

What is the High School Apprenticeship Program?

The High School Apprenticeship Program (HSAP) is an Air Force Research Laboratory Munitions Directorate sponsored program that is designed to hire promising young scientists from around the Eglin Air Force Base area. Our program at Eglin AFB is one of the largest and most successful in the Air Force. We hire approximately ten apprentices each summer. Generally we hire high school juniors who work for the two summers after their junior and senior years. They work for nine weeks under the guidance of a mentor who volunteers to provide a research project for them to work during the summer. At the end of each summer, each apprentice is expected to write a research paper and present an oral presentation at a seminar open to the public.

We request applications from eleven high schools and home-schooled students in a three-county area (Okaloosa, Walton and Santa Rosa counties) in which Eglin AFB is located. Applications are usually due the first of March (Postmark). The program is very competitive and popular with the local academic achievers. The intent of the program is to select top-notch students and encourage them to go into science and engineering related fields that could be beneficial to the Department of Defense. A typical apprentice is usually in the top five percent in his or her class. However, academics are not the only factors taken into consideration. Extracurricular activities such as clubs, offices held, sports, music activities, and science fair participation are also important. A panel of scientists and engineers conducts interviews with the top selected students to determine final selection.

Potential Job Areas

Students should indicate on the application if they are interested in an Air Force Research Laboratory job, or an Air Armament Center job or both.

Air Force Research Laboratory Job Areas

While specific job areas are not identified prior to apprentice selection, typically all job areas involve learning computer models, simulations, and engineering tools needed for analysis of data. Some jobs involve setting up and conducting tests to collect data needed for analysis efforts. Tests and/or data collection may involve laboratory testing or specific collection on Eglin ranges.

What do the Apprentices do?

Jobs are dependent on the mission needs of the organization. Although the specific jobs change each year, the areas of work are basically the same from year to year. The descriptions below were prepared by the apprentices working in the jobs.

Computer Model Comparisons

This project consists of comparing two atmospheric dispersion models used for predicting

downwind dispersion of chemicals. The two programs used were Vapor, Liquid, and Solid Tracking (VLStrack), and Atmospheric Dispersion of Reacting Agents (ADORA). Both programs model the dispersion of chemical and biological agents through the air. Several trial runs of each program were performed using the same parameters so that the outputs from the two programs could be compared. The purpose of the comparison was to determine the similarity or differences of outputs of each program.

Biomimetic Image Processing

The purpose of this job is to assist the image processing team in their analysis of images of target zones by entering data and testing algorithms. Images can be simulated of real world target areas. Analysis and processing of images includes learning the principles of noise and frequency in order to apply algorithms which increase or decrease contrast, enhance edges, and reduce noise - all in the effort to make targets more visible to guidance system against the image background.

Image Processing

The purpose of this job is to obtain image data and perform various processing procedures. Image data can be collected from sensors, such as cameras, or generated using MATLAB (a matrix-based programming language). Once data is obtained, various algorithms and filters can be applied to the digital forms of the image to sharpen, blur, or intensify the features of the images. Once this is completed the images can be used for target detection, image recognition, motion detection and tracking, and a variety of other procedures essential to developing guidance systems for various weapons systems.

Guidance and Control Engineering

The purpose of this job is to assist aerospace engineers in designing, simulating, and evaluating different guidance and control technologies and methodologies. The job is very mathematically oriented and involves much computer work. Familiarity with a computer programming, or multiple languages, especially C and FORTRAN, is a necessity for running and creating the computer simulations. MATLAB, a math and programming environment, is used on a daily basis for graphical analyses as well as for simulations. Mathematics above the calculus level is needed for this job and experience with linear algebra and differential equations would be very useful. All of these are used to simulate and design improved systems for guided munition technology.

Computational Tool Development

This summer's project was to complete two separate goals: the completion of an image analysis tool and a data translation tool. The image analysis tool made use of an existing program, and its embedded macro program module. It is used to analyze photos taken during impact tests. Due to calibration problems, this project remains unfinished. The data translation program was created to convert data so it could be used in two different computer programs. During the summer, both Pascal and Fortran had to be learned in order to complete the tasks.

Air Armament Center Job Areas

Web user interface design, development, and testing: A senior system engineer is the primary system back-end component designer, but the screen layouts need to be designed, developed, and tested under the supervision of the senior system engineer. Depending on the skills of the student, the student might be asked to perform code inspections (critical reviews of code written by a senior engineer) and make recommendations for improvement to the code before sending it to testing. A small part of the work will entail the creation of static web pages to support creation of help files.

Test Activity Support: Assist engineers in planning and execution of various test activities in support of the F-35 program at Eglin AFB. This may include Climatic Test planning, system and subsystem testing of bomb racks, Ordnance Quick Loading System (OQLS), and Ordnance Hoist

System (OHS).

Assist data manager in maintaining F-35 filing system, training plans, and Safety plan.

High School Apprenticeship Program (HSAP) Selection Criteria

1. All Applicants must be U.S. citizens, students in Okaloosa, Walton or Santa Rosa Counties and in the top 25% of their class academically. The student must provide a school generated transcript and a teacher recommendation.
2. Applications are considered only from high school Juniors. A student graduating from high school is eligible if the student participated in the program last year.
3. Factors considered in selection by the panel include:
 - Grades
 - Standardized test scores
 - Interest and ability in science, math and engineering
 - Science Fair activities
 - Extracurricular activities
 - Offices held in clubs, etc.
 - Communication skills
 - Maturity
 - Teacher recommendation
4. Student must be available to work for the entire summer, except for minor absences. Student should not have other obligations that would cause an absence over 1 week or daily obligations between the hours 0800 – 1600. Students must have transportation to Eglin AFB.
5. Final selection will involve matching apprentice skills (e.g. computer programming, math, physics) with the needs of mentor projects.
6. One student may be selected from the Regional Science Fair based on the criteria above.
7. Juniors who are chosen for the HSAP are generally invited to return the next summer.
- 8. As long as they meet the above criteria, all students are eligible for the HSAP regardless of parent income, employer, or length of residence in the area.**

Application Procedure

To apply for this program a student must meet the eligibility criteria, fill out the application form, obtain his/her school's endorsement and forward the application together with their high school transcript to **AFRL/RWGG, 101 W. Eglin Blvd., STE 236, ATTN: Michael Deiler, Eglin AFB, FL 32542-6810**, no later than March 1, 2011. **Applications postmarked, or submitted electronically after March 1, 2011 will not be accepted.** Electronic submissions are accepted. An electronic version of the application can be found in the High School Apprenticeship Program area on the AFRL Munitions Directorate Website at: <http://www.eglin.af.mil/units/afrlmunitionsdirectorate/> Scan all attachments, including transcript and email to michael.deiler@eglin.af.mil. All paper and electronic submissions will receive an email receipt, if an email is provided. The school endorsement can be prepared by any school official (teacher, gifted student program coordinator or principal) that has first hand knowledge of the student's ability to do independent work in science, engineering or mathematics. Students are not limited to the space available on the application form. Additional pages may be added for any pertinent information.

Selection Procedures

All applications will be reviewed by a committee of Laboratory scientists and engineers for compliance with the eligibility criteria. Candidates will be judged on their grades, courses completed, demonstrated ability in science, engineering or mathematics and participation in extracurricular activities. It is important that students do a thorough job of documenting their extracurricular activities. We are looking for well-rounded individuals. Students' participation, particularly in a leadership capacity, in athletics, band, school clubs and service organizations, civic groups, and other organizations and hobbies is an important factor in the selection process.

Applicants will be ranked in accordance with the aforementioned factors. The top candidates will be invited for an interview by a panel of scientists/engineers. During the interview, the panel will describe their technical areas and explore the student's areas of interest and capabilities to obtain the best possible match of student and the available research areas. All students will be notified in writing of their selection/non-selection. This usually occurs in March. Student must be available to work for the entire summer, except for minor absences. Student should not have other obligations that would cause an absence over 1 week or daily obligations between the hours 0800 – 1600.

Student Conduct

Students will be expected to behave in a professional manner, comply with all Laboratory rules and regulations and dress in a manner appropriate to a laboratory/office environment. Serious breaches can result in a student's removal from the program.

STUDENT APPLICATION FORM

AIR FORCE RESEARCH LABORATORY MUNITIONS DIRECTORATE

HIGH SCHOOL APPRENTICESHIP PROGRAM

NAME _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____ PHONE _____

Junior () Senior ()

Email Address _____

HIGH SCHOOL _____

U.S. CITIZEN () YES () NO (Must be U.S. citizen to apply)

OVERALL HS GPA**: Weighted _____ Unweighted _____

STANDARDIZED TEST SCORES**: PSAT INDEX _____ SAT _____ ACT _____ OTHER _____

** Attach Transcript and any Test Scores (PSAT, SAT, ACT, etc.) of Student

DO YOU HAVE ANY DISABILITIES THAT MUST BE ACCOMMODATED? () Yes () No

IF YES, PLEASE SPECIFY. _____

For the following items (A-F), you may use additional space as necessary:

A. Honors received (In or Out of School):

B. Major Academic Interests:

C. Other Hobbies, Interests, or Other School Activities:

D. Describe Your Participation in Math/Science Activities (Clubs, Fairs, Research):

E. Describe Your Experience with Computer Applications and any Computer Languages:

F. Write a short paragraph explaining why you want to participate in the summer apprenticeship program, including area(s) you are interested in performing research.

I, _____ (Parent or Legal Guardian Name), give permission for _____ (Student) to participate in the Air Force Research Laboratory High School Apprenticeship Program.

_____ (Parent Signature / Date)

I certify the above and attached information is correct.

_____ (Student Signature / Date)

TEACHER RECOMMENDATION(S)

Comment briefly on qualities of student related to participation as an apprentice.

Signature _____

Printed Name of School Official _____

Title: _____ Date _____

PRIVACY ACT STATEMENT

The U.S. Office of Personnel Management and other Federal agencies rate applicants for Federal jobs under the authority of sections 1104, 1302, 3301, 3304, 3320, 3361, 3393 and 3394 of title 5 of the United States Code. We need the information in this form to evaluate your qualifications. Failure to furnish the requested information may delay or prevent action on your application.

To be considered, this application, transcript(s) and any attachments must be postmarked no later than March 1st to AFRL/RWGG, 101 West Eglin Blvd, Ste 236, ATTN: Michael Deiler, Eglin AFB FL 32542. Electronic submissions accepted: michael.deiler@eglin.af.mil