

# ABSTRACT NUMBER

T-1

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**Teaching Mentor(s):** Kenneth L. Esbenshade/Associate Dean and Director  
of Academic Programs for the College of Agriculture &  
Life Sciences

**Title of Presentation:** An Investigation of Avian Influenza Virus

Avian influenza is of great importance to global health and could be the cause of the next pandemic. Symptoms of avian Influenza in animals vary depending on both the severity of the strain and also the species of animal; in humans, there is a high mortality rate along with severe complications. Currently, no treatments exist, so prevention-- through surveillance containment-- is the best method.

# ABSTRACT NUMBER

T-2

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**Teaching Mentor(s):** D. Barry Croom/Agricultural and Extension  
Education

**Title of Presentation:** The Secret Life of Rats

The purpose of our research was to investigate different aspects pertaining to the life of *Rattus norvegicus*. *R. norvegicus*, also known as the brown rat, can be found in metropolitan and rural areas. We focused our research on three major areas, social behavior, anatomy, and disease. We investigated the local habitats and community structures, along with food preference and relationships, within the social realm of the brown rat. Researching social behavior led us to further investigate the physical composition of the brown rat, particularly digestion, specialized senses, and dental structure. We also examined diseases that affect rats and those that are hosted by them. Although humans continue to view rats as a burden to our society, we concluded that rats have adapted many skills to survive in a world full of changing environments and threats to their existence.

# ABSTRACT NUMBER

T-3

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**Teaching Mentor(s):** Jonathan W. Olson/Microbiology

**Title of Presentation:** Biofilms

A biofilm is a community of microbial cells attached to a surface. Biofilms are very prevalent and are located everywhere from your teeth to the bottoms of ships. The process of biofilm formation begins via a unique form of cell-to-cell communication called quorum sensing. In quorum sensing, small molecules called autoinducers accumulate in a cell density-dependent manner. Once a threshold is reached, gene expression within the organism changes. In biofilms these regulated genes control processes such as motility, extracellular matrix production, and adhesion. In the environment, biofilms are typically found in aqueous locations, which has been proven to cause problems within municipal water systems. In addition to biofouling, these biofilms also provide a reservoir for human pathogens presenting a serious problem in human health by causing infections such as dental caries, respiratory infections, urinary tract infections, and kidney infections. A number of these infections are complicated by the fact that medical devices (such as catheters) are easily colonized by biofilms due to their ability to escape the body's immune system. Additionally, biofilms have a role in plant health, both causing diseases in some important commodities and protecting some from fungal attack.

# ABSTRACT NUMBER

T-4

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**Department(s):** College of Agriculture and Life Sciences

**Teaching Mentor(s):** Clay Clark/Biochemistry

**Title of Presentation:** An Analysis of Procedures and Applications  
Relating to Transgenic Plants and Animals

Transgenesis is a new found revolution created in hopes of improving everyday life. It is defined as the transfer of a desirable gene(s) from one organism to another, either plant or animal. This paper further discusses the use and impact of transgenic organisms. Transgenic animals such as cattle and chickens are currently used to genetically engineer pharmaceutical proteins for treating diseases such as anemia, hemophilia, intravascular coagulation and the production of insulin for diabetes. For more severe circumstances, xenotransplantation, or the transplanting of living cells, tissues or organs, may be used to treat diabetes, Parkinson's disease, Huntington's disease and strokes. Gene therapy specifically targets and treats faulty genes that can cause disorders such as cancer and Alzheimer's disease. In the creation of transgenic plants, commonly sought after traits include salt resistance, insect resistance, and pharmaceutical proteins. Transgenesis, however, is not perfect. There are environmental impacts, such as lack of genetic diversity in crops, difficulty in removing herbicide resistant plants, or negatively impacting non-target genes introduced by GMO's, that could prove to be more harmful than beneficial. Transgenesis can be seen in everyday life; anything from edible vaccines to cosmetics could contain transgenic organisms. As transgenesis becomes more abundant in society, it is crucial that we become knowledgeable with the new research tactic at hand.

# ABSTRACT NUMBER

# T-5

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**Teaching Mentor(s):** Sarah Ash/Food, Bioprocessing and Nutritional Sciences

**Title of Presentation:** Creating Demand for Sustainable Agriculture in Wayne County through Education

Agricultural advancements since WWII have led to larger farms and fewer farmers, which has affected the economic and social conditions in rural communities. A recent shift in ideology to sustainable agriculture—defined as meeting the needs of today without compromising the ability of future generations to meet theirs—has the potential to address this change. This does not come without its challenges, including variety of products, availability of infrastructure and demand for locally-grown food. Several microenvironments exist in NC that help solve the issue of variety, and organizations are being created to collect the products of local farmers and distribute them to the public. The demand for local foods is slowly increasing across the street, but there is still considerable room for improvement. The Wayne County Food Initiative is a multi-pronged attempt to further the growth of sustainable agriculture. Wayne County is the 3rd largest agricultural county in North Carolina but there is no farmers market; the average income is well below the state average and access to fresh fruits and vegetables is limited. Our part of the initiative was aimed at increasing demand for and consumption of locally grown produce by focusing on educating children at Dillard Academy, a charter school for at-risk youth. The school has a large garden that provides an educational framework through which to teach a variety of basic skills. We wanted to add herbs to the garden as a way to add value to their commercial enterprise, as well as introduce children and their families to ways to season foods more healthfully. We created an educational herb workbook that also reinforced basic academic skills, and worked with the children to create simple dishes that they could recreate at home. The project culminated in an event where the children planted the herbs to take home prepared a meal utilizing their new “herb” knowledge.

# ABSTRACT NUMBER

T-6

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**Teaching Mentor(s):** Gerry H. Luginbuhl/College of  
Agriculture and Life Sciences Dean's Office and  
Staff/Assistant Director

**Title of Presentation:** Research on National Bio and Agro-Defense  
Facility Laboratory Proposed for Butner, North  
Carolina

Butner, North Carolina, is a potential site for the proposed new National Bio and Agro-Defense Facility (NBAF). We investigated the importance, benefits and risks of the NBAF. We discuss some of the accidents that have occurred in similar laboratories with a focus on preventative strategies, consequences and lessons learned. The eight proposed pathogens to be studied are deadly; all of them are extremely important animal pathogens and most of them are hazardous to human beings. We describe the origins, microbiology, symptoms and protocols used with these pathogens, as well as the research that still needs to be done. Comparisons of the other proposed locations for the NBAF are presented and analyzed. We focused on the implications of building the NBAF in the town of Butner, especially considering the citizens of Butner and the surrounding communities. Lastly, public opinions supporting and opposing this research are presented.

# ABSTRACT NUMBER

T-7

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**Teaching Mentor(s):** Jane Lubischer/Zoology

**Title of Presentation:** Sex on the Brain: An Assessment of the Quality of Educational Resources on Wikipedia

Although most people use popular media and the internet to learn about new research, these sources can sometimes misinterpret research or imply unfounded conclusions. To get an idea of the accuracy of popular reporting on scientific research, we started by examining the accuracy of popular media articles that reported on studies that cited neurobiological differences as causes for sex differences in aggression, emotion, or intellectual abilities, and subsequently compared those pieces to the primary research articles. Although we found that many articles did portray the original research fairly and accurately, there were significant amounts of misinterpretation and overall bias in the presentation of information on Wikipedia, a popular user-content-based encyclopedia. However, the biggest weakness of the articles that focused on neurobiological sex differences was that they did not stress that the ties between neurobiological and behavioral differences are weak at best. Through the phenomenon of neuroplasticity, an individual's brain can be altered by his/her experiences and hormones. Thus, a neurobiological difference between the sexes does not necessarily mean a hard-wired, unchangeable difference. Through our research, we also discovered and examined how stereotype threat can guide and affect an

individual's behavior, leading to the perpetuation of gender stereotypes. Our research led us to the conclusion that although it will be impossible to keep popular media articles (like Wikipedia) free of bias, learning about research from their original sources will give an individual a much more accurate portrayal of what researchers are actually claiming.

# ABSTRACT NUMBER

T-8

**Student Author(s):** Rachel C. Koontz

**Department(s):** Genetics

**Teaching Mentor(s):** Wendell H. McKenzie/Genetics

**Title of Presentation:** Implementing Message Boards to Optimize Student Participation in the Distance Education Section of GN 301

Genetics in Human Affairs, GN 301, is a course where students gain an understanding of genetics as it relates to human development, disease, and diversity. As a Teaching Assistant Coordinator for the Distance Education section of the course, I act as the primary communicator and Webmaster. To enhance the students' communication, I added an interactive dialogue component via the Message Board function of the online testing management system WebAssign. The purpose of this teaching project was to facilitate an atmosphere for allowing the students to engage and discuss the controversial and difficult topics presented in the course. This forum allowed students to share thoughts, pose questions, and respond to each other, simulating a classroom setting. The level of participation was then analyzed and compared to comments made by an online survey regarding the courses methods of communication. The effectiveness of the Message Boards was assessed through the use of surveys and student feedback. Many students specified that expanding the incentives would increase the amount of participation; while others indicated that incorporating the Message Boards into the requirements for the course would authenticate this component of the course. I concluded that overall students found the Message Boards to be a useful component to the course. As a result, I would recommend the further use of this type of communication for the Distance Education section of Genetics in Human Affairs.

# ABSTRACT NUMBER

T-9

**Student Author(s):** Jessica L. Little

**Department(s):** Biological Sciences; minor in Genetics

**Teaching Mentor(s):** Wendell H. McKenzie/Genetics

**Title of Presentation:** Integrating GN 301 Honors Brochures into the Genetics and Human Affairs Course to Expose Students to Current and Pertinent Genetics Issues of Today

For my ALS 499 Honors project I worked closely with Dr. Wendell H. McKenzie's GN 301, Genetics in Human Affairs, Honors section and with students of the entire course. I took on a major leadership role as Teaching Assistant Coordinator by organizing and facilitating the Honors section of the GN 301 course. The Honors section met six times for approximately one hour each time throughout the semester; each meeting consisted of a presentation on a genetics topic accompanied by a speaker or debate, a brochure and power point slides. Students brainstormed genetics topics early in the semester and groups were assigned to selected topics based on student's choice. As Teaching Assistant Coordinator, I arranged meeting times, acted as a resource, addressed problems and questions, and worked with Dr. McKenzie in assigning grades. One of my main goals was to incorporate the Honors brochures into the regular course to help open students' eyes to genetics issues involved in society today. As an incentive for students to carefully read the brochures, specific information from these pamphlets was included on tests. It was my responsibility to craft and grade these test questions, which were designed to 1). Evaluate whether students read the brochures, and 2). Encourage students to expand on information obtained in the class and brochure. Brochures were introduced in the MWF class, as well as made available via the course web site. When grading tests, I found that most students were receptive to the information and received full credit for their responses. After reading over the GN 301 course/instructor evaluations, students seemed to like this method of presenting new information, with only a few instances where students voiced their dislike for the brochure questions. Overall, the implementation of these brochures into the larger classroom exposed students to the pertinent genetics issues of today.

# ABSTRACT NUMBER

**T-10**

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**Department(s):** Animal Science  
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**Teaching Mentor(s):** Vivek Fellner/Animal Science

**Title of Presentation:** Nutrition and Genes: Behind the Scenes:  
Exploiting the Myths of Dietary Habits

Obesity in the United States, and across the world, has become a major issue. Theories suggesting the cause of obesity include the amount of calories people consume, the genetic differences that affect fat consumption and breakdown, and the controversy between organic and processed foods. Misconception of caloric intake is the main underlying issue contributing to the nutrients that people consume. Foods that are easy to buy and consume, such as high density foods from fast food restaurants, are a major contributing factor to obesity. Also, research has shown that the genetic makeup of certain individuals contributes to their dietary preferences, fat cell differentiation, homeostasis, and how the individual's body stores fat. These differences in genes have been proven to lead to obesity. Lastly, the global demand for organically grown foods has developed much debate as to what is healthier for the body and the environment. Genetically engineered foods have been perceived to improve nutritional quality; however, there is opposition to this belief.

# ABSTRACT NUMBER

T-11

**Student Author(s):** Kristin P. Marley

**Department(s):** Food, Bioprocessing, and Nutrition Sciences

**Teaching Mentor(s):** Sarah Ash/Food, Bioprocessing, and Nutrition Sciences

**Title of Presentation:** Body Weight Perception among College Students

This study investigated the difference in body weight perception between female and male students enrolled in an introductory nutrition course. The study also examined changes in body weight perception in college age students over time. Out of the 176 total participants, 89 were females and 87 were males. The Nutrition Questionnaire developed by Ash (1995) was administered to the participants. An independent measures *t* test was used to analyze the collected data. The reported *t* value = 6.747 and the  $p = <.0001$ . Since the *p* value was smaller than my significance level of  $\alpha = 0.05$  it confirmed the hypothesis that there would be a difference in body weight perception between males and females. Data showed that female participants overestimated their perceived body size by  $M = 0.213$  and male participants underestimated their perceived body size by  $M = -2.48$ . Overestimation or underestimation of body size was determined by using the calculation  $BMI \pm$  perceived BMI point. Body Mass Index (weight in kg/ht in m<sup>2</sup>) was calculated through self-reported data and the perceived BMI point was selected by each participant on a body image scale. The perceived BMI point on the body image scale was determined by assigning a number range to each point on the scale. The range was based on standard ranges associated with the BMI index. In addition to the difference between body weight perception in female and male participants being statistically significant, as indicated by the *p* score, the study also found that both males and females have become increasingly more satisfied with their body weight from 1995 to 2007. The increase in body weight satisfaction was determined by administering this survey three times during this time period. This suggests that males and females may be less concerned with body weight than they have been in the past.

# ABSTRACT NUMBER

# T-12

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**Teaching Mentor(s):** Michael B. Goshe/Biochemistry

**Title of Presentation:** Performance-enhancing Drugs in Sports: It Is Only Cheating if You Get Caught

The use of performance-enhancing drugs has become a worldwide issue that ranges from professional sports to amateur local gyms, mainly through the use of anabolic steroids (AS) and human growth hormone (HGH). AS and HGH effects are somewhat unclear, although research indicates significant changes to the body with long-term administration. The positive effect with AS is increased muscle mass and the long-term negative effects include heart attacks, blood clotting, joint deterioration, and liver damage. To test for the use of AS, we examined several analytical techniques that are used for detecting these small organic compounds and their biotransformed metabolites in urine which included high performance liquid chromatography, nuclear magnetic resonance, and the gold standard, gas chromatography-tandem mass spectrometry. However, various modified forms of AS have been developed to circumvent detection while preserving their efficacy. In contrast to AS, HGH has a different mode of action. HGH is a naturally occurring peptide-based hormone containing 191 amino acid residues which is secreted by the pituitary gland, but can be synthesized via genetic engineering to create recombinant HGH (rHGH). The mass produced rHGH is virtually identical to endogenous HGH such that detection of doping is extremely difficult and is compounded by a short half-life in plasma. Truly robust methods for the HGH detection are lacking, but usually involve

radioimmunoassays to identify the presence of HGH and its isoforms. Indirect methods that measure HGH-induced indicators with relatively long half-lives are still in the developmental stage. Although there are no clear long-term negative effects of using HGH, it has been suggested that it may promote cancerous cell growth. Overall, research indicates that analytical methods for detecting certain classes of performance-enhancing drugs are lagging athlete usage, and the knowledge regarding the long term effects on the health of both teenage and mature athletes is severely lacking.

# ABSTRACT NUMBER

T-13

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**Department(s):** Biochemistry  
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**Teaching Mentor(s):** James A. Knopp/Biochemistry

**Title of Presentation:** Gender Differences in Performance in Principles of Biochemistry Based on Bloom's Taxonomy of Question Difficulty

A study was conducted to investigate gender differences in examination performance in an introductory undergraduate Biochemistry lecture course. The null hypothesis was that there exists no gender difference in examination performance in individual test questions regardless of question difficulty. Participants were approximately 70 female and 40 male students in Dr. Knopp's Spring 2008 Principles of Biochemistry course (BCH 451 Sections 002 and 003). All participants were given the same 50-minute examinations. The individual performance on every question for three out of the four examinations was recorded, and the percentages were calculated from these raw scores. The questions on the examinations were assigned different difficulty levels based on Bloom's taxonomy. A question weighted data analysis was utilized to normalize and to test for significant differences ( $p < 0.05$ ) in these data. Specifically, the means and standard deviations of the percent scores within a particular category were calculated separately for responses from males and females. Of the 6 categories delineated by Benjamin Bloom, results indicate significant statistical differences in gender performance for knowledge-specifics question category where females performed better than males on the third examination. For the analysis question category on the second and third examinations, males performed better than females. On the synthesis question category for the first and third examinations, males also performed better than females. There was no significant statistical difference for the knowledge-universals and abstractions, comprehension, and application categories between males and females.

# ABSTRACT NUMBER

T-14

**Student Author(s):** Ashton D. Mudd

**Department(s):** Biological Sciences-Nutrition

**Teaching Mentor(s):** Sarah Ash/Food, Bioprocessing and Nutrition Sciences

**Title of Presentation:** Pictorial Guide to Assist with the Estimation of Dietary Intake for NTR 301

As a teaching assistant for NTR 301, I attempted to aid students with their food diary project by creating a pictorial guide to assist with the estimation of dietary intake. The food diary project is a major component of the course in which the students record their food and beverage consumption for five to seven days. The students input their dietary intake into a food analysis program which gives information regarding macronutrient and micronutrient intake. The instructor, Dr. Sarah Ash, expressed that a major obstacle to completing the food diary project for the students is estimating how much food they consumed; the general trend for students is to underestimate their intake, specifically relative to restaurant portions. In order to help students better estimate the amount of food they consumed, I constructed a booklet that provided students with pictures of different foods in different measurements. I took pictures of commonly consumed foods such as rice, cereal and pasta. I also received take-out orders from popular restaurants and took pictures of the meals from the restaurants. After the students completed the food diary project, they completed a survey to assess the benefit of the booklet. On a scale from one to five, with one being not helpful and five being very helpful, 221 out of 291 students rated the booklet with a three or greater, deeming the booklet helpful in assessing dietary intake. An “informal” analysis by the instructor indicated that there were many fewer students reporting total calorie intake below 1,000 calories, which has been common in previous semesters. Students also gave feedback regarding which foods were beneficial to have pictures of and foods that they would like to see added to the booklet. They also specified whether they would prefer the booklet or would prefer an online pictorial guide.

# ABSTRACT NUMBER

T-15

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**Department(s):** Biological Sciences, Biochemistry

**Teaching Mentor(s):** William A. Hoffmann/Plant Biology

**Title of Presentation:** Making a Movie on Climate Change

As a small group, we addressed a variety of topics relating to climate change. We begin with addressing greenhouse gases, patterns in temperature change, and how the ocean and the cryosphere play a role in climate change. Finally, we take a look at how agriculture, rainforests, and biodiversity will be affected by climate change. These ideas were presented in a movie format similar to the “Bill Nye the Science Guy” series that is commonly shown in elementary and middle schools. By doing this, we had hoped to present the information in an entertaining way, while also providing visual metaphors for what is occurring in our surrounding environment. For example, to demonstrate how glacier melting will affect life in the arctic, we used a Lego polar bear and a sink in Sullivan Hall. The sink was first filled with ice to demonstrate a solid glacier, with the polar bear on top. Then, the sink was shown filled with water, with the polar bear at the bottom of the sink, to demonstrate what will happen when the animals in the arctic lose their environment. Other visuals were used for the different topics addressed in our video. In our poster, we will provide the information we found in our research as well as the visuals we used to present the information in the video.

# ABSTRACT NUMBER

T-16

**Student Author(s):** Laura L.Sims  
**Department(s):** Plant Biology  
**Teaching Mentor(s):** Barbara Thakor/Plant Biology  
**Title of Presentation:** Evaluating the Importance of Classroom Interaction

Technology and online classes have enabled students to do virtually everything on the computer minimizing “face to face” interactions. But can technology really replace the in-class experience? This study focuses on the importance of classroom interaction and how interaction affects student outcomes; analyzing the rise in student exam scores (over two semesters and three lab classes) compared with time in lecture/lab and the trend in quiz grades associated with an interactive lab. I also examine what interaction means in the context of this research. This study indicates that classroom interaction should not be replaced by technology. Instead, technology is complimented by a classroom environment in which the students stand to gain what they will not acquire outside the classroom, an interactive understanding of the material. To achieve this goal, an active approach to engagement between instructor and students should be taken. The knowledge gained by the instructor from this active engagement can then be used to transform student questions into quiz questions. Past studies have shown the number of minorities earning a PhD in the natural sciences has increased steadily over the past twenty five years. With an increase in diversity, the avenues of communication need to be wide open, starting at the undergraduate level. The interactive lab environment allows for this type of interface and is the best possible approach for challenging students and creating a balance between technological advancement and student understanding.

# ABSTRACT NUMBER

T-17

**Student Author(s):** Elizabeth E. Swicegood  
**Department(s):** Biological Sciences  
**Teaching Mentor(s):** Wendell H. McKenzie/Genetics  
**Title of Presentation:** Might Genetics Education Influence Perspectives Regarding Contentious Topics?

Students are confronted with numerous controversial topics which are discussed in several college courses; sometimes the material presented conflicts with their opinions or beliefs. In genetics, for example, such topics include stem cell research, implications of the Human Genome Project, gender orientation, and whether procedures, such as amniocentesis, should be offered. Throughout society, demographics presumably influence one's position as well as the strength of position regarding these matters. A survey was constructed to evaluate whether an introductory genetics course (GN 301: Genetics in Human Affairs) affects students' opinions on controversial topics presented and if background variables correlate with significant change in position. It was hypothesized that students who have been less exposed to the topics, such as younger students, liberal arts majors, and those from smaller hometowns, will be more apt to change. However, students who are strongly influenced by their religion will be less likely to change. The survey consisted of two parts: background variables and opinion statements. The students completed the same survey at the beginning and at the end of the Fall 2007 Semester. The data was compiled using Microsoft Excel, which sorted the demographic variables and student responses. The results of the pre- and post-semester survey were then compared, using variance and standard deviation with a 5% significance level. Each variable showed a slight change in opinion. The greatest amount of change was shown when students began the course with a neutral stance but then had a much stronger position at the end of the semester. Because of the significant change from a neutral position to a much stronger opinion, one can conclude that the information presented during the course gave the students the ability to evaluate their positions more thoroughly and with a more informed, educated basis.

# ABSTRACT NUMBER

# T-18

**Student Author(s):** Joseph A. Thomas  
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**Department(s):** Biological Sciences  
Biological Sciences

**Teaching Mentor(s):** Marianne Niedzlek-Feaver/Zoology

**Title of Presentation:** Redesigning the Introductory Biology (BIO 181) Laboratory Course

Students often overlook the organization, time, and energy required to design a lab. We have to admit that we have been guilty of thinking a lab is too boring, or too simplistic. This past summer we were privileged to be part of a team of four undergraduate students that were responsible for re-designing the introductory Biology (BIO 181) laboratory course at North Carolina State University. It didn't take us long to realize that designing a lab, and testing it, is not an easy task. As part of the re-design team, it was our job to test the newly designed labs that the faculty and staff came up with to see how long the lab would take, how clear the instructions were written, and if the main concepts that the faculty and staff wanted to get across were apparent upon conclusion of the lab. All undergraduates, ourselves included, kept a journal of the daily activities and recorded information about every lab we tested. In this journal, along with how long the lab took, how clear the instructions were, and if the main concepts were distinct, we offered ideas of how to make the lab better, and our general impression of how freshman biology students would view each lab. The lab re-design lasted about eight weeks, and kept us busy the entire time. When it was all said and done, we helped with the design of nine complete labs, and three extensive lab projects. Although we concluded shortly after the second summer session, this BIO 181 lab course was complete, including the lab manual, at the start of the Fall semester.