



A SUMMER OF SCIENCE AT LOYOLA--AND MORE!!



The Academy of Applied Sciences and Loyola University Chicago are proud to announce the continuation of an exciting program designed to give high school students a rare opportunity to engage in cutting-edge scientific research.

The Research and Engineering Apprenticeship Program (REAP) is looking for current high school students of exceptional academic merit who are considering a career in science or science related areas.

Successful applicants to REAP will spend a summer at Loyola working in a close relationship with one of our top scientists on an ongoing research project. In addition to the opportunity to work with a research active scientist in a significant area of study, participants will receive a summer salary of \$1,100.00. In addition to this stipend, students will receive an allowance of \$100.00 for parking/commuter fees.

Many students working with Loyola professors have published papers in the professional literature and have presented their findings at regional and national conferences. This is an invaluable experience and provides an enviable set of credentials for students planning on applying to undergraduate, professional or medical schools.

All current high school students (except graduating seniors) are eligible to apply. Applicants must be US citizens or have permanent resident status. Applications must be postmarked no later than 13 May 2011. Applicants must submit a completed application form, a high school transcript, and letter of recommendation from a science teacher. The letter of recommendation must be typed and on school stationery. Letters may be submitted directly to Loyola, or included with the student's application. If included with the student's application, the letter must be placed in a sealed school envelope with the recommender's signature across the back flap. If standardized test scores are available (ACT/SAT), they may be submitted but are not required.

All students applying for the REAP internship must apply directly with the AEOP (Army Educational Out Reach Program) as well as following our procedures. The web site address is www.usaeop.com/aeop.htm, click on apply now (bottom left) being sure to select students, next page use drop down box and select REAP. Please follow the rest of the direction.

Once students are notified of their selection, they will work out the details of their beginning/end dates with their individual faculty mentor. Projects typically begin at the end of June or beginning of July, and end in early-mid August, but scheduling is somewhat flexible. Students can expect to spend approximately 25-30 hours on campus each week as part of this program.

Questions concerning REAP may be directed to Dr. William Kroll at 773-508-3287 or via email (wkroll@luc.edu). All application materials should be sent to:



Dr. William Kroll
Department of Biology
Loyola University Chicago
1032 W. Sheridan Rd.
Chicago, IL 60660
Telephone: 773-508-3287
Fax: (773) 508-3646



REAP 2011
APPLICATION FORM

Please complete questions 1-8 on this form, and type your answers to question 9 on separate sheets. Applicants must submit this application, a high school transcript, and a letter of reference from a science teacher. Your teacher must print this letter of support on school stationery. These letters should comment explicitly on the applicant's ability to engage in university level research. The letter may be sent directly to the address below, or may be submitted with the student's application. If submitted with the student's application, the letter must be in a sealed school envelope with the author's signature across the back.

1. Name _____
2. Social Security Number: _____
3. High School attended _____
4. Expected date of graduation: _____
5. Please indicate the research area you most wish to work with this summer by placing a "1" next to it. Place a "2" next to the research area you would like to work on if you are not able to get your first choice.

Dr. Paul Chiarelli - Chemistry Dept.

_____ The student will be involved in a project that involves the analysis of illicit drugs and their metabolites in different water sources. The goal of this project is to develop a means of drug testing targeted populations or groups of people without being personally invasive (testing single individuals). The information acquired in such studies could be used to inform anti-drug campaigns and public health policies. The student will have an opportunity to work with a new mass spectrometer and liquid chromatography system that is used to quantify these drugs in water.

Dr. Ken Olsen – Chemistry Dept.

_____ There are 3 major projects ongoing in my laboratory, listed below. The REAP student could work on any of them depending on his/her interests.

1. Synthesis of a Polymeric Hemoglobin Blood Substitute
This project involves purifying hemoglobin from blood and running a series of reactions to polymerize it in the presence of anti-oxidant enzymes that will protect it outside of the red blood cell. The student would then characterize the product in terms of molecular weight, stability, oxidation rate and oxygen binding ability. The student would learn the wet chemistry techniques needed to do both the preparation and characterization experiments.
2. Synthesis of New Photodynamic Therapy Agents
This project involves the preparation of light-activated compounds that specifically kill cancer cells. The student would be involved in biomacromolecular synthesis of PDT agents and to test them in cell culture or zebrafish. The exact compounds to be prepared next summer would depend on the status of the project at that time. The student would learn both synthesis and cell culture techniques for this project.

3. Molecular Dynamics of Ligand Protein Interactions

This is a computational project that involves simulating how small molecules bind to proteins. We are currently looking at the binding of gasses to globin proteins like hemoglobin and myoglobin. We are also examining control mechanisms by investigating allosteric enzymes and G-proteins involved in signal transduction. The student would learn about computational methods used to both simulate the motions of protein molecules and to display these motions as a movie. Due to the computer cluster available in the laboratory, this type of project is more likely to be finished during the summer than the other two.

Dr. Eric Schroeter – Biology Dept.

_____ My research focuses on using the zebrafish retina as a model system to understand how cells acquire their identity and differentiate into a functional tissue. Towards this goal we will be cloning control regions for genes that are important for this process and use them to express fluorescent proteins in the fish. This will allow us to watch the cells as they grow and move in the living fish.

6. Local Address (include apt. number if applicable as well as zip code):

7. Local phone number: _____

8. Email address: _____

9. a) Describe any scientific research experience you might have (lack of such experience does not disqualify applicants for the REAP). Specify the nature of the research, your role in the project, and where and when the research took place. b) Explain why you wish to work on the project you designated as your top choice in question 5 above. Your answer should reflect your knowledge of the general area of the research project as well as underscore any experience you have in this area or special skills you have that would make you a good choice for this project. Your answers for this question should not exceed three typewritten pages.

All application materials must be postmarked no later than 13 May 2011 and should be mailed to:

**Dr. William Kroll
Dept. of Biology
Loyola University Chicago
6525 N. Sheridan Rd.
Chicago, IL 60626**