I. PROPOSAL SUMMARY

The Division of Environmental Studies (ENS) at Alfred University requests $25,000 to be disbursed $12,500 per year for two years to establish a Student Environmental Research Fund. The purpose of the fund will be to provide critical support for independent undergraduate research in environmental studies, particularly the senior project required for ENS majors. It is widely recognized that students learn best by actively participating in the educational experience – learning by doing, via internships, fieldwork, and independent research. The experience of designing and conducting original research, to which students in ENS are exposed through the senior project, teaches more about the environment and the process of scientific inquiry than lecture classes alone. Currently, the scope of research possible through student projects is limited by the lack of discretionary funds available for materials and supplies (e.g., chemical reagents, computer software), travel to and from field sites, and other general expenses incurred in the course of extended independent projects. The Student Environmental Research Fund will provide a source to which students may competitively apply for funds to support their research endeavors, including materials and equipment, travel monies, and modest stipends, particularly for field research conducted during the summer months. It is anticipated that funds from this project will provide support for 12 student research projects annually, with the exact level of support for each student determined by the nature and duration of each individual project.

II. NARRATIVE

A. Background

Since its founding in 1836, Alfred University, located in Alfred, New York, has earned a reputation as one of the most outstanding universities in the nation. Our nearly 2000 undergraduates and over 300 graduate students pursue studies through three privately endowed colleges – Business, Engineering and Professional Studies, and Liberal Arts and Sciences – and through the publicly funded New York State College of Ceramics. Alfred University offers 54 academic programs that lead to bachelor's degrees, 12 that lead to master's degrees, and three that lead to doctoral degrees. Faculty offer courses in disciplines including astronomy, communications, engineering, environmental studies, fine arts, humanities, mathematics and computer science, modern languages, performing arts, psychology, and social sciences. Nearly 90 percent of the faculty hold doctorates or the highest degrees in their fields.

For 12 consecutive years, Alfred University has earned a top 15 ranking among regional northeast universities from *U S. News and World Report*. Our internationally acclaimed programs in the College of Ceramics consistently are ranked among the top in the country. *U.S. News'* most recent edition of *America's Best Graduate Schools* ranks our M.F.A. program as fifth in the country, and the M.F.A. in ceramic art is number one. The *Gourman Report* ranks our undergraduate ceramic engineering program first in the nation and gives top ranking to our graduate program in this discipline. Overall, *Barron's Guide to American Universities and Colleges* rates Alfred University as "Very Competitive."

Every year the University attracts some of the most talented and motivated students in the northeastern United States. Of the Fall 2000 freshmen class, 70 percent ranked in the top quarter of their high school classes; more than 100 students qualified as Presidential Scholars (ranking in the top 10% of their high school classes); and eight students were National Merit Scholars. Additionally, in the past four years, Alfred has graduated seven Fulbright Fellows, plus finalists for Truman, Rhodes, and Marshall Scholarships. Students attending the University in 2000-01 came from forty states and ten foreign countries, as well as from a range of diverse social and economic backgrounds. Approximately 65% of our students come from New York State, primarily the western New York region, with a significant population coming from New England (Connecticut, Massachusetts, Maine), Pennsylvania, and Ohio.

Alfred University's mission is to foster a spirit of inquiry, to search for knowledge through fundamental and applied research, and to transmit that knowledge to our students in a highly personalized setting. Valuing diversity, tolerance, interdisciplinary work, and active learning, the University strives to develop students' abilities to think critically; communicate clearly; understand an increasingly complex, technology-dependent, international society; and respond creatively to change, so that they are prepared for a life of achievement and leadership.

As part of its commitment to undergraduate education, Alfred University has identified the incorporation of active learning experiences – i.e., internships, fieldwork, and student research – as a strategic priority. Such hands-on, student-driven experiences provide opportunities for students to further their technical knowledge while gaining valuable practical skills in applying what they learn in the classroom to projects

in the field. This request to the Oliver S. and Jennie R. Donaldson Charitable Trust to establish the Student Environmental Research Fund will directly support these efforts.

The Environmental Studies program (ENS) at Alfred University, established in 1971, is a distinct, interdisciplinary unit in the College of Liberal Arts and Sciences. ENS offers the Bachelor of Arts degree, with an emphasis in either natural or social sciences. In addition to core courses and electives, all majors are required to complete an independent research project, which funds from this grant request will be used to support.

Enrollment in the ENS program has steadily increased over the past several years. In 2001, ENS graduated 18 seniors, one of our largest classes to date. This increase is due in part to greater environmental awareness of incoming students, but also to the program's established emphasis on project-oriented, hands-on learning. Additionally, in recent years, the program has benefited from greater administrative support in terms of faculty assignments, course development, and minor equipment needs. While the program has grown in size, because we have maintained rigorous standards, we have also seen the quality of students rise. Approximately 15% of Alfred University Scholars (the university-wide honors program) are ENS majors, and a large number of ENS graduates are also National Merit Scholars. Currently, one-third of ENS students complete dual majors, studying biology, chemistry, or geology in addition to environmental studies. About one-third of our seniors attend graduate school upon completing their undergraduate degrees, a number that each year also is increasing.

As a Division of Environmental *Studies*, with an interdisciplinary focus, our mission is to educate students while engaging in research that furthers understanding of the natural environment – activities that are complementary, not exclusive. Our goal is to prepare students to succeed in competitive graduate programs and job markets. Consequently, ENS's approach to teaching and research is to integrate the several disciplines in the natural and social science that make up the field. Faculty practice the "team approach" model used in modern environmental problem solving, incorporating contemporary methods of "learning by doing" and team teaching to provide students with a multi-faceted, practical foundation upon which they may build with either advanced study or career experiences. Faculty research activities, which are intended to lead to a better understanding of the environment and the effects that human have on the environment, directly involve students at all levels of the team research effort. When appropriate, faculty direct research expertise and student resources toward projects that will have positive impact on the local community.

From the outset, students in the Environmental Studies program learn to tackle environmental problems collaboratively, with each member of the team contributing his or her own expertise to the group effort. We strive to make available for students the latest technologies and to orient the curriculum in such a way as to give them experience using contemporary procedures, approaches, techniques, and instruments. The expectation is that ENS students will graduate with a solid understanding of theoretical concepts as well as the capability to apply that understanding to practical situations.

All ENS majors must complete a senior research project, which they devise independently with advise from appropriate faculty. Results of these year-long projects are shared with the university community through publication and presentation. Topics of these research projects vary widely and have in past

years included groundwater from local aquifers, zebra mussels, and toxic metals in harbor sediments, to name a few. Students from the ENS program have also presented their research at professional meetings (e.g., Geological Society of America, Eastern Colleges Science Conference); at one of these meetings, one student received an award for "Best Undergraduate Paper."

Due in part to its interdisciplinary focus, the Environmental Studies program offers a rich variety of courses, e.g., hydrogeology, environmental research procedures, geographic information systems, data analysis, global ecopolitics, technology, values and the environment, and many others. The program is considered one of the most rigorous majors in the College of Liberal Arts and Sciences. Alfred's program is distinguished from other academic environmental programs in several ways. While many colleges and universities have recently added a major in environmental science or environmental studies, largely in response to student interest and job market opportunities, our program – originally an outgrowth of biology and geology programs at Alfred – has been in existence for thirty years. Most of our competitors' programs in environmental sciences are still closely associated with a "home" department (usually biology or geology) and have yet to reach the degree of interdisciplinarity that we have been able to achieve after three decades of program refinement.

In recent years, the Division of Environmental Studies has been successful in acquiring federal funds to improve specific aspects of the program. Grants from the National Science Foundation have funded the purchase of sophisticated analytical equipment (e.g., ion chromatograph, atomic absorption spectrophotometer) and computers with which we have set up a student computer laboratory. NSF funds also have supported installation of five groundwater wells on the Alfred campus, resulting in a truly unique facility for teaching and research purposes, as well as the development of a spatial analysis laboratory for the program. Most recently, the NSF has acknowledged Alfred's excellence in the teaching of environmental science by awarding Dr. Michele Hluchy, Chair of the Division of Environmental Studies, and a colleague at SUNY-Brockport with an over $1 million grant to present workshops to undergraduate faculty on teaching strategies for undergraduates in the sciences. Twenty such workshops will be presented in locations across the United States over the next five years.

ENS also has had success in securing private funds in support of the program. A previous grant from the Oliver S. and Jennie R. Donaldson Charitable Trust (1997) was used to establish an interactive multimedia classroom for the Environmental Studies program, which provides access to specialized computers, software, and Internet resources. In keeping with the interdisciplinary nature of the program, the classroom is frequently utilized by students from other disciplines – biology, geology, chemistry, psychology, and physics. Student recipients of the prestigious ARGUS grants (**A**lfred **R**esearch **G**rants for **U**ndergraduate **S**tudents) also benefit from this classroom.

Two full-time faculty teach in the Environmental Studies program: a geologist and a geographer. Additionally, many other faculty from across the university contribute to the interdisciplinary program via teaching, student advising, and research activities. Non-teaching staff includes a half-time secretary and a half-time technician. The Division of Environmental Studies is a member of NEES, a group of northeastern colleges and universities with Environmental Studies programs designed to share resources and discuss curricula and pedagogy.

B. Funding Request

We request $25,000 to be disbursed $12,500 per year for two years to establish a Student Environmental Research Fund. The purpose of this fund will be to provide miscellaneous but critical support for independent undergraduate student research projects. While any undergraduate student doing environmental research will be eligible to apply for funding, we anticipate that the majority of funds will be awarded to ENS majors to support the required senior research project.

Undergraduate research projects in ENS, designed and conducted wholly by students in consultation with ENS faculty, provide unprecedented opportunities for learning the process of scientific inquiry and for applying analytical and computational skills acquired in the classroom to actual environmental problems in the field. Through the Division of Environmental Studies, Alfred students have available to them most of the major equipment required for their research, but there are no discretionary funds available for other expenses incurred in the process. Specifically, students often need particular chemical reagents, computer software, compressed gas for instruments, glassware, and specialized items for field use that frequently are beyond the capacity of students to purchase themselves. Further, students often need funds to cover travel to and from field sites. Finally, because the field component of this research is typically conducted over the summer, students often require partial assistance with living expenses while conducting their work. We believe that is it especially important to have available for students support for this latter need, since the majority of them cannot afford to "give up" a summer to engage in uncompensated research activities and still meet tuition demands the following year. The Student Environmental Research Fund established by the Oliver S. and Jennie R. Donaldson Charitable Trust will allow us to meet these critical needs, thus significantly enhancing the undergraduate educational and field experiences for deserving students.

Once the fund is established, students may apply for research support beginning Fall semester 2001. The application process will consist of a proposal written and submitted by the students, complete with a project budget and timeline, which will be competitively reviewed by members of the Environmental Studies faculty. Funds will be allocated based on the quality of the proposals – their scientific merit and technical feasibility – and the demonstrated need for funds. Specific budget items for which support may be requested will include:

- chemical reagents
- sampling apparatus
- travel expenses (to / from field sites; to / from professional meetings to present results)
- expendable supplies for analytical equipment (e.g., compressed gas, etc.)
- modest stipend for work during summer months

Based on ENS' current enrollment figures and the scope of typical projects, we anticipate that $12,500 will allow us to support 12 student research projects annually. The exact level of support for each student will depend upon the nature and duration of each individual proposal. Funds will be allocated each year according to the following approximate breakdown:

- Student summer stipends (3 @ $2500 ea) $7,500
- Materials and supplies (12 projects @ ~ $300 / project).....3,600
- Travel 1,000

- Minor equipment needs (e.g., field gear) 400

Total annual budget $12,500

Our request of $25,000 will support this project for two years, during which time we will pursue other funding sources to sustain the project once this grant is expended. We are confident that once the fund's use is demonstrated we will be able to find other sources to ensure its long-term continuation.

Faculty in the Division of Environmental Studies will be responsible for the implementation and administration of this project. (See Attachment B.3 for brief faculty resumes.) Dr. Michele Hluchy, Professor of Geology and Environmental Studies and Chair of the Division of Environmental Studies, is a geologist who studies soil, surface and groundwater, and earth surface processes. Dr. Hluchy will be Project Director. Dr. Diana Sinton, Assistant Professor of Geography and Environmental Studies, is a geographer whose recent work has involved evaluating the effects of environmental perturbations on forests. Both Dr. Hluchy and Dr. Sinton have extensive experience in advising undergraduate students and supervising undergraduate research.

This project will not only fund the research efforts of approximately 24 students over the next two years, but also will contribute measurably to the quality of the program's overall research and teaching efforts. Supporting undergraduate research is an integral part of the Environmental Studies program, as well as the larger undergraduate mission of Alfred University, due to the significant educational and career value realized by students who engage first-hand in the pursuit of knowledge.

C. Evaluation

We anticipate that we will be able to assess the impact of this project on our students and programs primarily by maintaining a dialogue with our graduates, their employers, and graduate school faculty regarding our students' preparation for employment or future study in their chosen fields. To that end, we will continue to make concerted efforts to solicit and respond to the concerns of our students and alumni, as well as the industrial and educational communities that recruit them. Currently, student representatives serve on the Environmental Studies Program Committee (a college committee that advises on curricular matters), and we periodically survey alumni to review our major programs so that our students are better prepared for graduate school and the work force. We will continue to gather this information and use it, in conjunction with our evaluation of student numbers and student "success" (at graduate school and in the job market), to fully assess the impact of this project on our students and our program.