will use Western Blot analysis to confirm the enzyme Cre-recombinase is being expressed only in skeletal muscle after activation by doxycycline.

If this double transgenic systems works well, it will serve as a tool for the investigation of gene function in adult skeletal muscle. One future project utilizing this new mouse system will be to study the function of the gene c-myc in skeletal muscle hypertrophy. After deleting c-myc, the mice will be subjected to normal growth stimulus. If no growth occurs, it can be inferred that c-myc is necessary for skeletal muscle growth. The mice generated this summer will be an invaluable tool for the study of skeletal muscle.