The Pope M. & Grace C. Burkhart
Undergraduate Research Fellowship
Department of Physics
Weber State University

Introduction:
Research is a fundamental component of the scientific process. Consequently, in order to provide the best possible education for majors in the Department of Physics at Weber State University, it is important that our students have the opportunity to participate actively in research activities while working closely with highly trained faculty. Furthermore, it is becoming increasingly common for the best graduate schools to look favorably on applicants who have had an undergraduate research experience, and published the results of their work or presented their work at professional meetings.

Given the importance of the undergraduate research experience, the Pope M. & Grace C. Burkhart fellowship will be awarded to a qualifying student on a competitive basis to support his/her research during the summer months. With this opportunity, the successful candidate will be able to conduct meaningful research and advance his/her scientific education rather than needing to find temporary summer employment in areas unrelated to career goals. Furthermore, the work begun through the fellowship may be able to be continued through subsequent enrollment in PHYS 4800, 4970, or 4990.

Undergraduate research fellowships will be of benefit to the faculty as well. Long-term research projects can often be subdivided into smaller, yet meaningful units that are accessible to undergraduate students. Students who begin projects during the academic year may be able to continue their work over the summer months, providing valuable support to faculty who are engaged in long-term studies. This continuity is invaluable for establishing effective and efficient research programs.

Award:
The successful candidate will receive a fellowship of $2500 plus support benefits. In return, the recipient will be required to work a minimum of 40 hours per week for eight weeks, excluding official university holidays, during the summer months (June—August) on a project to be jointly agreed upon by the award recipient and the sponsoring faculty member (specific dates to be arranged). Failure to satisfy the minimum work requirements of the project will result in forfeiture of the fellowship. Potential projects for the upcoming summer are attached.

Criteria:
1. The applicant must be a formally declared major or minor in the Department of Physics at Weber State University. Students who will be graduating during the spring term prior to the time of the fellowship will be eligible for consideration.
2. The applicant must have a minimum GPA of 3.0.
3. The applicant must have completed PHYS PS2210 and PHYS 2220. Preference will be given to those candidates who have completed a significant amount of upper-division course work in physics as well.
4. Previous research experience (e.g., PHYS 4800) will be considered favorably.
5. Concurrent enrollment in PHYS 4800 will not be allowed during the period of time the fellowship is in effect. The applicant should consider research during the time of the fellowship to be a full-time commitment.

The Pope M. & Grace C. Burkhart
Undergraduate Research Fellowship Application Form

(Due April 10, 2008, 4:00 p.m.)

Name _____

Phone _____

E-mail _____

Address _____
Street, Apt # City State Zip Code

Major(s): _____ **Minor(s):** _____

Class Standing: _____ **(freshman, sophomore, junior, senior)**

List Physics and Mathematics Courses with Grades:

Physics and Mathematics Grade Point Average (4.00 = A): _____

Overall Academic Grade Point Average (4.00 = A): _____

Please List the Three Projects in Rank Order that You Are Most Interested In:

1. _____

2. _____

3. _____

Please attach a typed statement describing why you are interested in applying for the Pope M. & Grace C. Burkhart Undergraduate Research Fellowship. You should include a discussion of your plans following graduation from Weber State University. Please specify any other significant time obligations during the period when the fellowship will be in effect (such as course work or other jobs).

_____ _____
Signature Date

Research Projects Available
Summer 2008

1. **Applied Physics—Photonics Product Development:** Several photonics products are being developed by Dr. Sohl that use light emission and/or detection for warning systems. One device will test filters and another device will be used to warn motorists of dangerous conditions ahead during power outages. A system is also being developed to improve search and rescue operations underwater. (This system will involve research in both photonics and fluid flow.) These are focused tasks with the goal of applying for patents and marketing the results. Any student applying for this project will need to have done well in the electronics course or have a strong electronics background. The applied optics course and/or experience in PlC programming are pluses but are not required. (Contact: Dr. John Sohl)

2. **Physics Education Research:** Undergraduates interested in physics education will be able to participate in research in physics learning. This may include analysis of students in different learning environments and their learning outcomes, analysis of teachers' understandings of science and the resulting outcomes in the classroom, or the development of science laboratories and curricula for pre-service and in-service teachers. Research in this area may be worthy of presentation at both regional and national conferences in physics and science education. (Contact: Dr. Adam Johnston)

3. **Materials Characterization with Atomic Force Microscopy:** Students will make nanoscale measurements of materials with the Atomic Force Microscope. Current projects include conductivity mapping of materials for phase-change applications and imaging of mineral surfaces. The specific project could be tailored to the student's interest and background. (Contact: Dr. Colin Inglefield)

4. **Collaborative Research in Extrasolar Planets:** The recipient will be expected to perform research in extrasolar planets in the Physics Department's Computational Physics Lab using the 132-node computing cluster. The student researcher will be expected to work full time for eight weeks. The successful candidate will have a working knowledge of UNIX, be fluent in at least one programming language (Java, C++, FORTRAN, or equivalent, and have completed PHYS 2210/PHYS 2220. Ideal candidates will have completed PHYS 2300, PHYS 3300, and PHYS 3160. (Contact: Dr. John Armstrong)