INFORMATION ABOUT PRINCIPAL INVESTIGATORS/PROJECT DIRECTORS(PI/PD) and co-PRINCIPAL INVESTIGATORS/co-PROJECT DIRECTORS

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. Submission of this information is voluntary and is not a precondition of award. This information will not be disclosed to external peer reviewers. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPROMISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Herbert L Dershem

Gender: ☒ Male ☐ Female

Ethnicity: (Choose one response) ☐ Hispanic or Latino ☐ Not Hispanic or Latino

Race: (Select one or more)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☒ White

Disability Status: (Select one or more)
- ☐ Hearing Impairment
- ☐ Visual Impairment
- ☐ Mobility/Orthopedic Impairment
- ☐ Other
- ☒ None

Citizenship: (Choose one) ☒ U.S. Citizen ☐ Permanent Resident ☐ Other non-U.S. Citizen

Check here if you do not wish to provide any or all of the above information (excluding PI/PD name): ☒

REQUIRED: Check here if you are currently serving (or have previously served) as a PI, co-PI or PD on any federally funded project ☒

Ethnicity Definition:
Hispanic or Latino. A person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race.

Race Definitions:
American Indian or Alaska Native. A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
Asian. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Black or African American. A person having origins in any of the black racial groups of Africa.
Native Hawaiian or Other Pacific Islander. A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
White. A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

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The Federal Government has a continuing commitment to monitor the operation of its review and award processes to identify and address any inequities based on gender, race, ethnicity, or disability of its proposed PIs/PDs. To gather information needed for this important task, the proposer should submit a single copy of this form for each identified PI/PD with each proposal. Submission of the requested information is voluntary and will not affect the organization's eligibility for an award. However, information not submitted will seriously undermine the statistical validity, and therefore the usefulness, of information recieved from others. Any individual not wishing to submit some or all the information should check the box provided for this purpose. (The exceptions are the PI/PD name and the information about prior Federal support, the last question above.)

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PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 00-2

NSF 00-107 09/15/00

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NSF PROPOSAL NUMBER

0097464

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IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES ☐ NO ☒ IF YES, LIST ACRONYMS(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Hope College

AWARDEE ORGANIZATION CODE (IF KNOWN)

0022731000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Hope College
P.O. Box 9000
Holland, MI. 494229000

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE

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(See GPG II.D.1 For Definitions) ☐ FOR-PROFIT ORGANIZATION ☐ SMALL BUSINESS ☐ MINORITY BUSINESS ☐ WOMAN-OWNED BUSINESS

TITLE OF PROPOSED PROJECT **REU Site: An Undergraduate Research Participation Program in Computer Science**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PREPROPOSAL NO., IF APPLICABLE
$ 159,300	36 months	02/01/01	

CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW

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☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.D.1)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG II.D.10)
☐ NATIONAL ENVIRONMENTAL POLICY ACT (GPG II.D.10)
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☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES
☐ FACILITATION FOR SCIENTISTS/ENGINEERS WITH DISABILITIES (GPG V.G.)
☐ RESEARCH OPPORTUNITY AWARD (GPG V.H)

PI/PD DEPARTMENT
Department of Computer Science

PI/PD FAX NUMBER
616-395-7123

PI/PD POSTAL ADDRESS
27 Graves Place
Hope College
Holland, MI 494229000
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME Herbert L Dershem	Ph.D.	1969	616-385-7508	dershem@cs.hope.edu.
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Received :09/15/2000

CERTIFICATION PAGE

Certification for Principal Investigators and Co-Principal Investigators:

I certify to the best of my knowledge that:

(1) the statements herein (excluding scientific hypotheses and scientific opinions) are true and complete, and
(2) the text and graphics herein as well as any accompanying publications or other documents, unless otherwise indicated, are the original work of the signatories or individuals working under their supervision. I agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if an award is made as a result of this proposal.

I understand that the willful provision of false information or concealing a material fact in this proposal or any other communication submitted to NSF is a criminal offense (U.S.Code, Title 18, Section 1001).

Name (Typed)	Signature	Social Security No.*	Date
PI/PD **Herbert L Dershem**		*ON FASTLANE SUBMISSIONS* SSN's are confidential and are not displayed	
Co-PI/PD			
Co-PI/PD			
Co-PI/PD			
Co-PI/PD			

Certification for Authorized Organizational Representative or Individual Applicant:

By signing and submitting this proposal, the individual applicant or the authorized official of the applicant institution is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application. Further, the applicant is hereby providing certifications regarding Federal debt status, debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in Grant Proposal Guide (GPG), NSF 00-2. Willful provision of false information in this application and its supporting documents or in reports required under an ensuring award is a criminal offense (U. S. Code, Title 18, Section 1001).

In addition, if the applicant institution employs more than fifty persons, the authorized official of the applicant institution is certifying that the institution has implemented a written and enforced conflict of interest policy that is consistent with the provisions of Grant Policy Manual Section 510; that to the best of his/her knowledge, all financial disclosures required by that conflict of interest policy have been made; and that all identified conflicts of interest will have been satisfactorily managed, reduced or eliminated prior to the institution's expenditure of any funds under the award, in accordance with the institution's conflict of interest policy. Conflict which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Debt and Debarment Certifications

(If answer "yes" to either, please provide explanation.)

Is the organization delinquent on any Federal debt? Yes ☐ No ☒

Is the organization or its principals presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency? Yes ☐ No ☒

Certification Regarding Lobbying

This certification is required for an award of a Federal contract, grant, or cooperative agreement exceeding $100,000 and for an award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

Certification for Contracts, Grants, Loans and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME/TITLE (TYPED)		**08/07/00**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER

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Project Summary

The Hope College REU program in Computer Science is designed to provide promising undergraduates with an intensive and meaningful research experience that will encourage them to consider a career in computer science research. Our goal is to expose students to the techniques, attitudes, and rewards of computer science research and to provide encouragement and direction in the pursuit of such a career through close collaboration with a faculty mentor on a significant project. We will make extensive efforts to include qualified female and minority group students among the participants.

Each year a partner undergraduate institution will be selected where there is presently insufficient infrastructure for a strong undergraduate research program in computer science. One faculty member from the partner institution will be invited to participate in this program, joining three or four Hope College faculty members as research mentors. In addition, two students from the partner institution will join three Hope College students and three students from other institutions as student participants.

The student participants will reside on the Hope College campus, spending a minimum of 40 hours per week on research activities for a 10 week period. Each participant will work in close collaboration with a faculty mentor and be given exclusive use of a workstation on the Hope College Computer Science network. The development of communication skills will be emphasized by having participants present their results during summer seminars, at their home institution during the following academic year, and at a regional or national conference. In addition, the participants will prepare a research report and an online poster describing their work.

Project Description

Introduction

The NSF-REU program has allowed the Computer Science Department at Hope College to successfully prepare undergraduates for careers in computer science research for the past nine years. In addition, over this period of time this support has enabled a number of other institutions to strengthen their undergraduate computer science research programs through collaboration and consultation with those participating in this program. The success of the program and the plans for the next three-year period are described in this proposal.

1 Overview

1.1 Objectives and Intended Impact

The objectives of this project are:

- to encourage and motivate undergraduate participants to pursue careers in Computer Science research
- to support and enhance undergraduate research and instruction in the Hope College Computer Science Department
- to provide a model for Computer Science undergraduate research for other primarily undergraduate institutions
- to encourage and support undergraduate research at institutions that presently lack the infrastructure to support such research
- to increase the number of undergraduates from groups underrepresented in computer science research who are considering such careers

As a result of this project, we expect that the Computer Science undergraduate research program at Hope College will continue to have a major impact on the students, faculty, and curriculum of the department. We also expect that as a result of their participation, the student and faculty participants in this program will play a role in increasing the presence and importance of undergraduate research at many other institutions, and as a result, the entire computer science academic community will benefit.

1.2 Targeted Student Participants

This project will target students with an interest in and aptitude for a research career in computer science. These students will be students attending Hope College, students from an annually-selected predominantly-undergraduate partner institution, and from other institutions throughout the United States.

Through our recruiting efforts we will specifically target qualified females, minority group members, and students attending institutions with limited opportunities for undergraduate research.

1.3 Intellectual Focus

The research projects that will be carried out under this project will be chosen according to the following criteria: (1) the project will be one that the faculty mentor is interested in, enthusiastic about, and qualified to carry out, (2) the project is accessible to undergraduates and will engage students in activities that will expose them to the techniques, the process, and the rewards of computer science research, and (3) extend the knowledge base of computer science. In our local program, the first two criteria will be of higher priority than criterion 3.

It is expected that the mentor and her student team will work on their project in a close, collaborative manner.

1.4 Organizational Structure

The **Principal Investigator** will have full responsibility for

- recruiting faculty mentors
- definition and description of projects
- preparing publicity and application materials
- selecting undergraduate participants
- administration of the summer program

- carrying out all assessment and reporting activities

The **Faculty Mentors** will serve, along with the Principal Investigator, on the committee that selects undergraduate participants from among the applicants. They will also supervise a single project with one to three undergraduate collaborators.

1.5 Timetable

The following is the timetable for the three years of the project:

Activity	2001	2002	2003
Faculty recruited and project defined	Sept - Dec of the preceding year		
Publicity and application materials distributed	Jan 15, 2001	Jan 15, 2002	Jan 15, 2003
Application Deadline	Feb 20, 2001	Feb 20, 2002	Feb 20, 2003
Offers extended to undergraduates	Mar 1, 2001	Mar 1, 2002	Mar 1, 2003
Beginning of research period	May 29, 2001	May 28, 2002	May 27, 2003
End of research period	Aug 3, 2001	Aug 2, 2002	Aug 1, 2003
Annual progress report submitted to NSF	Nov 15, 2001	Nov 15, 2002	Nov 15, 2003
Follow-up activities	The following academic year		

1.6 Institutional Commitment

The Computer Science Department and Hope College are committed to the principle that excellence in undergraduate education must include active student involvement in significant research. In support of this commitment, the college will provide housing to participants in this program at one-half the normal cost as well as providing all of the services normally available to Hope College summer students. These services include use of the physical activities center, the career and counseling center, the library, and computer facilities. In particular, each participant will be given exclusive use of a workstation on the department's network for the ten-week period of the program.

The college supports research efforts of faculty and students through release time for faculty, faculty development grants, travel funds to scientific meetings, acquisition and maintenance of hardware and software, general secretarial and clerical support, and funds for expendable supplies. These will all be provided in support in support of the activities of this project for both the Hope College faculty mentors and the visiting faculty mentor.

In addition to the eight annual participants supported by the NSF-REU funds, additional undergraduate researchers will be supported by other funds available to Hope College and the faculty mentors. During the nine year period of previous NSF-REU support, 72 undergraduate researchers have participated in this program with 57 of them supported by NSF-REU funds and the remaining 15 supported by other available funds. It is expected that this ratio will continue during the next three years.

The Fall Undergraduate Computer Science Research Symposium, described later in this proposal, will be fully funded by Hope College as a part of its institutional commitment to this project.

2 NATURE OF STUDENT ACTIVITIES

2.1 Student Involvement

The student participants in this project are expected to spend a minimum of 40 hours per week for 10 weeks on the research project to which they are assigned. Each student is assigned a faculty mentor, two or more students

being assigned to each mentor and working as a team. Early in the program, the students work closely with their mentors, but as they gain experience they will be encouraged to work more independently. Each student does library research in addition to the laboratory research so that they become familiar with techniques for searching and using research literature.

2.2 Student Orientation

The P.I. serves as the program coordinator and is responsible for the administrative details including housing arrangements, stipend payments, mentor assignments, scheduling of starting dates for students, the seminar program, organizing social activities, and submission of progress reports. It is particularly important for the P.I., with assistance from the Hope College student participants, to provide an orientation to the campus and the department for the non-Hope student participants. All students receive an orientation to the departmental laboratory facilities, both hardware and software, and the library facilities, particularly the use of various research tools.

During the orientation period, each mentor also provides her students with the particular information needed to carry out the assigned project.

2.3 Weekly Seminars

Each week a seminar is held that will be attended by all students and faculty. Early in the project period, each student or team presents one seminar describing the nature of the problem being investigated and a research plan. At the end of the project period, each student presents the results of the research project.

In addition to these student presentations, other seminars include faculty presentations on research methods, technical writing and presentation, and the use of various computer resources. Also, Hope alumni who are currently attending graduate school in computer science present seminars and informally meet with the research students to describe the nature of graduate study in computer science. When possible, this meeting is held on the campus of a graduate school. Other speakers from external organizations will be included when available. In the recent years, speakers from Microsoft and the National Institute of Health have made presentations.

2.4 Student-Faculty Communication

In order to achieve the goals of this project, it is vitally important that there be extensive communication between the undergraduate participant and her faculty mentor. This will take place in the following ways:

- Prior to the summer the mentor will give the participant preparation instructions through email.
- During the summer the mentor will meet with her research team a minimum of twice each week. Past experience has shown that these meetings occur much more frequently.
- All faculty mentors attend each weekly seminar meeting.
- A weekly lunch or other social event is scheduled that includes all faculty mentors and all undergraduate participants.
- A visit to a neighboring graduate school and other field trips are scheduled that include faculty mentors and undergraduates.
- The faculty mentor continues to work with undergraduate participants in the preparation of post-summer presentations and papers.

2.5 Student-Student Communication

In addition to the weekly seminars, there will be other activities and situations that involve student-student communication.

- All student workstations are in the same laboratory.
- Students will live in the same apartment building and, when possible share the same apartment or live in neighboring apartments.
- Weekly student-initiated social activities will be scheduled for the computer science undergraduates.
- Social activities are available that include students in all disciplines that are doing research on the Hope College

campus. This includes over 100 students in six science disciplines. In the past these activities have included weekly ice cream socials, beach volleyball competitions, and scavenger hunts.

2.6 Research Projects

The problems described below represent research interests of Hope faculty that could be made available to undergraduate students as research projects in this program. Each project is designed to require the student to apply experience and information gained in formal classroom instruction. These projects are only representative of those that might be conducted. The projects directed by faculty from partner institutions will be determined according to the interests of the faculty selected.

Project 1: Object-Oriented Execution Visualization Environment
Herbert L. Dershem

Previous work has developed a number of stand-alone execution visualization tools for use in introductory computer science courses. These have been designed to visualize method calls, object manipulation, and event-driven user interfaces. This project will integrate and enhance this previous work into an environment that is accessible through a web browser. It will also develop materials for using this tool in the classroom and design and implement experiments for measuring its effectiveness.

Project 2: Taking Notes with Handheld Devices
Ryan L. McFall

In this project, we seek to ascertain the viability of creating a hand-held based note taking system, in which the hand-held device can be used a both a web browser and also as an input device. Using the emerging standards of XPointer, XLink, and XSL we will attempt to create an interactive notetaking system that allows the resulting notes to be viewed anywhere that the device has network connectivity. Notes will be shareable via the network, and will be both textual and sketches.

Project 3: Creating a Single Computing Environment from a Handheld Network
Michael J. Jipping

This project will explore and implement the technology to maintain a network of handheld computers as a platform for distributed computing problems. We will examine existing technology in both distributed computing (such as PVM) and wireless networking (such as the emerging Bluetooth standard). We will implement experiments using these methods to implement a united computing platform derived from many separate wirelessly networked handheld machines.

Project 4: Using readability measures to estimate software complexity
Herbert L. Dershem

Previous student research has developed several measures of software complexity based on formulas used to estimate the readability of English text. This project would extend the work done in the following ways: (1) obtain empirical data based on comparisons of new metrics with traditional metrics on sample software; (2) experiment with changes in parameters in the readability metrics to further refinement their accuracy; and (3) implement parsers to evaluate these metrics in a variety of languages.

Project 5: Enabling Remote Displays on Handheld Computers with Jini
Michael J. Jipping

This project will study technology to enable remote display and management of handheld computers. We will examine technologies involved in remote displays (such as the X Window system and Windows-Based Terminal technology from Microsoft) and those that enable the networking of handheld machines. Specifically, the latter will be handled by experimenting with Java and Jini technology from Sun Microsystems. This project requires programming experience in Java.

2.7 Post-Project Activities

All REU participants are required to submit a final written report on their research activities, an electronic poster describing their work, and an evaluation of the overall program. The P.I. and the mentor recommend follow-up activities for each participant to carry out during the following academic year. For external students this might involve remote access to Hope College computing facilities as well as communication via electronic mail between student and mentor. For Hope students, this follow-up work may include formal continuation of the project by enrollment in the departmental Senior Project Seminar and/or the Independent Study/Research course. All participants are required to make a presentation of their work at their home institution and to submit it for presentation at a scientific meeting. When appropriate, the student's work will be included in a publication submitted to a professional journal.

2.8 Fall Undergraduate Research Symposium

Each fall after the summer research program, we propose the holding of a Fall Undergraduate Computer Science Research Symposium at Hope College. This symposium would provide a forum for all participants in the Hope College program to present their research results, but beyond that it would include presentations by Hope undergraduates who performed research in other settings and students from neighboring institutions and from former partner institutions who have research results.

Invited to this symposium will be all computer science students at Hope College, neighboring institutions, the partner institution for the current year, and all former partner institutions. This one-day symposium will be a way to have greater impact on other institutions, will serve as a follow-up with former partner institutions, and will be an opportunity to recruit undergraduates and faculty for future Hope summer research programs. In addition, it will establish a useful forum for students to present their work to other students and faculty who have not been active in research the previous summer.

All arrangements for this seminars will be made by the Principal Investigator and all costs will be paid by Hope College as an institutional commitment to this project.

3 THE RESEARCH ENVIRONMENT

3.1 Principal Investigator

The Principal Investigator has been directing undergraduate research projects for all of the 31 years that he has been on the Hope College faculty. He has directed over 100 such projects during that time. In addition, he has served as the director of the Hope College Summer Undergraduate Research Program in computer science in each of the nine years that it has existed. He has further administrative experience gained by serving for the past 25 years as the chair of the Hope College Computer Science Department.

He has made numerous presentations and served on a number of panels on undergraduate research. For the past six years he has been a Councilor in the Mathematics and Computer Science Division of the Council on Undergraduate Research (CUR). He has also served as a consultant to many colleges and universities on the integration of undergraduate research into their computer science programs.

3.2 Institution

Hope College is a four-year liberal arts college (enrollment of approximately 2900 students) that is known for excellence and a historical commitment to undergraduate research in science and mathematics. The Hope College faculty and administration are convinced that the training of future scientists is best achieved through a research-rich curriculum build upon collaborative research between faculty and undergraduate students. Hope College currently holds five NSF-REU grants in the disciplines of biology, chemistry, computer science, mathematics, and physics.

In the period from 1995 to 2000, the Natural Science Division of Hope College received 90 external grants totaling more the $5.5 million. The Division is identified by Project Kaleidoscope as a model "Program that Works," based upon the research-rich culture that is the focus of the division's program. Hope College is one of only ten

undergraduate institutions recognized by the NSF with an Award for Integration of Research and Education (AIRE).

The Computer Science Department has received over one million dollars in external grants in the period from 1989 to 2000. During the twenty-year period from 1981-2000, the Hope College Computer Science Department has graduated 259 majors. Of those, 46 (18%) attended graduate or professional school immediately after graduation and 193 (7%) participated in a Research/Independent Study project during their time at Hope. Of those Hope students who have participated in the summer research program over the past nine years, 44% have attended graduate school immediately upon graduation.

3.3 Faculty

The department's three faculty members are a good mix of junior and senior faculty. A fourth faculty member is to be hired in the 2000-2001 academic year. Interest and ability to participate as a mentor in the summer undergraduate research program is a requirement for this position. All three of the faculty hold a Ph.D. in computer science and all are active in computer science research and have experience supervising undergraduate research. Two of the three members of the faculty have been principal investigators of National Science Foundation projects. In addition, they have been the recipients of support for research from other government agencies including the Department of Energy, NASA, DARPA, and the United States Air Force.

In the nine years of REU programs at Hope, all faculty in the department have supervised undergraduate research teams. Faculty participating during the next three years will be Herb Dershem, Mike Jipping, and Ryan McFall. The fourth tenure-track faculty member will be expected to be a regular participant in the REU program as well.

Each year, one external faculty mentor is invited to participate in the program. This mentor is a faculty member at an institution that does not presently have sufficient infrastructure to support and encourage such research. It is expected that the experience of participating in this program will enable this faculty member to establish an active undergraduate program at her institution. The availability of this position will be announced via the SIGCSE list server and will also be publicized through informal networks of the Hope College faculty. Each applicant will submit a proposed research project along with her application. From among these applicants, one or more will be chosen to join the program and work with a team of undergraduates during the course of this program. The faculty member, if within commuting distance, will be required to be on the Hope College campus working with the students at least two days of every week during the ten weeks of the project. She will also remain in contact with the students electronically on the remaining days. It is expected that a different institution will be represented by an external faculty member each of the three years of this project. Support is requested to reimburse the travel expenses for a nearby faculty member or to subsidize housing costs for one beyond commuting distance.

Three external faculty mentors participated in the program from 1998 to 2000. They were:

- **Alyce Brady, Kalamazoo College**
- **Myles McNally, Alma College**
- **Gary Lewandowski, Xavier University (Ohio)**

As a result of these past collaborations, two papers have been published and four conference presentations made by the faculty and students at these institutions. In addition, through the relationships established with these other institutions through this program, one institution has received equipment from the Hope Computer Science Department, another institution has used Hope faculty as consultants for their Computer Science program. In addition, a joint research symposium has been held with faculty and students from Hope and one of the partner institutions during a year other than the year of the partnership. One faculty member from a partner institution remained on the Hope campus for the academic year following the summer of his participation for further collaboration with Hope faculty as a part of his sabbatical leave.

3.4 Facilities and Equipment

The departments of Computer Science, Mathematics, and Physics are housed in Vander Werf Hall. This building was constructed in 1964 and a major renovation was completed in 1990, resulting in the building being joined to Van Zoeren Hall. The complex now includes, in addition to the three laboratories that are exclusively for Computer Science, three campus-wide computer laboratories that contain 59 PC-compatible systems and a wide variety of workstations, all connected via a campus network backbone.

The Computer Science Department's hardware facilities are currently 34 workstations. These are shown in

the table below:

	Unit	Memory	Disk Capacity	Notes
Servers	Ultra enterprise 450	512 MBytes	40 GBytes	This is our main server 2 processors
	Linux PC 333MHz	128 MBytes	6 GBytes	Web/Database server
	Ultra-2	128 MBytes	4 GBytes	Research server
General Purpose Lab	2 Ultra-5's	64 MBytes	2 GByte	
	2 Ultra-1's	32 MBytes	2 GBytes	
	5 Ultra-10's	128 MBytes	9 GBytes	
OS/Net-working Lab	5 Pentium II's 800 MHz	256 MBytes	20 GBytes	
Faculty	2 Ultra-10's	256 MBytes	9 GBytes	
	1 Ultra-1	64 MBytes	4 GBytes	
	1 Pentium 800 MHz	256 MBytes	10 GBytes	
ClabRoom	8 Ultra-1's	64MBytes	2 GBytes	
	5 Ultra-10's	256MBytes	9 GBytes	

Lab software includes the standard Sun operating system and documentation, windowing system, and reference material. Unbundled components include C and C++ compilers, Java development environment, network management and protocol implementations, word processors, and code debugging environments. Many public domain tools are in use.

The lab is currently administered by one individual. About 7 hours per week are devoted to lab administration. Both software and hardware administration is handled by this individual. Operator duties, e.g., file system backups and preventative maintenance are mostly automated. The department handles maintenance of its facilities by itself. It negotiates maintenance contracts, keeps on hand supplies for its printers and other peripherals, provides the "raw materials" (e.g., cable, connectors, etc.) and tools for hardware maintenance, and maintains a "spare parts machine" for computer hardware maintenance.

3.5 Departmental Statistics

Year	Graduating Majors	Graduates Attending Grad School	Independent Study and Research Projects	Summer Research Students
1983-84	16	2	22	0
1984-85	29	3	34	0
1985-86	18	2	12	0
1986-87	15	3	5	0
1987-88	16	2	17	1
1988-89	8	4	9	2
1989-90	14	3	10	2
1990-91	14	1	14	3
1991-92	12	6	2	7
1992-93	8	2	5	8
1993-94	4	1	2	8
1994-95	7	3	4	8
1995-96	14	3	6	6
1996-97	13	2	5	7
1997-98	10	3	4	10
1998-99	14	1	6	10
1999-00	10	2	5	7

4 Student Recruitment and Selection

4.1 Recruitment of Participants

4.1.1 Hope College Students

The summer research program in computer science will be announced in all upper-level computer science classes, in the departmental seminar, through notices on the departmental bulletin board, and through an electronic mailing to all computer science majors. A packet describing the program, research areas, participant benefits and obligations, and application procedures will be available from the departmental office. Since upper-level classes in computer science are typically smaller than 20 students, the professors will be able to individually encourage especially promising students to apply including women and minorities.

4.1.2 Non-Hope College Students

At least five of the eight participants each summer will be from institutions other than Hope College. At least two of these participants will be chosen from the institution of the non-Hope faculty mentor. Recruiting at that institution will follow the same pattern as that described above for Hope College students. The selected outside faculty mentor will direct the process of recruiting students at her institution.

As many as three participants will be selected from institutions other than Hope College and the institution of the outside faculty mentor. A special effort will be made to encourage women and minorities from other institutions to apply.

A program announcement will be sent to the Computer Science Department Chair and the Officer for Minority Affairs at all colleges and universities within an approximate 500 mile radius of Hope College. These Chairs and Officers will be asked to send the names of women and minorities who are majoring in computer science. They will also be asked to post the announcement of the program where it can be seen by potential participants. The P.I. will contact all students whose names are submitted through this process to encourage them to apply to the program.

Extensive use will be made of the Internet. Announcements will be distributed to a list of Computer Science Departments via email. This mail list has been constructed from inquiries received during the past nine years of the Hope College Computer Science REU program. In addition, publicity and application forms will be made available via World Wide Web. Information will also be sent to the listserver for ACM Special Interest Group for Computer Science Education (SIGCSE).

Contacts will be made with Computer Science department chairs at institutions which have historically enrolled a large percentage of minority students, inviting faculty to nominate minority students at their institution for participation in the program. Past experience has shown that this mailing has resulted in a large number of applications to our program, though we have been less successful in turning those applications into participants.

All promotional materials will be distributed by January 15. Applications and transcripts will be due by February 20 and notification of the awards will be made no later than March 1.

4.2 Selection Process

There will be eight student participants in the program. Typically there will be three participants from Hope College, two from the visiting faculty mentor's institution, and three from other institutions. During the application process, the Hope students will be considered as one pool of applicants, applicants from the visiting mentor's school another, and the non-Hope students still another.

All applicants will be asked to submit a written statement indicating their career goals and the role of research in their future plans. Students from other institutions will also be asked to provide a transcript and a letter of reference from a faculty member. These items will be obtained by the P.I. directly for Hope student applicants.

The criteria considered in the selection of participants within each pool of applicants are the applicant's (1) academic record; (2) demonstrated interest in computer science and research; (3) potential for success in research as indicated by independence, creativity, and motivation; and (4) career plans. The faculty participants in this program comprise the selection committee that makes the final selection of student participants.

The overall aim of this process is to provide flexible guidelines for the selection of participants to ensure that the program has the maximum impact on the participants in their choice of a career in computer science and on the discipline of computer science itself.

4.3 Matching Participants with Research Projects

After the student participants are selected, the P.I. will coordinate the assignment of students to specific faculty mentors and research projects. Each faculty mentor will be asked to select from the participants those students whose interests and qualifications match the requirements of one of the mentor's research projects and interview that group of students. Those students at institutions other than Hope College will be interviewed by phone. As a result of these interviews, each mentor will provide a priority list of those participants that she would like to supervise. The P.I. will then make the final assignments of participants to projects based on these priority lists as well as consulting with the mentors and the student participants. No assignment will be made that is not enthusiastically supported by both the mentor and the student participant.

5 Project Evaluation

The evaluation components associated with each of the objectives listed in Section 1 of this proposal are given below:

- *to motivate undergraduate participants to pursue careers in computer science research*

All participants will complete an exit interview survey upon completion of their summer participation and they will be asked to complete another survey three years following their participation. In addition, all participants will be tracked to monitor their future academic and career activities.

- *to support and enhance the undergraduate research and instruction in the Hope College Computer Science Department*

This will be evaluated by the amount of research activity as measured by grants received, articles published, and papers presented by the students and faculty at Hope College.

- *to provide a model for computer science undergraduate research for other primarily undergraduate institutions*

This will be evaluated through the number of participants of this program who appear in panels at national or regional meetings and the number of articles written by participants encouraging undergraduate computer science research.

- *to encourage and support undergraduate research at institutions that presently lack the infrastructure to support such research*

The success of research programs at institutions of the external faculty mentors will be measures by grants, articles, and papers, and by the undergraduate research activity at these institutions following the faculty mentor's participation in this project.

- *to increase the number of undergraduates from groups underrepresented in computer science research who are considering such careers*

Data will be collected that will quantify the participation of underrepresented groups.

6 RESULTS FROM PRIOR NSF SUPPORT

Grant Number: CDA-9200118 Amount of Award: $86,550 Support Period: April 1, 1992 to September 30, 1995	Grant Number: CDA-9423943 Amount of Award: $114,393 Support Period: March 1, 1995 to February 28, 1998	Grant Number: CDA-9732339 Amount of Award: $146,700 Support Period: February 1, 1998 to January 31, 2000
Title: REU: An Undergraduate Research Participation Program in Computer Science		

6.1 General Results

With support from the National Science Foundation, Hope College has hosted a Computer Science REU site program each of the summers from 1992-2000. During this time, REU has supported 57 participants, while an additional 15 undergraduate researchers have been supported by other funds. These additional funds have been provided through grants awarded to the faculty and the institution by sources that include NASA, NSF RUI, Pew Memorial Trust, Howard Hughes Foundation, and the United States Air Force. The student participants have completed 32 projects that are listed later in this proposal.

The table below provides data about the participants in this program over the past nine years

	Participants			Females		Minorities		Still under grads	Grad School attendees	
	Total	REU Supported	Distinct	#	%	#	%		#	%
1992-1994	24	18	21	6	29	0	0	0	10	48
1995-1997	21	18	21	3	14	1	5	0	9	43
1998-2000	27	21	26	10	38	3	12	11	8	53
Total	72	57	65	18	28	4	6	11	27	50

It can be seen in the preceding table that some progress has been made in several areas during the most recent three years of this program. The participation by females has increased significantly to 38% during the most recent three-year period, compared to a combined 21% over the first six years. Minority participation has also increased to 12% from a combined 2% during the first six years. While both of these figures are encouraging, there is still room for improvement in these areas. It should also be noted that the percentage of graduated participants entering graduate school is the same for females as for the entire population (50%) and higher for minority group members (75%).

It can also be noted that the percentage of participants attending graduate school immediately after graduation has been higher during the 1998-2000 period. Among the eleven participants who have not yet received their baccalaureate degree, seven presently plan to attend graduate school.

Graduate schools attended by project alumni include Duke, Clemson, Illinois, Michigan State, Utah, Texas A&M, Michigan, Colorado, UMass-Lowell, UMass-Amherst, Texas, Virginia, Indiana, and William & Mary. Many students who did not attend graduate school have gone on to pursue research-related careers in computer science. Among the employers of project alumni are Bell Labs, Evans & Sutherland, Crowe Chizek, Microsoft, Ford, UsAir, Macromedia, Max Planck Institute, and IBM.

6.2 Recruitment

In mid January of each year, announcements of the Hope College REU program are distributed. Email announcements are sent to computer science department chairs at colleges and universities throughout the United States. In addition, announcements are sent via the United States Postal Service to Minority Affairs Officers at large universities throughout the midwest. Announcements are also place on the ACM SIGCSE mail list server. Chairs of computer science departments at over 50 predominantly minority institutions are contacted individually via email to especially encourage their students to apply. At the same time, an announcement is distributed in all computer science classes at Hope College. The application numbers for the six years of summer undergraduate research supported by the above two grants are given in the following table:

Application Profile	1992	1993	1994	1995	1996	1997	1998	1999	2000
External applicants	82	59	65	67	57	62	52	39	44
External participants	3	3	3	3	3	2	5	5	2
Hope applicants	7	11	12	17	15	17	20	14	13
Hope participants	3	3	3	3	3	4	3	3	3
Undergrad researchers not supported by NSF-REU	2	3	2	2	0	1	2	2	2

Two disturbing trends can be observed in this table, both of which we will address in the proposed project. First, it is apparent that the number of applications has been decreasing in recent years. Our hypothesis is that this is the result of an increasing number of competing opportunities available to computer science students. We intend to address this with Hope College students in future years by more deliberately emphasizing the benefits of the program in preparation for a research career. We hope to do this through academic year presentation by alumni from the program. To address this concern with non-Hope students, we plan to communicate more directly with faculty at other institutions to encourage them to communicate advantages of our program to their qualified students. In order to do this more effectively, we will especially work through faculty at institutions that have sent students to this program in previous years.

The second disturbing observation from the preceding table is the low number of external participants in the 2000 program. In fact, we were unable to fill any of the three non-Hope, non-partner institutions slots during this year. We made a total of nine offers for the three positions and all nine chose not to attend our program. Based on the follow-up information that was solicited, factors that caused this were not being assigned to their preferred project and the availability of opportunities that were better paying and geographically closer to the undergraduates. In addition to increasing the applicant pool by the strategy outlined in the preceding paragraph, we intend to address this by being more careful in matching applicants with projects and by stepping up our efforts to recruit participants in Michigan and neighboring states.

6.3 Past Projects

Hope College Computer Science Summer Research Projects, 1992-2000

Year	Projects	Faculty Mentor	Undergraduate Researchers * indicates non-REU funded
1992	An Object-Oriented Application/Programmer Interface for Network Programming	Shirley Browne	Jennifer Howell, Ming Shu*, Robert Wohlfarth
	Visualization of Abstract Models of Computation	Herbert Dershem	Brett Folkert, Ryan McFall
	An Object Oriented Test Bed for Parallel Ray Tracing	Gordon Stegink	Eric Matthews, Mike Shield
1993	AdaVision and THREADS: Algorithm Animation & Experimental Labs for Teaching Data Structures	Herbert Dershem	Wendy Barth, Cheri Bowsher, Bob Chen*
	The Genetic Algorithm Parallel Programming Project	Gordon Stegink	Russell Nelson, Bryan Showers
	An Empirical Case Study of Software Integration Techniques	Michael Jipping	Jon Beard*, Mike Crider*, Serge Hallyn, Nick Rahn
1994	Creating an Integrated Concurrent System Design Environment	Michael Jipping	Mike Crider*, Serge Hallyn*, John Duperon, Heather Mintz
	Algorithm Visualization and Animation	Herbert Dershem	Cheri Bowsher, Darrick Brown
	Finding an Ideal Path Using Genetic Algorithms	Gordon Stegink	Deborah Kaplan, Nick Slager
1995	Evaluating Parallel Software Design Tools	Michael Jipping	John Duperon, Jeff Oegema*
	Comparison of Ada 95 to C++ for Object-Oriented Programs	Herbert Dershem	Manuel Calderon, Andrew Van Pernis*
	Construction of an Operating System Laboratory	Michael Jipping	Darrick Brown, Mike Crider
	Dynamic Updating & Visualization of Large Voronoi Diagrams	Gordon Stegink	Robert Powell, Dan Toth
1996	Building a Networking Laboratory	Michael Jipping	Mike Thelen, Vic Polites
	Java-Oriented Test Harness	Herbert Dershem	Marvin Malkowski
	Java-Based Object-Oriented Fraction Visualization	Herbert Dershem	Marcia Janjecic
	A JDBC Implementation for SyBase	Ryan McFall	Kathryn Boner
	Foundations of a Pascal to Java Compiler	Ryan McFall	Jason Bucata

Year	Projects	Faculty Mentor	Undergraduate Researchers * indicates non-REU funded
1997	Visualization in Java	Herbert Dershem	James Vanderhyde
	Educational Animations of Algorithms	Herbert Dershem	Peter Brummund
	Dynamic Anomaly Detection in Java	Michael Jipping	Mike Bradshaw, Nate Oosten-dorp, Anita Van Engen*
	Persistent Annotation of HTML Documents	Ryan McFall	Jeff Penney, Daryl Blood
1998	Dynamic Anomaly Detection	Michael J. Jipping	Bob Murillo, Nate Oostendorp
	ALAN: The Algorithm Animator	Herbert Dershem	Dave Christian
	Java Development Environment	Gordon Stegink	Jon Pater, Daron Vroon
	Synchronize Implementation of Classes	Alyce Brady	Matt Hahnfeld*, Ilya Lipkin
	The Function Visualizer	Herbert Dershem	Erin Parker, Becky Weinhold
	WALDO: Web Accessible Learning Design Options	Michael Jipping	Andy Aardema*, Patti Marcoux
1999	Exploring Thin Client Technology on Handheld Computers	Michael Jipping	Karl Rasche*, Marcia Zangrilli
	Supporting Classroom Interaction By Handheld Computers	Michael Jipping	Maria Casipe, Jessica Hovater
	Algorithm Visualization on the Web	Herbert Dershem	Chris Rowland, Tim Vroom
	Program Execution Animation and Visualization	Herbert Dershem	Josiah Dykstra, Keith Suppes
	Learning Algorithms Applied to Game Playing	Myles McNally	Jessie Link, Daron Vroon
2000	Supporting Classroom Interaction By Handheld Computers	Michael Jipping	Sam Sandro, Josh Krikke, Sarah Dieter
	Smart(?) Lego Robots	Andrew VanPernis	Mike Branstein, Ben Wing*
	Timetable Construction and Student Course Scheduling	Gary Lewandowski	Abby Walker, Prakash Ojha*

Each summer, the participants were present on the Hope College campus for ten weeks of research. Those participants supported by non-REU funds are indicated by an *. In addition to the research work that was carried out, the following activities were also held in some or all of the summers:

- Weekly seminars where students present their research work
- Field trip to a University graduate computer science department
- Weekly seminar for preparation for the computer science GRE examination
- Field trip to computer trade show when one is in the area
- Faculty-led workshops on topics that are pertinent to all projects
- Workshop on how to give technical presentations

Students are required to make a formal final presentation of their research during the final week of the project and to submit a final research report. In addition, all students are required to submit an electronic poster of their research. These posters are then placed on the World Wide Web. Participants are also required to present their results in a colloquium at their home institution and to submit it for presentation and/or publication to a journal or conference.

6.4 Post-Summer Results: Presentations and Papers

(* indicates undergraduate co-author)

6.4.1 Papers presented

McFall*, R. 1992. Using the Computer to Visualize and Simulate Abstract Models of Computation. Pew Midstates Consortium Undergraduate Research Symposium. Grinnell, IA., October

Shu*, M. 1992. An Object-Oriented Application/Programmer Interface. Pew Midstates Consortium Undergraduate Research Symposium. Grinnell, IA.

Matthews*, E. and M. Shield*. 1992. Photosynthesis: An Object-Oriented Test Bed for Parallel Ray Tracing. Argonne Symposium on Undergraduate Research. Argonne, IL.

Howell*, J., R. Wohlfarth*, and M. Shu*. 1993. An Object-Oriented Application/Programmer Interface for Network Programming. Symposium on Applied Computing. Indianapolis, IN.

Engel, G., H. Dershem, R. McFall*, A. Lopez, and S. Wiltz. 1993. Research Experience for Undergraduates Panel. SIGCSE Technical Symposium on Computer Science Education. Indianapolis, IN.

Nelson*, R. and B. Showers*. 1993. The Genetic Algorithm Parallel Programming Project. Pew Midstates Consortium Undergraduate Research Symposium. Chicago, IL.

Barth*, W. and C. Bowsher*. 1993. AdaVision and THREADS: Algorithm Animations and Experimental Laboratories for Teaching a Data Structures Course in Ada. Argonne Symposium for Undergraduate Research. Argonne, IL.

Dershem, H. 1993. Algorithm Animation for Data Structures. United States Air Force Academy Computer Science Colloquium. USAF Academy, CO.

Jipping, M., S. Hallyn*, M Crider*, N. Rahn*, and J. Beard. 1993. An Empirical Case Study of Software Integration Techniques. NASA Langley Space Flight Center Symposium. Langley, VA.

McFall*, R. and H. Dershem. 1994. Finite State Machine Simulation in an Introductory Lab. SIGCSE Technical Symposium on Computer Science Education. Phoenix, AZ.

Dershem, H., Barth*, W., Bowsher*, C., and D. Brown*. 1996 "Data Structures with Ada Packages, Laboratories, and Animations," First Annual Australasian Conference on Computer Science Education, Sydney, AU.

Penney*, J. and D. Blood*. 1997. Persistent Annotation of HTML Documents. Pew Midstates Undergraduate Research Symposium. Chicago, IL

Van Engen*, A., Bradshaw*, M., and N. Oostendorp*. 1998."Extending Java to Support Shared Resource Protection and Deadlock Detection in Threads Programming", ACM Student Posters, SIGCSE Technical Symposium, Atlanta, GA.

Dershem, H. and P. Brummund*. 1998. "Tools for Web-Based Sorting Animation," SIGCSE Technical Symposium, Atlanta, GA.

Dershem, H. and J. Vanderhyde*. 1998. "Java Class Visualization for Teaching Object-Oriented Concepts," SIGCSE Technical Symposium, Atlanta, GA.

Dershem, H., Parker, D.E.*, and R. Weinhold*. 1999. "A Java Function Visualizer," Computing Consortium for Small Colleges: Rocky Mountain Conference, Colorado Springs, CO.

Dykstra, J.*, Dershem, H., and K. Suppes*. 2000. "An Abstract Window Toolkit Visualizer for Computer Science Instruction, " Midwest Instruction and Computing Symposium, Minneapolis, MN.

Vroom, T.* and C. Rowland*. 2000. "Salsa: A Tool for Teaching and Learning Algorithms through Animation," National Conference on Undergraduate Research, Missoula, MT

6.4.2 Papers Published

Howell*, J., R. Wohlfarth*, and M. Shu*. "An Object-Oriented Application/Programmer Interface for Network Programming," Proceedings of the 1993 Symposium on Applied Computing, 1993.

McFall*, R. and H. Dershem. "Finite State Machine Simulation in an Introductory Lab," SIGCSE Bulletin, 26,1 (1994), pp. 126-130.

Dershem, H., Barth*, W., Bowsher*, C., and D. Brown*. "Data Structures with Ada Packages, Laboratories, and Animations," Proceedings of the First Australasian Conference on Computer Science Education, Sydney, Australasian, July 3-5, 1996, pp. 32-38.

Van Engen*, A., Bradshaw*, M., and N. Oostendorp*. "Extending Java to Support Shared Resource

Protection and Deadlock Detection in Threads Programming", Crossroads, 4,2(Winter 1997), 9-17.

Dershem, H. and P. Brummund*. "Tools for Web-Based Sorting Animation," SIGCSE Bulletin, 30,1(Mar 1998), 222-226.

Dershem, H. and J. Vanderhyde*. "Java Class Visualization for Teaching Object-Oriented Concepts," SIGCSE Bulletin, 30,1(Mar 1998), 53-57.

Dershem, H., Parker, D.E.*, and R. Weinhold*, "A Java Function Visualizer," Journal of Computing in Small Colleges, 15,1(Oct 1999), 221-230.

Dykstra, J.*, Dershem, H., and K. Suppes*, "An Abstract Window Toolkit Visualizer for Computer Science Instruction, " Proceedings of the 33rd Midwest Instruction and Computing Symposium (CD-ROM), April 14-15, 2000, Minneapolis, MN.

6.4.3 Panels on Undergraduate Research

Dershem, H., with Engel G., McFall*, R., Lopez, A., and S. Wiltz*. "Research Experiences for Undergraduates," Twenty-fourth SIGCSE Technical Symposium on Computer Science Education, Indianapolis, IN, March, 1993.

Dershem, H., with Bard, G., and D. Berque. "Finding and Developing Research Experiences for Undergraduates in the Small College Setting," Third Annual CCSC Midwestern Conference, Greencastle, IN, October, 1996.

Dershem, H., with Sanders, D., Eller-Meshreki, R., and G. Pitts. "Undergraduate Research - Welcome to the 21st Century," Twenty-eighth SIGCSE Technical Symposium on Computer Science Education, San Jose, CA, February, 1997.

Dershem, H., with Hedges, H. "Birds of a Feather Session on NSF-REU Program for Computer Science," Twenty-ninth SIGCSE Technical Symposium on Computer Science Education, Atlanta, GA, March, 1998.

Biographical Sketches

Principal Investigator: Herbert L. Dershem

Education:

B.S. University of Dayton, 1965
M.S. (Computer Science) Purdue University, 1967
Ph.D. (Computer Science) Purdue University, 1969

Professional Experience:

Hope College, Assistant Professor, 1969-1974, Associate Professor, 1974-1981, Professor, 1981-present, chair of Computer Science Department, 1975-present.
Oak Ridge National Laboratories, Visiting Research Scientist, 1977-1978.
Boston University Overseas Program, Visiting Professor, 1982-1983.
United States Air Force Academy, Distinguished Visiting Professor, 1993-1994.

Publications (last six years):

Dykstra, J., Dershem, H.L., and K. Suppes, "An Abstract Window Toolkit Visualizer for Computer Science Instruction," *Proceedings of the 33rd Midwest Instruction and Computing Symposium (CD-ROM)*, April 14-15, 2000, Minneapolis, MN.

Dershem, H.L., Parker, D.E., and R. Weinhold, "A Java Function Visualizer," *Journal of Computing in Small Colleges*, 15,1(Oct 1999), 221-230.

Dershem, H.L. and J. Vanderhyde, "Java Class Visualization for Teaching Object-Oriented Concepts," *SIGCSE Bulletin*, 30,1(Mar 1998), 53-57.

Dershem, H.L. and P. Brummund, "Tools for Web-Based Sorting Animation," *SIGCSE Bulletin*, 30,1(Mar 1998), 222-226.

Dershem, H.L., Barth, W., Bowsher, C., and D. Brown, "Data Structures with Ada Packages, Laboratories, and Animations," *Proceedings of the First Australasian Conference on Computer Science Education*, July, 1996, 32-38.

Dershem, H.L. and M.J. Jipping, *Programming Languages: Models and Structures: Second Edition*, PWS Publishing Co., 1995.

McFall, R. and Dershem, "Finite State Machine Simulation in an Introductory Lab," *SIGCSE Bulletin*, 26,1(Mar 1994), 126-140.

Research Grant Awards:

Co-director, "Introduction of the Computer in the Statistics Curriculum," NSF Office of Computing Activities, 1971-1973, $45,800.

Director, "A Modular Approach to the Introductory Course in Computer Science," NSF Local Course Improvement Program, 1978-1980, $14,200.

Co-director, "A Microcomputer Laboratory for use in Teaching Statistics," NSF Instructional Scientific Equipment Program, 1979-1980, $10,315.

Director, "CSNET Membership in Support of Computer Science Research," NSF RUI Program, 1987-1990, $9,375.

Director, "Computer Science Undergraduate Research Program," NSF REU Program, 1992-1994, $86,550; 1995-1997, $114,393; 1998-2000, $146,700.

Director, "Use of Ada, Laboratories, and Visualization in the Teaching of Data Structures and Discrete Mathematics," DARPA Curriculum Development Grant, 1993-1994, $23,010.

Director, "Curriculum and Textbook Development Using Ada 9X for the Teaching of Object-Oriented Concepts," US Air Force Contract, 1995-1996, $34,464.

Co-Director, "An Integrated Classroom/Laboratory for Introducing Students to Object-Oriented Concepts," NSF ILI Program, 1996-1998, $46,356.

Collaboration:

A list of collaborators over the last 48 months includes: Michael Jipping, Gordon Stegink, Ryan McFall

Biographical Sketches

Michael J. Jipping

- ***EDUCATION***

  Ph.D. in Computer Science, May 1986, The University of Iowa, Iowa City, Iowa 52242. Dissertation: "An Information-Based Methodology for the Design of Concurrent Systems". Advisor: Ray Ford.

  M.S. in Computer Science, December 1984, The University of Iowa, Iowa City, Iowa 52242.

  B.S. in Computer Science, May 1981, Calvin College, Grand Rapids, Michigan 49506.

- ***PROFESSIONAL EXPERIENCE***

  Associate Professor, Department of Computer Science, Hope College,Holland, Michigan 49423 (August, 1994 - present). Taught courses on software engineering, programming language concepts,operating systems, networking, parallel programming, and programming handheld computers. Administered a departmental computing laboratory based in Unix workstations. Participated in departmental academic and research activities as well as personal research projects.

  Assistant Professor, Department of Computer Science, Hope College,Holland, Michigan 49423 (August, 1987 - July, 1994). Taught courses on introduction to programming and Pascal, software engineering, programming language concepts,operating systems, and parallel programming. Administered a departmental computing laboratory based in Unix workstations. Participated in departmental academic and research activities as well as personal research projects.

  Research Fellow, NASA Langley Research Center, Information Systems Division, System Architecture Branch, Hampton, VA 23681 (June - August, 1992). Worked on a research team investigating software integration strategies.

  Assistant Professor, Department of Computer Science, The University of Iowa, Iowa City, Iowa 52242 (August, 1986 - August, 1987). .

- ***PUBLICATIONS AND REPORTS***

  M.J. Jipping, "Using Tcl as a ToolTalk Encapsulation Mechanism", *Proceedings of the 1993 Sun User Group Conference*, December 1993, pp. 161-174.

  D.E. Eckhardt, M.J. Jipping, C.J. Wild, S.J. Zeil, and C.C. Roberts, "Open Environments to Support Systems Engineering Tool Integration: A Study Using the Portable Common Tool Environment (PCTE)", NASA Technical Memorandum 4489, NASA Langley Research Center, September 1993.

  M.J. Jipping and K. Bruce, "Imperative Language Paradigm", published in *The Computer Science and Engineering Handbook*, A.B. Tucker, ed., CRC Press, 1996.

  H.L. Dershem and M.J. Jipping, *Programming Languages: Structures and Models, 2nd Edition*. PWS Publishing Company, 1995.

M.J. Jipping, "Developing a Formal Model for Concurrency Control Design", *Proceedings of the Second Great Lakes Computer Science Conference,* April 1991.

R. Ford, M.J. Jipping, R. Schultz, and B. Wenhardt, "On the Performance of Concurrent Tree Algorithms", *Journal of Parallel and Distributed Computing*, 8, March 1990, pp. 253-266.

M.J. Jipping, J.R. Toppen, and S. Weeber, "Concurrent Distributed Pascal: A Hands-on Introduction to Concurrency", *Proceedings of the 1990 SIGCSE Technical Symposium, SIGCSE Bulletin,* Vol. 22, No. 1 (February, 1990), pp. 94-99.

H.D. Dershem and M.J. Jipping, *Programming Languages: Structures and Models*, Wadsworth Publishing Co., 1990.

M.J. Jipping, and R. Ford, "Predicting Performance for Concurrency Control Design", *1987 ACM SIGMETRICS Conference on Measurement and Modeling of Computer Systems*, pp. 132-142, Banff, Alberta, Canada (May 1987).

M.J. Jipping and R. Ford,"Performance Prediction in Distributed System Design", *Proceedings of the 1986 Rockwell International Software Engineering Symposium*, pp. 3.2.1-3.2.8, Cedar Rapids, Iowa (October 1986).

M.J. Jipping, "An Information-Based Methodology for the Design of Concurrent Systems", Ph.D. Thesis, Technical Report 86-01, The University of Iowa, Iowa City, Iowa (May 1986).

- ***RESEARCH GRANT AWARDS***

M.J. Jipping, "Using Handheld Computers in the Hope College Computer Science Curriculum," NSF Grant No. 9972390, $89,751, June 2000.

M.J. Jipping, H.L. Dershem, G.A. Stegink, "An Integrated Classroom/Laboratory for Introducing Students to Object-Oriented Concepts", NSF Grant No. DUE-9650129, $46,356, June 1996.

M.J. Jipping, "A Laboratory for Experimenting with Operating Systems and Networking Concepts", NSF Grant No. DUE-9550902, $52,601, June 1995.

Recipient of a NASA /JOVE Augmentation Award, June 1995 - September, 1996, $17,600.

M.J. Jipping, "Building a Software Infrastructure for Parallel Software Design", NASA Langley Research Center, NAG-1-1480, February 1993 - January 1996.

Recipient of a NASA Joint Venture Award, June 1992 - May 1995, $45,000.

M.J. Jipping, "Metrics for Concurrent System Design", Hope College Faculty Development Grant, June-August, 1991.

M.J. Jipping, "Refining a Metric for Concurrent System Design", Hope College Faculty Development Grant, June-August, 1990.

M.J. Jipping, "A New Course in Parallel Programming for Undergraduates", NSF Grant No. USE-9050417, Instrumentation and Laboratory Improvement Program, $54,761, July, 1990.

M.J. Jipping, "Creating an Environment for Parallel Programming", Hope College Faculty Development Grant, June-August, 1989.

- ***SUMMARY OF UNDERGRADUATE INVOLVEMENT***

A total of 71 undergraduate students have been advised by Dr. Jipping.

17 students have conducted research with Dr. Jipping.

- *COLLABORATION*

  A list of scientists collaborated with on projects over the last 48 months would include: Herbert Dershem, Dave Eckhardt, G. Michael Schneider, Chris Colgate, Tom Whaley, Henry Walker, Kim Bruce, Robert Cupper, James Bradley, Allen Tucker, and Raymond Ford.

Biographical Sketches

Ryan L. McFall

Education:

B.S. Hope College, 1993
M.S. (Computer Science) Michigan State University, 1995
Ph.D. (Computer Science) Michigan State University, 2000 (expected)

Professional Experience:

Hope College, Assistant Professor of Computer Science (2000-Present)
Teaching Assistant, Michigan State University, 1998-2000
Co-Developer, CPS 101 "Computing Concepts and Compentencies", Michigan State University, 1996-1998
Visiting Instructor, Hope College, 1995-1996
Teaching Assistant, Michigan State University, 1993-1995.

Publications (last six years):

McFall, R. and G. Stegink, "Introductory Computer Science for General Education: Laboratories, Textbooks, and the Internet," *SIGCSE Bulletin*, 29,1(Mar 1997), 96-100.

McFall, R. and Dershem, "Finite State Machine Simulation in an Introductory Lab," *SIGCSE Bulletin*, 26,1(Mar 1994), 126-140.

Collaboration:

A list of collaborators over the last 48 months includes: Herbert Dershem, Matt Mutka, and Gordon Stegink.

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **Hope College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Herbert L Dershem**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Herbert L Dershem - none**	0.00	0.50	2.00	$ 4,000	$
2. **Michael J Jipping**	0.00	0.00	2.00	2,000	
3. **Ryan L McFall**	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				2,000	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 26,000					
2. TRAVEL 3,200					
3. SUBSISTENCE 2,400					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (8) TOTAL PARTICIPANT COSTS				31,600	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				46,600	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 26000)**					
TOTAL INDIRECT COSTS (F&A)				6,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				53,100	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 53,100	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*: **Herbert L Dershem** DATE

ORG. REP. TYPED NAME & SIGNATURE* DATE

FOR NSF USE ONLY — INDIRECT COST RATE VERIFICATION

Date Checked	Date Of Rate Sheet	Initials - ORG

NSF Form 1030 (10/99) Supersedes all previous editions

1 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET YEAR 2

ORGANIZATION	FOR NSF USE ONLY		
Hope College	PROPOSAL NO.	DURATION (months) Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR	AWARD NO.		
Herbert L Dershem			

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Herbert L Dershem - none**	0.00	0.50	2.00	$ 4,000	$
2. **Michael J Jipping**	0.00	0.00	2.00	2,000	
3. **Ryan L McFall**	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				2,000	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 26,000					
2. TRAVEL 3,200					
3. SUBSISTENCE 2,400					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (8) TOTAL PARTICIPANT COSTS				31,600	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				46,600	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 26000)**					
TOTAL INDIRECT COSTS (F&A)				6,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				53,100	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 53,100	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*	DATE	FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Herbert L Dershem		Date Checked	Date Of Rate Sheet	Initials - ORG
ORG. REP. TYPED NAME & SIGNATURE*	DATE			

NSF Form 1030 (10/99) Supersedes all previous editions

2 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **Hope College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Herbert L Dershem**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. Herbert L Dershem - none	0.00	0.50	2.00	$ 4,000	$
2. Michael J Jipping	0.00	0.00	2.00	2,000	
3. Ryan L McFall	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				2,000	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 26,000					
2. TRAVEL 3,200					
3. SUBSISTENCE 2,400					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (8) TOTAL PARTICIPANT COSTS				31,600	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				46,600	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 26000)**					
TOTAL INDIRECT COSTS (F&A)				6,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				53,100	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 53,100	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE* **Herbert L Dershem** DATE

ORG. REP. TYPED NAME & SIGNATURE* DATE

FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

NSF Form 1030 (10/99) Supersedes all previous editions

3 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET

Cumulative

ORGANIZATION	FOR NSF USE ONLY		
Hope College	PROPOSAL NO.	DURATION (months) Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR	AWARD NO.		
Herbert L Dershem			

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. Herbert L Dershem - none	0.00	1.50	6.00	$ 12,000	$
2. Michael J Jipping	0.00	0.00	6.00	6,000	
3. Ryan L McFall	0.00	0.00	6.00	6,000	
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	1.50	18.00	24,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (3) POST DOCTORAL ASSOCIATES	0.00	0.00	6.00	6,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				30,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				6,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				36,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				6,000	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 78,000					
2. TRAVEL 9,600					
3. SUBSISTENCE 7,200					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (24) TOTAL PARTICIPANT COSTS				94,800	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				3,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				3,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				139,800	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				19,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				159,300	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 159,300	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*	DATE	FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Herbert L Dershem		Date Checked	Date Of Rate Sheet	Initials - ORG
ORG. REP. TYPED NAME & SIGNATURE*	DATE			

NSF Form 1030 (10/99) Supersedes all previous editions

C*SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

Budget Justification Page

A1. The salary for the Project Director includes $2,000 per year for administration of the project and $2,000 for directing the work of two undergraduates.

A2, A3, B1. Each Faculty Associate receives $1,000 per undergraduate researcher supervised. Typically, each Faculty Associate will direct two undergraduates.

C. Fringe benefits for faculty is calculated as 20% of faculty salaries. This includes FICA, MQFE, and retirement benefits.

E. Travel is provided for the external faculty mentor to travel from home to the Hope College campus a minimum of twice each week.

F1. Student stipends are $325 per week for 10 weeks for 8 students. The Hope College contribution to FICE/MQFE is included in this amount. The amount actually received by students is therefore approximately $300 per week.

F2. The participant travel budget includes $400 per student. This is used to pay participant travel expenses to make presentations of their results at regional and national conferences. Local funds will be used to supplement these travel expenses and to pay faculty mentor travel expenses to these same conferences.

F3. The cost of student housing is approximately $60 per week for a total cost of $600 per student for the ten-week period. Hope College will subsidize one-half of this amount, leaving $300 per student to be paid by the NSF-REU grant.

G1. Materials and supplies are budgeted at $1,000 per summer. This is used for postage, telephone, copying, and other general expenses. It will also be used to defray the cost of field trips and off-campus speakers.

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: **Herbert Dershem**

Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: **An Object-Oriented Execution Visualization Environment for Learning Introductory Computer Science**

Source of Support: **NSF-CCLI**

Total Award Amount: $ **74,937** Total Award Period Covered: **05/01/01 - 04/30/03**

Location of Project: **Hope College, Holland, MI**

Person-Months Per Year Committed to the Project. Cal: **0.00** Acad: **0.00** Sumr: **2.00**

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: **REU: Computer Science Research Experience for Undergraduates**

Source of Support: **NSF-REU**

Total Award Amount: $ **159,300** Total Award Period Covered: **02/01/01 - 01/31/04**

Location of Project: **Hope College, Holland, MI**

Person-Months Per Year Committed to the Project. Cal: **0.00** Acad: **0.50** Sumr: **1.00**

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Summ:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: **Michael Jipping**

Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: **Using Handheld Computers in the Hope College Computer Science Curriculum**

Source of Support: **NSF-CCLI**

Total Award Amount: $ **86,610** Total Award Period Covered: **05/01/00 - 08/31/01**

Location of Project: **Hope College, Holland, MI**

Person-Months Per Year Committed to the Project. Cal: **0.00** Acad: **4.00** Sumr: **4.00**

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Summ:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: **Ryan McFall**

Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: **An Object-Oriented Execution Visualization Environment for Learning Introductory Computer Science**

Source of Support: **NSF-CCLI**

Total Award Amount: $ **74,937** Total Award Period Covered: **05/01/01 - 04/30/03**

Location of Project: **Hope College, Holland, MI**

Person-Months Per Year Committed to the Project. Cal: **0.00** Acad: **0.00** Sumr: **2.00**

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Summ:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

SUMMARY PROPOSAL BUDGET

YEAR 1

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **Hope College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Herbert L Dershem**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. Herbert L Dershem - none	0.00	0.50	2.00	$ 4,000	$
2. Michael J Jipping	0.00	0.00	2.00	2,000	
3. Ryan L McFall	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				1,400	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 16,250					
2. TRAVEL 2,000					
3. SUBSISTENCE 1,500					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (5) TOTAL PARTICIPANT COSTS				19,750	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				34,150	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 16250)**					
TOTAL INDIRECT COSTS (F&A)				4,063	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				38,213	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 38,213	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*: **Herbert L Dershem** DATE

ORG. REP. TYPED NAME & SIGNATURE* DATE

FOR NSF USE ONLY		
INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

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1 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET

YEAR 2

ORGANIZATION	FOR NSF USE ONLY		
Hope College	PROPOSAL NO.	DURATION (months) Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR	AWARD NO.		
Herbert L Dershem			

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Herbert L Dershem - none**	0.00	0.50	2.00	$ 4,000	$
2. **Michael J Jipping**	0.00	0.00	2.00	2,000	
3. **Ryan L McFall**	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				1,400	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 26,000					
2. TRAVEL 3,200					
3. SUBSISTENCE 2,400					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (8) TOTAL PARTICIPANT COSTS				31,600	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				46,000	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 26000)**					
TOTAL INDIRECT COSTS (F&A)				6,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				52,500	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 52,500	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*	DATE	FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Herbert L Dershem		Date Checked	Date Of Rate Sheet	Initials - ORG
ORG. REP. TYPED NAME & SIGNATURE*	DATE			

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2 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET

YEAR 3

FOR NSF USE ONLY		
PROPOSAL NO.	DURATION (months) Proposed	Granted
AWARD NO.		

ORGANIZATION: **Hope College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Herbert L Dershem**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. Herbert L Dershem - none	0.00	0.50	2.00	$ 4,000	$
2. Michael J Jipping	0.00	0.00	2.00	2,000	
3. Ryan L McFall	0.00	0.00	2.00	2,000	
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.50	6.00	8,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (1) POST DOCTORAL ASSOCIATES	0.00	0.00	2.00	2,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				10,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				12,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				1,400	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 26,000					
2. TRAVEL 3,200					
3. SUBSISTENCE 2,400					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (8) TOTAL PARTICIPANT COSTS				31,600	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				1,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				1,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				46,000	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **25% of F1 (Rate: 25.0000, Base: 26000)**					
TOTAL INDIRECT COSTS (F&A)				6,500	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				52,500	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 52,500	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*	DATE	FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Herbert L Dershem				
ORG. REP. TYPED NAME & SIGNATURE*	DATE	Date Checked	Date Of Rate Sheet	Initials - ORG

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3 *SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

SUMMARY PROPOSAL BUDGET

Cumulative

ORGANIZATION	FOR NSF USE ONLY		
Hope College	PROPOSAL NO.	DURATION (months) Proposed	Granted
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR	AWARD NO.		
Herbert L Dershem			

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. Herbert L Dershem - none	0.00	1.50	6.00	$ 12,000	$
2. Michael J Jipping	0.00	0.00	6.00	6,000	
3. Ryan L McFall	0.00	0.00	6.00	6,000	
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (3) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	1.50	18.00	24,000	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (3) POST DOCTORAL ASSOCIATES	0.00	0.00	6.00	6,000	
2. (0) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	0.00	0.00	0.00	0	
3. (0) GRADUATE STUDENTS				0	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				30,000	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				6,000	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				36,000	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				4,200	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 68,250					
2. TRAVEL 8,400					
3. SUBSISTENCE 6,300					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (21) TOTAL PARTICIPANT COSTS				82,950	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				3,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				3,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				126,150	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				17,063	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				143,213	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 143,213	$

M. COST SHARING PROPOSED LEVEL $ 0 AGREED LEVEL IF DIFFERENT $

PI / PD TYPED NAME & SIGNATURE*	DATE	FOR NSF USE ONLY INDIRECT COST RATE VERIFICATION		
Herbert L Dershem		Date Checked	Date Of Rate Sheet	Initials - ORG
ORG. REP. TYPED NAME & SIGNATURE*	DATE			

NSF Form 1030 (10/99) Supersedes all previous editions

C*SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPG III.B)

Review Analysis

Proposal 0097464 from Hope College with PI H. Dershem was submitted to the CISE REU Sites program. A total of 20 proposals were considered by panelists on February 2, 2001, as described in the attached minutes. The panel rated 7 proposals as Highly Competitive, 6 as competitive and 7 as Non Competitive. This proposal was assigned by the panel to the Highly-Competitive category. Individual reviewers gave the proposal 2 excellent ratings, 1 very good rating and 1 good ratings.

This proposal is a well thought out continuation of a successful REU site program that has been running for nine consecutive years.

I concur with the panel and recommend this proposal for funding as a 3 year continuing award with increments of $38,213, $52,500 and $52,500.

Carl Smith
Temporary Program Manager
Experimental and Integrative Activities

NATIONAL SCIENCE FOUNDATION

Division of Experimental and Integrative Activities

REU Sites Panel Review - February 2, 2001

PUBLIC MINUTES

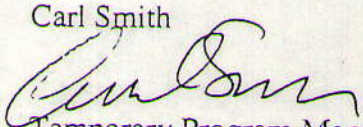
The panel convened in room 1150 at 8:30 AM. There were 8 panelists. The meeting began with Dr. Smith welcoming the panelists, discussing review criteria and conflict of interest (COI) issues with the panel. All the panelists read and signed the COI form. Panelists were cautioned about the confidentiality of the proposals under review and of the confidentiality of the identities of the panel members and the review discussions. Dr. Smith then instructed the panelists regarding the review process. Dr. Wardle discussed the history of the REU Sites Program. Ms. Joneka Thompson explained the administrative forms. The panelists were then organized into 2 subpanels, with 4 members each. In addition, Dr. Julia Abrahams, a NSF program manager attended the panel deliberations.

The panel reviewed and evaluated 20 proposals for suitability of funding under the Experimental Partnerships guidelines. Prior to the panel meeting, all reviewers had been sent the set of proposals they were to review in their subpanel. They had also written individual reviews and assigned individual ratings of Excellent (E), Very Good (VG), Good (G), Fair (F) or Poor (P) to each proposal. Each proposal had at least 3 subpanel members who had written individual reviews and assigned individual ratings. Then the panel discussed each proposal and gave a recommendation for funding priority of highly competitive (H), competitive (C) or not competitive (N).

Disqualifying conflicts of interest were resolved by having the involved panel member or NSF program Officer leave the room during discussion of the proposal. The cognizant program officer (C. Smith) reported a conflict of interest with 1 proposal that was handled separately from the panel process.

These minutes are an accurate summary of the matters discussed and conclusions reached at this meeting.

Carl Smith



Temporary Program Manager
Experimental and Integrative Activities

Panel Summary for
Proposal EIA-0097464

Investigator: Herbert L. Dershem
Hope College

Major strengths:

This proposal is very well organized and presented, showing the results of a successful nine-year ongoing REU program. The care and nurturing of the students with respect to the program is evident, and the analysis of the results of previous years in the program is well presented. The PI is to be commended for even reporting a disappointment with the meager success in attracting the underrepresented and discussing possible plans to further address this problem in the future.

Weaknesses

There are few weaknesses with the project. Some questions were raised with respect to whether the projects in which the students are involved are really ``research,'' or whether they more aptly fall into the category of special individual projects that might be expected in regular computer science programs. This observation came from comparisons with other proposals in which participants were assigned to researchers with ongoing, externally funded research projects. Nonetheless, the reviewers like the project and the result that many participants appear to go on to graduate school.

Other comments

It might be possible to address the problem of attracting the underrepresented to the REU program by having one or more partner institutions with primarily minority enrollment. A specific mentor at those institutions could personally contact appropriate students and acts as the home site mentor for the REU project. This strategy would provide continuing support and encouragement to those students when they return to their home institutions.

In general, this is a great proposal with good organization. Hope College is to be commended for its work.

Overall rating

PROPOSAL NO.: 0097464
INSTITUTION: Hope College
NSF PROGRAM: CISE RESEARCH INFRASTRUCTURE
PRINCIPAL INVESTIGATOR: Dershem, Herbert L.
TITLE: REU Site: An Undergraduate Research Participation Program in Computer Science
RATING: Excellent

REVIEW:
What is the intellectual merit of the proposed activity?

Since REU programs are substantially different from other NSF programs the comments have all been placed in the summary statement.

What are the broader impacts of the proposed activity?

Summary Statement

Overall, this is a very well done proposal. The enthusiasm and the motivation of those involved in the project are evident. The reporting of the results of previous REU projects has also been done very well. It appears that a lot of effort is spent on the undergraduate researchers in this environment. The experience with previous REU grants has been well-analyzed used to enhance this proposal, a laudable aspect.

The only counterpoints that might be mentioned are these:
 Are there any opportunities for students to see (through, say, field trips) the kinds of research activities that might be involved in larger, externally funded projects at other institutions or laboratories where the primary objective of the scientists involved is research? This would not only give students a taste for research activities as provided at Hope, but also give them insight into real-world research.
 It may have been an oversight, but I was unable to find a review of publications that had undergraduates from the program as co-authors, a point that was to be addressed according to the program announcement. I assume that in this

environment there have been collaborative publications with undergraduates. It would be nice to highlight these.
 'Providing professional development opportunities to undergraduates' was another (I think less important) point to be covered by the program announcement that was not specifically mentioned in the proposal.

The Hope REU project appears to be successful and well-run.

PROPOSAL NO.: 0097464
INSTITUTION: Hope College
NSF PROGRAM: CISE RESEARCH INFRASTRUCTURE
PRINCIPAL INVESTIGATOR: Dershem, Herbert L.
TITLE: REU Site: An Undergraduate Research Participation Program in Computer Science
RATING: Excellent

REVIEW:
What is the intellectual merit of the proposed activity?

This strikes me as an excellent proposal along virtually all dimensions (cf. minority involvement). The PI has given considerable thought to how the REU can be structured to maximize the experience for undergraduates. The idea of picking an annual partner is a creative and apparently effective outreach effort. Yet, the REU adds to this with a more universal search.

The experience seems to have some strong activities for the students, including, but not limited to, the research component. The PI's previous REU experience has paid off in a proposal full of pedagogical devices, interesting topics, and intellectual atmosphere.

What are the broader impacts of the proposed activity?

Despite the PI's efforts to recruit minorities, the data they report suggest they have had little success. One solution might be to weight minority issues more aggressively when picking a partner. This may require partnering with a more distant college. Another possibility is to be more aggressive without partnering by visiting the school or paying for a representative to visit Hope.

Summary Statement

This is a solid proposal from an institution that has had good success in past REUs. The cost per intern is $6637.

PROPOSAL NO.: 0097464
INSTITUTION: Hope College
NSF PROGRAM: CISE RESEARCH INFRASTRUCTURE
PRINCIPAL INVESTIGATOR: Dershem, Herbert L.
TITLE: REU Site: An Undergraduate Research Participation Program in Computer Science
RATING: Good

REVIEW:
What is the intellectual merit of the proposed activity?

The proposal suggests a number of mainly independent study projects (I am not sure if visualization, animation, supporting, exploring technology projects of the types suggested in the proposal can be called "research"). In my opinion, this project will hardly lead to scientific discoveries, however, it will certainly advance (to lesser extent)knowledge and (probably, to greater extent) understanding within the field. On the other hand, there is no doubt (as supported by the student evaluations) that study projects of this kind give students a very good chance to explore and further practical applications of the knowledge that they acquired in classrooms, as well as shape their careers. Suggested study topics (for example, algorithm and function visualization - typical programming exercises in many colleges) do not seem too original, though they will require certain skills and creativity from students. The team members (especially the PI) are very qualified to conduct the project, though, the quality of prior work in many cases does not seem to rise above the level of (sometimes, comperehensive) programming expercises. Taking into account the level of studies, as well as qualifications of the PI, there is no doubt that proposed activity would be very well organized. Students will have access to all necessary resources.

What are the broader impacts of the proposed activity?

As the extensive list of publications (co-authored by undergraduate students) indicates, the PIs are very skillful in utilizing and advertising results of their research, especially in the field of computer science education. Collaborating with their mentors on publication preparation, students will get a valuable educational and social experience. The project will certainly advance training and teaching skills of the PIs. On the other hand, it will hardly attract students from other colleges (as evidenced by prior

experience of the team), since there are a number of more attractive research-oriented opportunities around. In particular, it is not clear how this project targets students from underrepresented groups, though the PIs provide some evidence indicating that the number of students from these categories participating in the program is steadily increasing. There is, probably, no chance to broaden participation geographically.

Summary Statement

G (good). The Criterion 1 (relatively low scientific value of the project, relatively high educational value of the project, high educational qualifications of the PIs) was critical to my decision. Criterion 2 (students will have broad opportunities to disseminate their results, the project will help them to make their career choices, the project is not very likely to attract students from other colleges) contributed to my decision to a lesser extent.

PROPOSAL NO.: 0097464
INSTITUTION: Hope College
NSF PROGRAM: CISE RESEARCH INFRASTRUCTURE
PRINCIPAL INVESTIGATOR: Dershem, Herbert L.
TITLE: REU Site: An Undergraduate Research Participation Program in Computer Science
RATING: Very Good

REVIEW:
What is the intellectual merit of the proposed activity?

This is a proposal to continue the support for a very good REU program. The faculty are clearly good at running this program, at attracting students, and at helping undergraduate students to become involved in research activities beyond the boundaries of the REU program. The available research projects are all within the field of computer science and in areas such as handheld devices and visualization that are particularly appealing to students.

The program recruits its students from around the nation, but primarily from Michigan and nearby states. Five of the eight supported students will be from other colleges.

The evaluation of results of prior support is quite good. It shows their success in attracting women and an improving recruitment of minority students. Their total rate of graduate school attendance is 50%, an excellent result.

What are the broader impacts of the proposed activity?

The use of a Fall Research Symposium gives this program the opportunity to further their educational goals and to further encourage the students to continue in research programs. The program also includes faculty from other colleges. This outreach to other colleges furthers the goals of the REU program by extending its range of influence.

Summary Statement

This is a worthy program that has demonstrated its success with prior REU funding. It has appealing computer science research topics and faculty members who are committed to undergraduate research experiences. The overall level of external research support for the faculty is less than that of some of the other programs.

National Science Foundation

4201 WILSON BOULEVARD, ARLINGTON, VIRGINIA 22230

Award Date: May 19, 2001
Award No. EIA-0097464
Proposal No. EIA-0097464

Dr. James E. Bultman
President
Hope College
P.O. Box 9000
Holland, MI 49422-9000

Dear Dr. Bultman:

The National Science Foundation hereby awards a grant of $38,213 to Hope College for support of the project described in the proposal referenced above as modified by revised budget submitted by your principal investigator on March 21, 2001.

This project, under the direction of Herbert L. Dershem, is entitled:

"REU Sites: An Undergraduate Research Participation Program in Computer Science."

This award is effective June 1 , 2001 and expires May 31, 2002.

This is a continuing grant which has been approved on scientific / technical merit for approximately 3 years. Contingent on the availability of funds and the scientific progress of the project, NSF expects to continue support at approximately the following level:

FY 2002	$52,500
FY 2003	$52,500

This grant is awarded pursuant to the authority of the National Science Foundation Act of 1950 (42 U.S.C. 1861 et seq.) and is subject to Grant General Conditions (GC-1) dated 04/01 and the following terms and conditions:

Funds provided by this award include support for "Research Experiences for Undergraduates" in accordance with NSF Announcement 00-107.

The attached budget indicates the amounts, by categories, on which NSF has based its support.

The cognizant NSF program official for this grant is Carl H. Smith (703) 306-1980. The cognizant NSF grants official contact is Shirley R Kerchner (703) 292-8213.

Sincerely,

Sharon P. Graham
Grants Officer

CFDA No. 47.070
arndt@hope.edu

EIA-0097464
000

SUMMARY PROPOSAL BUDGET
Award No. 0097464

Person MOS	cal	acad	sumr	Funds granted By NSF
A. (3.00) Total Senior personnel	0.50	6.00	0.00	$8,000
B. Other Personnel				
1. (1.00) Post Doctoral associates	0.00	0.00	2.00	$2,000
2. (0.00) Other professionals	0.00	0.00	0.00	$0
3. (0.00) Graduate students				$0
4. (0.00) Secretarial-clerical				$0
5. (0.00) Undergraduate students				$0
6. (0.00) Other				$0
Total salaries and wages (A+B)				$10,000
C. Fringe benefits (if charged as direct cost)				$2,000
Total salaries wages and fringes (A+B+C)				$12,000
D. Total permanent equipment				$0
E. Travel				
1. Domestic				$1,400
2. Foreign				$0
F. Total participant support costs				$19,750
G. Other direct costs				
1. Materials and supplies				$1,000
2. Publication costs/page charges				$0
3. Consultant services				$0
4. Computer (ADPE) services				$0
5. Subcontracts				$0
6. Other				$0
Total other direct costs				$1,000
H. Total direct costs (A through G)				$34,150
I. Total indirect costs				$4,063
J. Total direct and indirect costs (H+I)				$38,213
K. Residual funds / Small business fee				
1. Residual funds (if for further support of current projects GPM 252 and 253)				$0
2. Small business fee				$0
L. Amount of this request (J) or (J-K1+K2)				$38,213
M. Cost sharing				$0

Use the **Back** button on the toolbar to return to the previous screen.

User: dershem
Host: gandalf
Class: gandalf
Job: standard input

Annual Report for Period: 02/1998 - 01/2001

Submitted on: 02/05/1999

Principal Investigator: Dershem, Herbert L.

Award ID: 9732339

Organization: Hope College

REU: Computer Science Research Experience for Undergraduates

Participant Individuals

Senior Personnel

Name: Dershem, Herbert
Worked for more than 160 Hours: No
Contribution to Project:

Name: Stegink, Gordon
Worked for more than 160 Hours: No
Contribution to Project:
Faculty Associate

Name: Jipping, Michael
Worked for more than 160 Hours: No
Contribution to Project:
Faculty Associate

Name: Brady, Alyce
Worked for more than 160 Hours: No
Contribution to Project:
External Faculty Associate

Post-doc

Graduate Student

Undergraduate Student

Name: Pater, Jonathan
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate participant

Name: Vroon, Daron
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate participant

Name: Murillo, Robert
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate participant

Name: Parker, Daisy
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate participant

Name: Weinhold, Rebecca
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate participant

Name: Lipkin, Ilya

Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate Participant

Name: Christian, David
Worked for more than 160 Hours: Yes
Contribution to Project:
Undergraduate Participant

Name: Marcoux, Pataricia
Worked for more than 160 Hours: Yes
Contribution to Project:
Student Participant

Partner Organizations

Other Collaborators

Activities and Findings

Research Activities:
Five projects were conducted during the summer of 1998. They were:
1.Algorithm and Code Animations on the Web
2.Concurrency Anomaly Prevention Using POSIX Threads
3.Exploring Dynamic Web Page Implementations
4.Visualization of Function Calls and Execution
5.Linking Program Implementations to Original Specifications
6.Java Interactive Environment

Research Findings:
Research Training:
All undergraduate participants received training in research techniques and presentation skills.

Education and Outreach:

Journal Publications

Stegink, G.A., Pater, J. and Vroon, D. , "Computer Science and General Education: Java, Graphics, and the Web", *SIGCSE Bulletin*, p. , vol. 31, (1999).) Accepted

Books or Other One-time Publications

Web/Internet Sites

URL(s):
http://www.cs.hope.edu/~dershem/reu/papers98.html
http://www.cs.hope.edu/~dershem/reu/posters98.html
Description:

Other Specific Products

Contributions

Contributions within Discipline:

Contributions to Other Disciplines:

Contributions to Education and Human Resources:

Contributions to Science and Technology Infrastructure:

Beyond Science and Engineering:

Special Requirements

Special reporting requirements:

Change in Objectives or Scope:

Unobligated Funds:

Animal, Human Subjects, Biohazards:

Categories for which nothing is reported:

Partner Organizations
Activities and Findings: Any Education or Outreach
Any Book
Any Product
Contributions: Any within Discipline
Contributions: To Any Other Disciplines
Contributions: To Any Education or Human Resource
Contributions: To Any Science or Technology Infrastructure
Contributions: Beyond Science or Engineering
Change in Objectives or Scope: None
Special Requirements for Annual Progress Report: None
Change in Objectives or Scope: None
Unobligated funds: None
Animal, human subjects, biohazards: None

FINAL REPORT FOR AWARD # 0097464

Herbert L Dershem ; *Hope College*
REU Sites: An Undergraduate Research Participation Program in Computer Science

Participant Individuals:
Senior personnel(s) : Michael J Jipping; Ryan McFall; Matthew DeJongh
Research Experience for Undergraduates(s) : Christopher Johnson; Matthew Shaefer
Senior personnel(s) : Keith VanderLinden; Rose Shumba; William Fitzgerald
Research Experience for Undergraduates(s) : Ngozi Uti; Sarah Allen; Steve Marlowe; Matthew Boes; Harkness Connell; Michael Ku; Carrie Halvorsen; Timothy Kelley; Chad Kettner; Martin Kane; Agata Bugaj; Christy Niemerg; Ben Occhipinti; Donald Porter; Joshua Rowe; Joshua Morse; Jordan Kairys; Andrew Kalafut; Kathleen Ludewig; Nathan Kooistra; Aaron Phillips; Benjamin Ramsay; William Sumner; Pamela Van Dort

Participants' Detail

Partner Organizations:

Activities and findings:

Research and Education Activities:

Summer of 2004
During the summer of 2004, one student was supported by an extension of this grant. Below is a report on the entire project.

The following projects were conducted during the summer of 2004:

1. Discovering properties of mobile phones
2. Modeling a cellular tranport system
3. Mining implicit links in the gene ontology
4. Mobile Java networks over Bluetooth
5. User interface considerations for older users
6. Programmer-defined formatting
7. E-textbook project

Recruitment and Selection:
The program was announced through the SIGCSE listserv and through the Systers listserv. In addition, chairs of computer science departments at minority institutions were sent information about the program.

Number of applicants from host institution: 21
Number of applicants from outside: 94

Students were paid a stipend of $3800 and their on-campus housing was provided.

In-Program Activities
- Field trip to the University of Michigan graduate school
- GRE Exam preparation seminar

- Presentations by participants and outside speakers
Out-of-Program Activities
- Occasional social events
- Weekly pizza luncheons
- Interaction with undergrad researchers in other departments via ice cream socials, beach volleyball, and picnics.

Summer of 2003
The following projects were conducted during the summer of 2003:

1. Electronic Textbook Development
2. Automated Visualization of Abstract Data Types
3. Wireless network Analysis Using Handheld Computers
4. Functional Modeling of Gene and Cellular Processes
5. Speech and Dialog on Small Devices

Recruitment and Selection:
The program was announced through the SIGCSE listserv and through the Systers listserv. In addition, chairs of computer science departments at minority institutions were sent information about the program.

Number of applicants from host institution: 21
Number of applicants from outside: 92

Students were paid a stipend of $3800 and their on-campus housing was provided.

In-Program Activities
- Field trip to Purdue University graduate school
- GRE Exam preparation seminar
- Presentations by participants and outside speakers
Out-of-Program Activities
- Occasional social events
- Weekly pizza luncheons
- Interaction with undergrad researchers in other departments via ice cream socials, beach volleyball, and picnics.

Summer of 2002
The following projects were conducted during the summer of 2002:

1. Electronic Textbooks
2. Precedence Network Technique Tool Development
3. Static Analysis Tool Development for C++ Programs
4. SIMD Implementation of Computational Geometry Algorithms
5. A Platform for Network Analysis Using Handheld Computers

Recruitment and Selection:
The program was announced through the SIGCSE listserv and through the Systers listserv. In addition, chairs of computer science departments at minority institutions were sent information about the program.

Number of applicants from host institution: 10
Number of applicants from outside: 44

Students were paid a stipend of $3800 and their on-campus housing was provided.

In-Program Activities
- Field trip to the Michigan State University graduate school
- GRE Exam preparation seminar

- Presentations by participants and outside speakers
Out-of-Program Activities
- Occasional social events
- Weekly pizza luncheons
- Interaction with undergrad researchers in other departments via ice cream socials, beach volleyball, and picnics.

Summer of 2001
The following projects were conducted during the summer of 2001:

1. Infrastructure Design for a Mobile Ad Hoc Network for Parallel Processing
2. Electronic Readers and Software: The Textbooks of the Future
3. Obvis: The Object Visualizer
4. One-to-Many Cryptography
5. Serving User Documentation with Dynamic Web Pages
6. Enhancing a GUI Event Recorder to Support the Automated Creation of User Documentation
7. Hardware Design and Testing over a LAN
8. JVALL: Java Visual Automated Linked List

Recruitment and Selection:
The program was announced through the SIGCSE listserv and through the Systers listserv. In addition, chairs of computer science departments at minority institutions were sent information about the program.

Number of applicants from host institution: 15
Number of applicants from outside: 42

Students were paid a stipend of $3800 and their on-campus housing was provided.

In-Program Activities
- Field trip to the University of Michigan graduate school
- GRE Exam preparation seminar
- Presentations by participants and outside speakers
Out-of-Program Activities
- Occasional social events
- Weekly pizza luncheons
- Interaction with undergrad researchers in other departments via ice cream socials, beach volleyball, and picnics.

Findings:

1. Development of Java classes that characterize the TCP/IP stack.
2. Alpha version of Java class that characterizes wireless transport.
3. Development of a database-linked web page annotation method with browser support.
4. Discovery of ways of linking genome databases.
5. Development of innovative visualizations for algorithms and machine execution.

Training and Development:

This project developed research skills in the students who participated.

Outreach Activities:

We recruited and selected participants to include students from underrepresented groups and from institutions that do not have active research programs.

Journal Publications:

M. Jipping, A. Bugaj, L. Mihalkova, and D. Porter, "Using Java to Teach Networking Using a Programmable Network Sniffer", *Proceedings of the 2003 SIGCSE Technical Symposium*, vol. 35, (2003), p. 120. Published

M. Jipping, S. Marlowe, A. Sherstov, "Using Handheld Computers in the Classroom Laboratories and Collaboration on Handheld Machines", *SIGCSE Bulletin*, vol. 33, (2001), p. 169. Published

H. Dershem, R. McFall, and N. Uti, "Animation of Java Linked Lists", *SIGCSE Bulletin*, vol. 53, (2002), p. 53. Published

H. Dershem, R. McFall, and N. Uti, "A Linked List Prototype for the Visual Representation of Abstract Data Types", *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning*, vol. 4, (2002), p. na. Published

M. Jipping, A. Kalafut, N. Kooistra, and K. Ludewig, "Investigating Wired and Wireless Networks Using a Java-based Programmable Sniffer", *ITICSE 2004 Proceedings*, vol. 36, (2004), p. 12. Published

Book(s) of other one-time publications(s):

Other Specific Products:

Internet Dissemination:

http://www.cs.hope.edu/~dershem/reu/reu04.html

This web site contains links to deliverables from the Summer 2004 projects.

Contributions:

Contributions within Discipline:

1. Development of techniques and approaches to algorithm visualization
2. Development of a parallel approach to computational geometry algorithms
3. Development of methods for establishing links in the gene ontology
4. Study of protocol development for mobile ad hoc networks
5. Development of tools for precedence network development
6. Development of tools for the study of the effectiveness of an e-textbook
7. Development of techniques for analyzing wireless networks using handheld computing devices

Contributions to Other Disciplines:

The work on the the gene ontology contributed to the discipline of biology.

Contributions to Education and Human Resources:

Students appreciated the exposure to graduate school preparation. This occurred both through our field trip and the GRE preparation. These were both cited as highlights and we were encouraged to continue them in the future

Students were excited about their contributions. Some were encouraged to enter their work in research contests; this occurred in connection with the writing of the research paper and subsequent submission to SIGCSE, ITICSE, and CCSC conferences. The research work was accepted for competition at SIGCSE. Others took their contributions and used them at their school for student projects in classes. Still others continued their work with their research mentor beyond the summer into the fall semester.

In general, the summer research experience for the students was rated extremely high. Among the research accomplishments from the students were the research contributions listed previously. In addition to these, several others were included: meeting others and working with interesting students, learning that it is possible to contribute to a research project, writing a scientific paper. In addition, several skills were cited: increased Java programming skills, paper writing skills, and heightened skills developed through experience with specific research projects.

It was difficult to assess the REU experience's impact on career choices. Most did not indicate that the experience steered them one way or another. When a direction was indicated, it was always in a more positive direction toward a computer science research career.

Categories for which nothing is reported:
Participants: Partner organizations
Participants: Other Collaborators
Products: Book or other one-time publication
Products: Other Specific Product
Contributions to Resources for Science and Technology
Contributions Beyond Science and Engineering

Submit Return

We welcome comments on this system

Project Participants

Dershem L Herbert : Principal Investigator
Has worked for more than 160 hours : Yes
Contribution to project : Dr. Dershem was the director of the project. Specific responsibilities were: 1. Recruitment of external faculty mentor. 2. Collection and editing project descriptions from all faculty. 3. Preparation and distribution of all undergraduate recruiting materials. 4. Communication with all applicants during the application and selection process. 5. Direction of the selection process for undergraduate participants. 6. Make housing and other local arrangements for all participants. 7. Reserve all facilities for the program. 8. Plan and coordinate all seminars and activities for the summer. 9. Prepare and administer all assessment activities. 10. Serve as liaison for all faculty and undergraduates during the summer program. 11. Prepare all required reports for NSF.

Jipping J Michael : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty mentor

McFall Ryan : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty mentor

DeJongh Matthew : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty Mentor

VanderLinden Keith : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty Research Mentor

Shumba Rose : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty Research Mentor

Fitzgerald William : Senior personnel
Has worked for more than 160 hours : No
Contribution to project : Faculty Research Mentor

Johnson Christopher : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Shaefer Matthew : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : Worked on project: User Interface Considerations for Older Users
Years of schooling completed : Sophomore
Home Institution: Other than Research Site
Home Institution if Other: Valparaiso University
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2004
REU Funding: REU site award

Uti Ngozi : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Northern Kentucky University
Home Institution Highest Degree Granted (in fields supported by NSF): Master's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Allen Sarah : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Carleton College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Marlowe Steve : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: University of the South
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Boes Matthew : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:

REU Funding: REU site award

Connell Harkness : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Sophomore
Home Institution: Other than Research Site
Home Institution if Other: Kalamazoo College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Ku Michael : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Calvin College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Halvorsen Carrie : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Sophomore
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Kelley Timothy : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Calvin College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported:
REU Funding: REU site award

Kettner Chad : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site

Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Kane Martin : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Bugaj Agata : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Sophomore
Home Institution: Other than Research Site
Home Institution if Other: Carnegie-Mellon University
Home Institution Highest Degree Granted (in fields supported by NSF): Doctoral Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Niemerg Christy : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other: Western Illinois University
Home Institution Highest Degree Granted (in fields supported by NSF): Master's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Occhipinti Ben : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Grand Valley State University
Home Institution Highest Degree Granted (in fields supported by NSF): Master's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Porter Donald : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes

Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Hendrix College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Rowe Joshua : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Grand Valley State University
Home Institution Highest Degree Granted (in fields supported by NSF): Master's Degree
Fiscal year(s) REU Participant supported: 2002
REU Funding: REU site award

Morse Joshua : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2003 2002
REU Funding: REU site award

Kairys Jordan : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Kalamazoo College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2003
REU Funding: REU site award

Kalafut Andrew : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Bradley University
Home Institution Highest Degree Granted (in fields supported by NSF): Master's Degree
Fiscal year(s) REU Participant supported: 2003
REU Funding: REU site award

Ludewig Kathleen : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Freshman
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2003
REU Funding: REU site award

Kooistra Nathan : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2003
REU Funding: REU site award

Phillips Aaron : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Wheaton College
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2003
REU Funding: REU site award

Ramsay Benjamin : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Junior
Home Institution: Other than Research Site
Home Institution if Other: Taylor University
Home Institution Highest Degree Granted (in fields supported by NSF): Associate's Degree
Fiscal year(s) REU Participant supported: 2004
REU Funding: REU site award

Sumner William : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Sophomore
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Bachelor's Degree
Fiscal year(s) REU Participant supported: 2004

REU Funding: REU site award

Van Dort Pamela : Research Experience for Undergraduates
Has worked for more than 160 hours : Yes
Contribution to project : No information.
Years of schooling completed : Sophomore
Home Institution: Same as Research Site
Home Institution if Other:
Home Institution Highest Degree Granted (in fields supported by NSF): Associate's Degree
Fiscal year(s) REU Participant supported: 2004
REU Funding: REU site award

Return

We welcome comments on this system