INHIBITION OF CYTOCHROME P450 BY NAPHTHYL AND ADAMANTYL ACETYLENES

Mentor: Nancy Eddy Hopkins
Cell & Molecular Biology
Stern 4009
862-3162
E-mail: nhopkin@tulane.edu

Project Description:
Cytochrome P450 (CYP) enzymes are an important super family of enzymes. These enzymes are involved in the production and destruction of steroid hormones, in the cytokine response, in the metabolism of foreign compounds and drugs, and in carcinogenesis. Our laboratory is studying possible inhibitors of several CYP enzymes.

The compounds we are studying have been synthesized by Dr. William Alworth's laboratory at Tulane and Dr. Maryam Foroozesh's laboratory at Xavier. These compounds are acetylene derivatives of known substrates of several important CYP enzymes. We are seeking to find compounds that inhibit by mechanism-based inhibition. In this type of inhibition, the enzyme metabolizes the inhibitor to its active form. The activated inhibitor then covalently binds to the enzyme and destroys it. Important implications of this research include developing anti-carcinogens and developing cancer drugs.

Project Objectives:
The objectives of this project include testing a group of recently synthesized adamantyl and naphthyl acetylenes to determine if they are inhibitors of CYP 1A1, 1A2 and 2B1 *in vitro*. We will be using commercial available human enzymes produced in culture in a fluorescence assay with a selective resorufin substrate. We will screen the compounds to determine which compounds are inhibitors. Using kinetic analysis methods we will determine the type of inhibition and the K_I and k_i kinetic inhibition parameters. This work will identify promising compounds to test further in cell culture or animal models and will give us insight to design better inhibitors.

Prerequisites:
Students who have completed organic chemistry and introductory biology will be able to carry out this work. Knowledge of cell biology and biochemistry are useful but not necessary.

NATURAL PRODUCT ANALOGS AS INHIBITORS OF PROSTATE CANCER CELL PROLIFERATION

Mentor: Nancy Eddy Hopkins
Cell & Molecular Biology
Stern 4009
862-3162
E-mail: nhopkin@tulane.edu

Project Description:
Prostate cancer is an extremely common form of cancer and the incidence approaches 95% in elderly men. Treatment options include surgery, radiation and chemotherapy and these options and, therefore, the mortality rate has not appreciably changed in almost thirty years. New treatments and adjunct treatments are needed if the cure rate of this cancer is to improve. Our laboratory is screening analogs of promising natural products as possible chemotherapeutic agents.

The compounds that we are testing were synthesized in the laboratories of Dr. William Alworth, Tulane University, and Dr. Maryam Foroozesh, Xavier University. Several natural products such as curcumin have been shown to be effective inhibitors of cell proliferation in prostate tumor cells in high doses. By modifying selected functional groups, we hope to improve the inhibition. Compounds which show inhibition of cell growth in cell will be sent to Addanki Kumar at the University of Colorado for testing in a mouse model system.

Project Objectives:
The objectives of this project is to test a series of curcumin analogs with two prostate cancer cell lines, DU 145 and LNCaP, in a colorimetric cell proliferation assay. Those compounds that show good inhibition of growth in this assay will be tested to determine if the decrease in proliferation is due to cytotoxicity, induced apoptosis, or cell cycle arrest. This work is important in establishing which compounds are candidates for future study and to establish the mechanism of action of the compound to determine its best possible use in combined therapy.

Prerequisites:
Students who have completed general chemistry and introductory biology will be able to carry out this work. Knowledge of cell and/or molecular biology and biochemistry are useful but not necessary. This work requires strict attention to detail and the ability to follow protocols exactly.

SHAPE EVOLUTION IN FISHES OF THE SUBFAMILY ICTIOBINAE

Mentor: Henry L. Bart, Jr., Ph.D.
Associate Professor
Department of Ecology and Evolutionary Biology
Tulane University
310 Dinwiddie Hall
New Orleans, LA 70118.
(504) 862-8283
E-Mail: hank@museum.tulane.edu

Project Description:

Fishes of the subfamily Ictiobinae are large, bottom feeding forms native to large rivers and lakes in eastern North America (inclusive of Mexico). Seven species are currently recognized in the two extant genera: *Carpiodes* and *Ictiobus*. However, most ichthyologists consider the group to be much more diverse, with each of the current species representing complexes of two to many species. The seven currently recognized ictiobine species are easily distinguished on the basis of shape characteristics such as proportions of the head and body, size and shape of the eye, length of the snout, position of the nostrils, size and height of the fins, and size and position of the mouth. Considerable shape variation also exists within species, and many ichthyologists consider this variation to be taxonomically informative.

In this project, students will use modern, computer-based methods of morphometrics (shape analysis) to quantify shape differences within current ictiobine species complexes and to interpret this information taxonomically. Data on overall shape and shape-change during growth will be gathered for different populations of select ictiobine species using an image-analysis system. Analysis of the images will reveal patterns of shape evolution and may confirm the existence of new species within the ranges of currently recognized ictiobine species. (For additional background on this project, please visit the web site: http://www.museum.tulane.edu/ictiobin).

Project Objectives:

During the 10-week period, participants will gain experience with:

Formulating and testing scientific hypotheses;

Modern methods of morphometrics and systematic ichthyology;

Computer analysis of data, scientific report writing and presentation of results.

Prerequisites:

Completion of sophomore year, GPA of 3.00 or higher, aptitude and motivation for advanced study in fish biology.

SYNTHESIS OF MATERIALS FOR ELECTROLUMINESCENCE APPLICATIONS

Mentor: Russ Schmehl
Department of Chemistry
Tulane University
5059 Percival Stern Bldg.
New Orleans, LA 70118
(504) 862-3566
E-mail: russ@tulane.edu

Project Description:
Organic light emitting diodes and electroluminescent organics have attracted considerable interest in the recent past because of their potential applications in display devices. Various derivatives of poly-phenylene vinylene appear to show promise because of their excellent luminescence characteristics. Recently we have been working on the synthesis of phenylene-vinylene units containing nitrogen heterocyclic ligands that can be polymerized by coordination of the nitrogen heterocycle to metal ions (i.e. Zn^{2+}, Fe^{2+}, Ru^{2+}, Ir^{3+}). The luminescence of the derivatives we have made thus far spans the green and red portions of the spectrum. Our need is to develop additional derivatives that exhibit blue emission.

Project Objectives:
Make electroluminescent metal organic compounds that emit blue light. Synthesize nitrogen heterocyclic molecules and metal complexes of the molecules. Examine the luminescence of the molecules. Work on the construction of electroluminescent cells.

Prerequisites:
A student with a background in Organic Chemistry is preferred. The student will spend most of his/her time doing synthesis of organic and metal organic compounds. Students will gain experience in synthetic methodology, NMR spectroscopy and fluorescence spectroscopy.

STRUCTURE OF STANDING WAVES IN CHAOTIC DYNAMICAL SYSTEMS

Mentor: Lev Kaplan
Physics Department
5046 Stern Hall
Tulane University
Phone: 504-862-3176
E-mail: lkaplan@tulane.edu

Project Description:
When a dynamical system exhibits simple, regular behavior due to a high level of symmetry (for example, the motion of a billiard ball on a rectangular or circular pool table without friction), the corresponding excitations or standing wave patterns (for example, the waves that can be excited on a rectangular or circular drumhead) are similarly simple. There is a direct correspondence between the billiard ball motion and the waves on the drum, known as classical—quantum correspondence, or ray—wave correspondence in optics. In dynamical systems that exhibit unstable, chaotic behavior (for example, motion on a pool table with an irregularly-shaped boundaries), the possible excitations (standing wave patterns on a drumhead with an unusual shape) are much more complex, but still bear imprints of the corresponding billiard-ball dynamics. This research involves a combination of theoretical work and computer simulations. It has possible application to multiple areas of physics such as atomic, nuclear, molecular, optical, microwave, and nanoscale physics.

Project Objectives:
The goal is to increase our understanding of how we can use information about billiard-ball bounces to make predictions about the statistical properties of drum oscillations. In particular, we want to extend our current understanding of this problem to a variety of distance scales, predicting wave patterns on scales much larger than or much smaller than a single wavelength. We also want to understand how existing theories can be extended to situations where the wavelength becomes comparable to the size of the drumhead, or where the irregularities are very strong.

Prerequisites or Experience Required:
Some familiarity with computer programming (any language) is very desirable. This research would be most appropriate for a student with a strong interest in theoretical science, applied mathematics, or numerical computation.

A NOVEL METHOD OF DESALINATION OF SEA WATER

Mentor: Vijay John
Chemical and Biomolecular Engineering Department
Tulane University
329 Lindy Boggs Center
New Orleans, LA 70118
(504) 865-5883
E-mail: vijay.john@tulane.edu

Project Description:
We are working on a method for seawater desalination using the technology of clathrate hydrates. These are ice-like structures formed from water and gas (see the web site http://www.netl.doe.gov/scng/hydrate/ for some neat information on hydrates) and are extensively found in the Earth's subsurface especially under the sea floor and in the arctic regions. But we make hydrates in the laboratory!

Project Objectives:
Since ice is essentially pure water, our objective is to make these ice-like structures from seawater and thus remove the salt. If successful, this project will have an enormous impact on the world's water supply.

Prerequisites:
A strong curiosity for science and the desire to get your hands dirty.

NANOTECHNOLOGY: A NEW WORLD BUILT FROM SMALL THINGS

Mentor: Yunfeng Lu
Chemical and Biomolecular Engineering Department
Lindy Boggs Center Room 327
Tulane University
New Orleans, LA 70118
Phone: 504-865-5827
E-mail: ylu@tulane.edu

Project Description:
Nanotechnology, including nanoscale science, engineering, and technology, holds the ability to manipulate individual atoms and molecules and to create large structures with fundamentally new properties and functions. These emerging fields are leading us to unprecedented understanding and control over the basic building blocks and properties of all natural and man-made things. The success of nanotechnology could revolutionize the 21^{st} century in the same way that the transistor and Internet led to the information age.

Nanostructures with critical dimensions less than 100 nm endow materials with unique and often superior mechanical, electronic, magnetic and optical properties, which can open a new avenue to numerous advanced applications. The method of self-assembly that spontaneously assembles and organizes various building blocks into hierarchical structures via non-covalent interactions has emerged as one of the most promising techniques to the efficient fabrication of nanostructured materials.

The research projects proposed for the LS-LAMP Summer Research Training Program will be the synthesis of the nanostructured materials using self-assembly and their applications in high-efficiency solar cells, fuel cells, catalysts, sensors, and thermoelectrics. More specifically, the research will be focused on the synthesis of nanowires with diameters less than 10 nm to convert solar energy, hydrogen, and heat from car engines into useful electricity. The use of hydrogen as fuels will allow one to build cars with zero emission, which is critical for our environmental protection.

Project Objectives:
Objectives of the research are to motivate students, in particular minority students, to participate research and education in nanotechnology, to broaden their scopes in materials science, and to develop their capabilities in learning new knowledge and solving problems. The ultimate goal is to blossom the field of nanotechnology through educating students, in particular, the under-representative minority students.

Prerequisites:
Some background in chemistry or materials science.

FORMATION AND CHARACTERIZATION OF METAL-CERAMIC NANOCOMPOSITES

Mentor: Brian S. Mitchell
Chemical and Biomolecular Engineering Department
322 Boggs Building
Tulane University
New Orleans, LA 70118
(504) 862-8257
E-mail: brian@tulane.edu

Project Description:
Aluminum is important for many structural applications, particularly automotive, due to its relatively low density, combination of favorable mechanical properties, and corrosion resistance. Attempts to improve the properties of aluminum have been aimed at increasing its hardness and wear resistance, particularly at elevated temperatures, while maintaining the advantages offered by a ductile metal. Nanocrystalline aluminum and aluminum nanocomposites are being explored as possible avenues for property enhancement. The driving force behind these nanoscale investigations is the concept that as the crystal grain size decreases, either for the metal or reinforcement, the surface to volume ratio of the particles increases dramatically, as does the interfacial area between the particles. As much as 20-50% of the nanocrystalline material consists of interface. Hence, the bulk properties can be at least influenced and, at most, dictated, by the intergranular and interfacial regions of the material.

The type of nanocrystalline metals of concern here are those produced by mechanical attrition; a.k.a., *high energy ball milling*. This method has advantages over other methods of nanoscale formation (such as electrodeposition, sputtering, and thermochemical synthesis) primarily because it relies upon structural decomposition instead of cluster assembly. The reinforcement of aluminum by ceramic particles and fibers is also well researched, but very little work has been done on the development of novel MMCs that contain both nanoscale matrix and reinforcement phases.

The purpose of this project is manufacture and characterize aluminum/mullite nanocomposites and to optimize their mechanical/corrosion properties.

Project Objectives:
? Use high energy ball mill to form nanocrystalline metals and ceramics in various proportions.
? Prepare pre-pressed pellets to send out for Hot Isostatic Pressing (HIP).
? Analyze HIPed nanocomposites for physical properties (density), mechanical properties (strength and modulus) and corrosion resistance.
? Optimize composition and processing conditions to give best combination of properties in composite.

Prerequisites:
Completion of sophomore year in any of the natural or physical sciences or engineering. Student should have completed calculus, physics and chemistry sequences. Good communication skills and an ability to work with one’s hands are a must.

REPAIR OF TIMBER BRIDGE STRINGERS

Mentor: Dr. Anthony J. Lamanna
201 Walter Blessey Hall
Department of Civil & Environmental Engineering
504-862-3269
E-mail: lamanna@tulane.edu

Project Description:
Timber stringers tend to exhibit five types of damage:

1. Interior decay along the span.
2. Top, bottom, or corner damage, with full width vertical splits inclined toward the bottom face.
3. Side or corner damage with full width corner splits inclined toward the side face.
4. Horizontal splits not within three inches of the top and bottom faces through the full width.
5. Any damage within 15 inches of the face cap, including interior decay, side damage, crushing and splitting.

These damage types are shown in Figure 1.

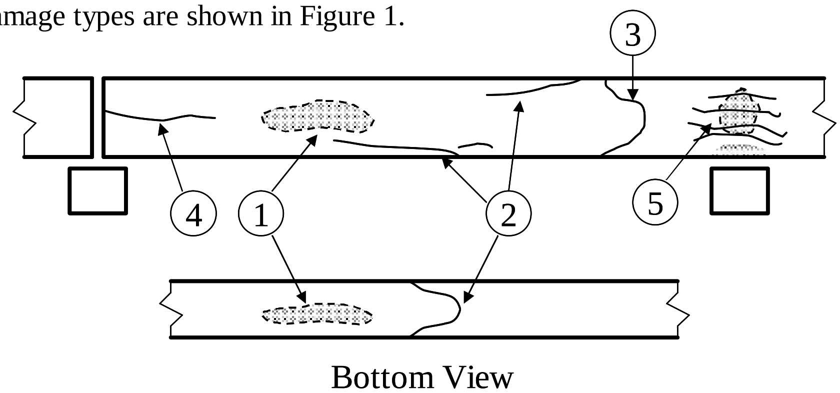

Figure 1: Stringer damage types.

The most commonly encountered damage type in timber stringers in bridge structures is type 4. These splits can often stretch the entire length of the span. This cracking is induced by shear stresses and severely impacts the strength of the timber member.

Project Objectives:
The objective of the proposed research is to investigate the feasibility of repairing timber bridge stringers that show signs of horizontal shear cracking along the length of the member. Existing repair techniques will be examined, and the feasibility and efficiency of attaching fiber reinforced polymer (FRP) strips to the sides of the stringers with mechanical fasteners will be investigated.

The LAMP student will assist a graduate student in repairing timber stringers, setting up laboratory instrumentation, and running tests. The LAMP student will also assist in analyzing the results.

Prerequisites

1. ENGR 241 Statics or equivalent
2. ENGR 243 Mechanics of Materials or equivalent
3. Ability to lift 50 pounds
4. Experience or willingness to work with power tools

NONDESTRUCTIVE EVALUATION OF FRP MATERIALS AT ELEVATED TEMPERATURE

Mentor: Paul H. Ziehl, Ph.D., P.E.
206 Civil Engineering Building
Dept. of Civil and Environmental Engineering
Tulane University
New Orleans, Louisiana 70118
504 862 3252

Project Description:

The research involves an ongoing project at Tulane University that is concerned with the nondestructive evaluation of fiber reinforced polymer components. These materials have a very high strength-to-weight ratio and are resistant to fatigue and most chemical environments. In addition, they will not corrode in the presence of moisture.

Acoustic emission monitoring is one way in which structures can be monitored to determine their long-term suitability in the constructed environment. When damage takes place within a structure, stress waves are generated that can be detected on the surface of a structure with a piezo-electric crystal. The interpretation of these captured waves is then used to determine the level damage that has occurred internally to the structure.

Project Objectives:

The use of acoustic emission has been proposed for a number of civil engineering and aerospace applications. In many cases, the structural system to be evaluated is subjected to elevated temperatures. In some cases, these temperatures can be extreme. The objective of this research investigation is to determine the effect of elevated temperature on the received acoustic emission data and the interpretation of that data. Specimens to be tested are 1/4" thick by 1.5" wide by 30" long fiber reinforced polymer specimens.

Prerequisites or experience required

No prerequisites or experience is required. An interest in structural or materials engineering will be helpful.

DYNAMIC BIOLOGICAL DATABASE WEB INTERFACE AND PERFORMANCE ANALYSIS

Mentor: Dale Joachim
Electrical Engineering and Computer Science
217 Stanley Thomas Hall
504-862-3297
E-mail: joachimd@tulane.edu

Project Description:
This project participates in the establishment a database structure for analysis of data acquired by sensors that capture sound, location and (in some occasions) images of particular biological sound emitters (such bird chirping). The database is internet accessible and uses standard accessibility protocols.

Project Objectives:
The scope of the LS-LAMP's participation includes Web design, compatibility study, performance analysis and, depending on the expertise of the student, database programming.
The Web design interface must be intuitive, logical, simple and tailored for both the scientific and K-12 communities. The design will therefore be implemented with feedback from biologists and K-12 students. In addition, the K-12 design must also be interesting and fun.

The compatibility studies include accessing the database using standard established protocols (such as DiGIR) and verifying proper functioning. The student will design accessibility test suites, participate in the correction of any discrepancies and write a compatibility report.
As part of the performance analysis, the student will test the outer bounds of the database in real-time data collection, service to end-users and querying ability. The student will design test suites for maximum data acquisition and will measure the system's performance. The student will also measure the response times to the web-users depending on the database load and make improvement recommendations. The student will also design querying tests and will observe the systems ability to accurately respond to such queries.

Depending on her/his ability and knowledge, the student may also participate in the actual database and querying interface design.

Prerequisites:
Knowledge of html, php and perhaps mySQL desirable. Extensive programming experience in other languages such as C, C++ or Unix scripts will substitute for lack of knowledge in web-based programming. Ability to work in teams and independently design and execute test suites a must.

CELLULAR TELEPHONE BROADCASTING AND RECORDING STATION

Mentor: Dale Joachim
Electrical Engineering and Computer Science
217 Stanley Thomas Hall
504-862-3297
E-mail: joachimd@tulane.edu

Project Description:
As part of a development effort to remotely monitor wildlife, we have proposed cellular telephone communication as transport methods for sound and data to/from a central laboratory to remote stations. These remote stations include cellular telephone, necessary analog and digital logic (including digital signal processing) electronics to effectively broadcast and record environmental sounds.

Project Objectives:
The scope of the LS-LAMP's participation includes remote broadcast and recording system design, field tests of the broadcast apparatus, and performance assessment of the data embedding system.

The student will design an attachment to the telephone earbud capable of broadcast and recording in an outdoor environment (an telephone conferencing system for the outdoor environment). This attachment must be robust and operational for relatively distant sounds over a 360-degree azimuth range and 180-degree elevation (up/down). The design will include analog devices for signal conversion and power conditioning and monitoring, all using a minimum amount of power. The design may be an improvement/adaptation of existing solutions or a new technology idea.

Field test will include environmental sounds simulations by people (a person/team outdoors producing the sounds) while the sounds are verified inside the laboratory. Then the outdoor team will monitor and relay outdoor sounds (as ground truth) to the laboratory.
The effectiveness of the system will be tested in conjunction with the help of ornithology experts: the students and experts will monitor (bird) responses to particular artificially generated vocalization. These tests will determine the adequacy of cellular telephones as communication methods to wildlife.

The student(s) will also test the remote data embedding (say temperature sensing) system by measuring remote sensing data and comparing it to the laboratory numbers.

Prerequisites:
Understanding of basic analog electronic circuit. Working knowledge of microcontrollers desirable. Understanding of cellular communication channel or sound acoustics is an added advantage.

ACOUSTIC DIRECTION FINDING SENSOR ASSESSMENT

Mentor: Dale Joachim
Electrical Engineering and Computer Science
217 Stanley Thomas Hall
504-862-3297
E-mail: joachimd@tulane.edu

Project Description:
In this project we use closely positioned microphones to estimate the location of sound source emitters. This design is part of a miniaturization project that will shrink a complete acoustic direction finding sensor into an inch-sized dice. Large-scale prototypes designed in the laboratory will be tested in this summer's student project.

Project Objectives:
The LS-LAMP sponsored student will design a web-based test suite for a large scale acoustic direction-finding sensor, investigate the performance of smaller geometries by modifying the algorithms and the current apparatus, and will determine the performance limits on the algorithm and associated processing environment. The student will also design an apparatus for testing the tracking potential of a system comprising of two or more direction finding sensors, a computer and a pan-tilt-zoom camera.

Acoustic direction-finding sensors "listen" to sounds and estimate the direction-of-arrival (DOA, the direction from which the sound was emitted) of a particular sound source. In a sound source localization environment, several DOAs are processed simultaneously to estimate the spatial location of a sound emitter.

The student will design a test suite to assess the performance of the apparatus in finding the DOAs of different sounds and locations. This experiment will provide researchers in the laboratory the data necessary to improve on the existing design. The students (depending on their background) may participate in the enhancement projects.

In addition to the localization experiments, the student will design an apparatus for testing the tracking potential of a larger system of sensors and programmable steerable camera for movable sound sources. This apparatus design will involve mechanical/electrical components, as well as "Matlab" programming.

Prerequisites:
Understanding of basic analog and digital circuits. Working knowledge of microcontrollers desirable. Working knowledge of "Matlab" and "C" programming environments. Creative electro/mechanical apparatus design for emulating a moving sound emitter.

COMPUTER CONTROL OF A PROTOTYPE UNDERWATER ROBOT FOR ENVIRONMENTAL MONITORING

Mentor: S. Raj Pandian
407 Stanley Thomas Hall
Electrical Engineering and Computer Science Department
Tulane University, New Orleans, LA 70118
Phone: (504) 862-3294
E-mail: pandian@eecs.tulane.edu

Project Description:
Environmental monitoring of rivers, lakes, and other ecosystems has become a major economic, social, and academic concern. Underwater robotics plays an increasingly important role in the monitoring of ecosystems, due to advantages of low cost, safety, and convenience. The current project focuses on the computer control of an underwater robot – consisting of a remotely operated vehicle (ROV) and a manipulator – for environmental monitoring. A low-cost, proof-of-concept prototype capable of navigating the shallow waters of the aquatic environments around New Orleans (e.g., the Mississippi River, Lake Pontchartrain, and the Gulf Coast) is currently being developed. The mentored student will have the opportunity to work on computer control of the prototype robot, in collaboration with the faculty and Tulane graduate students.

Project Objectives:
The mentored student will work on the computer control of the ROV and manipulator using a portable, laptop computer. The programming environment will be Visual Basic or Visual C++. The computer control consists of data collection from various sensors using a PCMCIA analog to digital converter card, and issuing control commands to the vehicle and manipulator actuators using a PCMCIA digital to analog converter card. The data collected from various environmental sensors will be stored in a data base for interpretation later. The student will develop a graphical user interface for data collection and manual control of the robot-manipulator. Depending on completion of these tasks, the student might also be able to participate in research on computer control of the underwater robot over the Internet, and development of a programming language to enable school children to control the robot to perform specific tasks and do environmental monitoring.

Prerequisites or Experience Required:
Background in electrical engineering, computer engineering/science, or mechanical engineering. Experience in computer programming on Windows PCs, preferably Visual Basic and/or Visual C++. Familiarity with computerized data acquisition is desirable but not essential.

ASSESSMENT OF THE IMPACT OF TOXIC CHEMICALS ON HUMANS AND THE ENVIRONMENT

Mentor: Assaf Abdelghani, DSC
Professor and Laboratory Director
The Environmental Health Laboratories
School of Public Health and Tropical Medicine
1501 Canal Street , New Orleans , LA 70112
(504) 584-2769
E-mail: assafa@tulane.edu

Project Description:
This ten-week summer internship will train two undergraduate students (LAMP Participants) about the Assessment of the impact of Toxic Chemicals on Humans and the Environment. Participants will be assisted to design experiments about evaluation of toxicity testing of organic and inorganic environmental xenobiotic. They will be guided in conducting these experiments in a laboratory setting by exposing aquatic organisms to different concentrations of toxicants. They will learn how to use analytical lab equipment and determine the levels of these contaminants in tissues of exposed animals. They will be trained on monitoring selected water parameters. These include dissolved oxygen, Ph, temperature, alkalinity and hardness. Finally, students are expected to learn and apply statistical methods to the interpretation of their data. Participants will write a final report and present it to a group of faculty and students.

Project Objectives:
Upon the completion of the Internship, students will be able to:

1) Design and implement a toxicity evaluation experiment.
2) Use statistical models to analyze and interpret the experimental results.
3) Use analytical lab equipment to measure the toxicant levels in abiotic and biotic samples.
4) Assess the risk of study chemicals to humans and the environment using available risk assessment models.
5) Write a scientific report and present it to a group of scientists.

Prerequisites:
A basic knowledge of biology, math and chemistry is much desirable. Motivation and commitment are extremely important.

NEW MEDICINES FOR THE TREATMENT OF CHRONIC PAIN

Mentor: Bradley K. Taylor, Ph.D.
Assistant Professor
Department of Pharmacology, SL83
Tulane University School of Medicine
3731 Tulane Avenue
New Orleans, LA 70112
504-988-3354
E-mail: taylorb@tulane.edu

Project Description:
Analgesic drugs like aspirin, ibuprofen, and Tylenol effectively treat acute pain, such as minor cuts, bruises, and headaches. Much more difficult is the treatment of chronic pain, such as with arthritis or lower back pain. Our medical sciences laboratory is studying how chemical changes in the spinal cord and brain might lead to chronic pain. Our approach is to study the body's natural pain-killers, including the endorphins (thought to cause the runner's "high") and other neuropeptides. Our work will contribute to the development of more effective drugs for the treatment of chronic pain. Further information can be obtained on our website: http://www.som.tulane.edu/departments/pharmacology/Faculty/Taylor.htm

Project Objectives:
1. Complete a pharmacology (drug research) experiment in rats or mice.
2. Analyze neurons in the brain or spinal cord after dissection.
3. Learn and utilize some molecular biological techniques.

Prerequisites:
This project is ideal for students considering a profession in the medical sciences. Requires some biological laboratory experience, such as mammalian dissection. Laboratory experience in chemistry a plus.