

**02 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:

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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.

WHY THIS INFORMATION IS BEING REQUESTED:

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PI/PD Name: Aaron C Cinzori

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)
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PI/PD Name: Roger L Veldman

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

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List of Suggested Reviewers or Reviewers Not To Include (optional)

SUGGESTED REVIEWERS:

Not Listed

REVIEWERS NOT TO INCLUDE:

Not Listed

COVER SHEET FOR PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

PROGRAM ANNOUNCEMENT/SOLICITATION NO./CLOSING DATE/if not in response to a program announcement/solicitation enter NSF 04-2					FOR NSF USE ONLY	
NSF 04-506			01/28/04		NSF PROPOSAL NUMBER	
FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)					0422388	
DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION	
01/28/2004	2	11040000 DUE	1536	050947084	02/18/2009 5:11pm S	
EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)		SHOW PREVIOUS AWARD NO. IF THIS IS <input type="checkbox"/> A RENEWAL <input type="checkbox"/> AN ACCOMPLISHMENT-BASED RENEWAL		IS THIS PROPOSAL BEING SUBMITTED TO ANOTHER FEDERAL AGENCY? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, LIST ACRONYM(S)		
381381271						
NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE			ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE			
Hope College			Hope College			
AWARDEE ORGANIZATION CODE (IF KNOWN)			141 E. 12th			
0022731000			Holland, MI. 494229000			
NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE			ADDRESS OF PERFORMING ORGANIZATION, IF DIFFERENT, INCLUDING 9 DIGIT ZIP CODE			
PERFORMING ORGANIZATION CODE (IF KNOWN)						
IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)		<input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> FOR-PROFIT ORGANIZATION		<input type="checkbox"/> MINORITY BUSINESS <input type="checkbox"/> WOMAN-OWNED BUSINESS		<input type="checkbox"/> IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE
TITLE OF PROPOSED PROJECT CSEMS Scholarship Program in Computer Science, Engineering, and Mathematics at Hope College						
REQUESTED AMOUNT \$ 398,040	PROPOSED DURATION (1-60 MONTHS) 48 months		REQUESTED STARTING DATE 08/01/04		SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE	
CHECK APPROPRIATE BOX(ES) IF THIS PROPOSAL INCLUDES ANY OF THE ITEMS LISTED BELOW						
<input type="checkbox"/> BEGINNING INVESTIGATOR (GPG I.A)			<input type="checkbox"/> HUMAN SUBJECTS (GPG II.D.6)			
<input type="checkbox"/> DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)			Exemption Subsection _____ or IRB App. Date _____			
<input type="checkbox"/> PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)			<input type="checkbox"/> INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.g.(iv).(c))			
<input type="checkbox"/> HISTORIC PLACES (GPG II.C.2.j)						
<input type="checkbox"/> SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.1)						
<input type="checkbox"/> VERTEBRATE ANIMALS (GPG II.D.5) IACUC App. Date _____			<input type="checkbox"/> HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.E.1)			
PI/PD DEPARTMENT Department of Computer Science			PI/PD POSTAL ADDRESS 27 Graves Place			
PI/PD FAX NUMBER 616-395-7123			Holland, MI 494229000			
United States						
NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address		
PI/PD NAME Herbert L Dershem	PhD	1969	616-395-7508	dershem@cs.hope.edu.		
CO-PI/PD Aaron C Cinzori	PhD	1998	616-395-7190	cinzori@hope.edu		
CO-PI/PD Roger L Veldman	PhD	2001	616-395-7154	veldman@hope.edu		
CO-PI/PD						
CO-PI/PD						

CERTIFICATION PAGE

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 debarment and suspension, drug-free workplace, and lobbying activities (see below), as set forth in Grant Proposal Guide (GPG), NSF 04-2. Willful provision of false information in this application and its supporting documents or in reports required under an ensuing 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. Conflicts which cannot be satisfactorily managed, reduced or eliminated must be disclosed to NSF.

Drug Free Work Place Certification

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Drug Free Work Place Certification contained in Appendix C of the Grant Proposal Guide.

Debarment and Suspension Certification

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

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

By electronically signing the NSF Proposal Cover Sheet, the Authorized Organizational Representative or Individual Applicant is providing the Debarment and Suspension Certification contained in Appendix D of the Grant Proposal Guide.

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 of Lobbying Activities," 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 Tracey Arndt		Electronic Signature	Jan 28 2004 3:28PM
TELEPHONE NUMBER 616-395-7190	ELECTRONIC MAIL ADDRESS arndt@hope.edu	FAX NUMBER 616-395-7923	

*SUBMISSION OF SOCIAL SECURITY NUMBERS IS VOLUNTARY AND WILL NOT AFFECT THE ORGANIZATION'S ELIGIBILITY FOR AN AWARD. HOWEVER, THEY ARE AN INTEGRAL PART OF THE INFORMATION SYSTEM AND ASSIST IN PROCESSING THE PROPOSAL. SSN SOLICITED UNDER NSF ACT OF 1950, AS AMENDED.

NATIONAL SCIENCE FOUNDATION
Division of Undergraduate Education

NSF FORM 1295: PROJECT DATA FORM

The instructions and codes to be used in completing this form are provided in Appendix II.

1. **Program-track** to which the Proposal is submitted: _____
2. Name of **Principal Investigator/Project Director** (as shown on the Cover Sheet):
Dershem, Herbert
3. Name of submitting **Institution** (as shown on Cover Sheet):
Hope College
4. **Other Institutions** involved in the project's operation:

Project Data:

- A. Major Discipline Code: 99
- B. Academic Focus Level of Project: BO
- C. Highest Degree Code: B
- D. Category Code: _____
- E. Business/Industry Participation Code: NA
- F. Audience Code: WM _____
- G. Institution Code: PRIV
- H. Strategic Area Code: _____
- I. Project Features: _____

Estimated number in each of the following categories to be directly affected by the activities of the project during its operation:

- J. Undergraduate Students: 36
- K. Pre-college Students: 0
- L. College Faculty: 24
- M. Pre-college Teachers: 0
- N. Graduate Students: 0

Project Summary

This project will provide scholarships for academically talented students with financial need to study computer science, engineering, or mathematics at Hope College. There will be two types of scholarships: Recruitment and Retention. Recruitment scholarships will be granted to 12 incoming first-year students in each of two years. The Retention scholarships will be awarded to students enrolled in Hope College introductory courses in the three disciplines, 6 students each year for two years. In all cases, the scholarships will continue until the end of the student's fourth year of undergraduate study as long as the student meets the eligibility requirements, including continuing progress toward a major in one of the three target disciplines at Hope College.

The objectives of this project are (1) to increase the number of students, especially members of minority groups and women, who are pursuing majors in computer science, engineering, or mathematics at Hope College, (2) to increase the retention of students in these three majors, and (3) to attract Hope College students to these majors after they arrive at Hope College.

Recruiting activities for recipients of the Recruitment scholarships will focus on high schools in western Michigan that have high minority enrollments and will be initiated through contact with mathematics teachers at those high schools. The Retention scholarship recipients will be recruited from among students enrolled in introductory computer science, engineering, and mathematics courses at Hope College and selection will be based on nominations from the instructors of those courses.

Recipients of all scholarships will be selected after personal interviews and a review of their college admissions packets. They will be chosen on the basis of promise for academic success and perceived potential for the scholarship to influence the candidate's career choice.

Students receiving CSEMS scholarships will be supported in their programs of study by intensive faculty advising, timely and appropriate academic assistance, peer mentoring, career counseling and education, internship and research opportunities, and a program for building community among all CSEMS scholars.

Intellectual Merit: This project will build upon the highly successful programs in science and mathematics at Hope College and the college's extensive infrastructure for student support in order to encourage 36 students to begin and continue the pursuit of degrees in computer science, engineering, and computer science.

Broader Impacts: This project especially targets students from groups that are underrepresented in the CSEMS disciplines. It is expected that this project will create connections at western Michigan high schools that will increase the flow of students from underrepresented groups into careers in these disciplines through study at Hope College.

TABLE OF CONTENTS

For font size and page formatting specifications, see GPG section II.C.

	Total No. of Pages	Page No.* (Optional)*
Cover Sheet for Proposal to the National Science Foundation		
Project Summary (not to exceed 1 page)	1	_____
Table of Contents	1	_____
Project Description (Including Results from Prior NSF Support) (not to exceed 15 pages) (Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	15	_____
References Cited	_____	_____
Biographical Sketches (Not to exceed 2 pages each)	4	_____
Budget (Plus up to 3 pages of budget justification)	6	_____
Current and Pending Support	3	_____
Facilities, Equipment and Other Resources	0	_____
Special Information/Supplementary Documentation	0	_____
Appendix (List below.) (Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)	_____	_____
Appendix Items:		

*Proposers may select any numbering mechanism for the proposal. The entire proposal however, must be paginated. Complete both columns only if the proposal is numbered consecutively.

Project Description

a. Results from Prior NSF Support

Hope College has received no prior NSF support for a CSEMS project. The three departments participating in this project have received considerable NSF support in the past for projects involving faculty research, undergraduate research, scientific equipment, and curriculum development. The Table below summarizes the total of grants received by these departments in past five years.

Department	Number of NSF grants received in the past 5 years	Dollar amount of NSF funding
Computer Science	12	\$639,335
Mathematics	9	\$571,486
Physics & Engineering	20	\$1,796,413

Note that the engineering program at Hope College is located in the Department of Physics and Engineering, so the grants reflected in the table are for both disciplines.

b. Project Objectives and Plans

The objectives of the proposed project are:

1. To increase the number of majors in computer science, engineering, and mathematics at Hope College.
2. To increase the number of minority majors in computer science, engineering, and mathematics at Hope College.
3. To increase the number of female majors in computer science and engineering at Hope College.
4. To increase the retention of students who come to Hope College planning to major in computer science, engineering, and mathematics.
5. To recruit students who would not ordinarily consider attending Hope College to apply to Hope and to major in computer science, engineering, or mathematics while at Hope.

The overall plan for this project includes the awarding of two types of scholarships plus program activities that will facilitate the retention of the scholarship holders as successful students pursuing a major in computer science, engineering, or mathematics.

Recruitment Scholarships

Approximately twelve of these scholarships will be awarded each of the first two years of the program. These scholarships will be offered to talented high school seniors with an interest in computer science, engineering, or mathematics who meet the scholarship eligibility criteria. Students receiving a recruitment scholarship will retain their scholarships for four years if they continue to satisfy all criteria. This recruiting initiative for these scholarships will target students at high schools with high minority enrollments.

Retention Scholarships

At least six retention scholarships will be awarded each year for two years. These scholarships will be offered to students enrolled in an introductory course of one of the

three target disciplines and will serve as an incentive for students to continue study toward a computer science, engineering, or mathematics major. These students will also continue to receive the scholarship as long as they maintain eligibility.

Program activities

Project activities will include all students receiving CSEMS scholarships with the purpose of increasing retention of these students in one of the three target disciplines. These activities will include faculty advising, academic assistance, peer mentoring, community-building events, information about research and internship opportunities, and career exposure seminars.

c. Significance of Project and Rationale

How this project supports the goals of CSEMS

1. *Increased numbers of well educated and skilled employees in technical areas of national need.*

This project will meet this objective by offering support and encouragement for at least 36 students to successfully prepare for careers in computer science, engineering, or mathematics. It will also provide an infrastructure that will support and encourage an increase in the number of students entering these disciplines in the future.

2. *Improved educational opportunities for students in the named disciplines.*

This project will provide financial aid to students with financial need to permit them to pursue a degree in computer science, engineering, and mathematics. This aid and the project activities will encourage students who might not otherwise consider pursuing these disciplines to do so.

3. *Increased retention of students to degree achievement.*

By both the financial incentive and through the many forms of encouragement included in the CSEMS program activities, retention in the degree program and in the CSEMS disciplines will be improved.

4. *Improved student support programs at institutions of higher education.*

The faculty advising and peer mentoring aspects of this project will build upon and improve present support activities for Hope College students, especially students with the special qualifications required of CSEMS scholars.

5. *Strengthened partnerships between institutions of higher education and high technology industry.*

Through the involvement of industry with this program through participation in the career exposure seminar and the internship program, the partnership between Hope College and high tech industries will be strengthened.

Information on Demographics

The most recent retention data from Hope College indicates the following rates at the end of each year:

Hope College Retention Rates ending 2003					
At end of Year 1	At End of Year 2	At End of Year 3	At End of Year 4	At End of Year 5	At End of Year 6
87.4%	81.3%	79.8%	74.9%	74.3%	75.3%

We expect that with the special services provided to CSEMS scholars, the retention rate of this group will meet or exceed the percentages above.

The number of graduating seniors for each of the participating departments over the past five years is given in the following table:

Graduating Majors by Year							
Department	1999	2000	2001	2002	2003	Ave.	% female
Computer Science	12	12	16	16	18	14.8	14.9%
Engineering	14	15	10	9	11	11.8	20.3%
Mathematics	9	6	10	7	12	8.8	45.5%

The three departments' capacities for majors exceed the numbers that are currently enrolled by a significant amount. This data also shows that women are significantly underrepresented in the computer science and engineering programs, while in the mathematics program, the percentage of women still falls short of the institutional percentage of 62.5%.

Hope College financial aid data indicate that 60% of Hope students have financial need at the level required for CSEMS scholarship recipients.

The percentage of enrolled Hope College students who are members of ethnic minority groups is given in the Table below:

Year	White non-Hispanic	Black non-Hispanic	Asian or Pacific Islander	Hispanic	American Indian or Alaskan Native
1999	92.83%	0.82%	1.60%	1.46%	0.31%
2000	92.11%	0.93%	2.15%	1.62%	0.27%
2001	92.67%	1.03%	2.37%	1.53%	0.17%
2002	92.68%	1.18%	2.20%	1.71%	0.16%
2003	92.96%	1.24%	1.99%	1.85%	0.16%

Although these data are not collected by department, the minority enrollment in the three CSEMS departments is not significantly different from the institutional percentages.

While Hope College has very low enrollment from among members of minority groups, there are a large number of high school students from these groups in the western Michigan area surrounding the Hope campus, particularly black and Hispanic students. This proposal intends to target this largely untapped pool of potential computer science, engineering, and mathematics majors for Hope College.

Rationale for number of scholarships and scholarship amount

Because we want to provide the maximum possible amount to the maximum number of targeted students, we propose that all scholarships be the maximum amount allowed of \$3,125 per year. Because we wish to insure that all scholarship awardees will retain their scholarship until the end of their fourth year as long as they successfully pursue their major, we are unable to assess the number of awards that we will be able to give since we do not know what the retention rate will be among CSEMS scholars. Each year, the number of retention scholarships will be determined by the number available after all recruitment scholarships and their extensions have been awarded. We estimate that by giving 12 recruitment scholarships in the first two years of the program, we will be able to award at least 6 retention scholarships, while awarding an average of 30 scholarships per year over the four years funded by this project.

The initial plan for awarding the scholarships is given below:

	Spring 2005 Year 1	2005-6 Year 2	2006-7 Year 3	2007-8 Year 4	2008-9 Year 5 No cost extension	2009-10 Year 6 Extension
New Recruitment Scholarships	0	12	12	0	0	0
Continuing Recruitment Scholarships	0	0	12	24	24	12
New Retention Scholarships	6 (half year)	6 (half year)	0	0	0	0
Continuing Retention Scholarships	0	6	12	9	3	0
Number of full year scholarships awarded	3	21	36	33	27	12

This plan is based on the assumption that there will be no attrition among the scholarship recipients. It also assumes that half of the recipients of the Retention Scholarships will receive their initial award during their first year of college work and the other half will receive it during their second year. This plan would result in the awarding of 132 one-year awards of \$3,125, while this proposal requests 120 such awards, the maximum allowed by program guidelines. The 12 excess awards will be funded from money not used by CSEMS scholars who become ineligible at some time during their program and therefore do not use their entire allotment. This assumes an attrition rate of approximately 9%. It is our hope that the attrition rate will be lower than this, in which case the remaining scholarships will be funded by Hope College.

d. Activities on Which the Current Project Builds

First-Year Seminars: Hope College offers First-Year Seminars, which are required of all Hope College students during the fall semester of their initial year. First-Year Seminars are small, discussion-driven classes taught by professors who serve as academic advisors for students in their seminar. The First-Year Seminar helps introduce new college students to the life of the mind and to the kind of college-level learning expected in other classes at Hope College. Each section of the First-Year Seminar focuses on a different topic that is chosen by the professor.

The PI will teach a First-Year seminar to each of the two cohorts of Recruitment Scholars. The topic of that First-Year Seminar section will be Problem Solving in

Mathematics, Science, and Engineering and it will be populated solely by CSEMS Recruitment scholars. Many of the activities and services of the CSEMS project will be provided through the structure of the First-Year Seminar program and it will insure semi-weekly contact between the PI and every first-year CSEMS scholar during the fall semester. It will also result in the PI being assigned as the academic advisor for each CSEMS Recruiting Scholar as they enter Hope College.

Grand Rapids Area Pre-College Engineering Program: The Grand Rapids Area Pre-College Engineering Program (GRAPCEP) is funded by a grant from the Michigan Department of Career Development. Its mission is to meet the need for well-trained engineers and scientists for growing businesses in West Michigan and to increase the number of historically under-represented populations in these career fields. GRAPCEP's primary focus is in the Grand Rapids Public School District, a major urban district of 20,000 students where 68% of the students are members of minority groups. Professor John Krupczak of the Hope College Engineering faculty has collaborated with GRAPCEP since 2001. His participation has included assisting with a summer program for middle school students and conducting a Saturday morning activity for 33 high school students in November, 2003. Dr. Miguel Abrahantes, a curriculum specialist for GRAPCEP, is a part-time Assistant Professor of Engineering at Hope College.

Undergraduate Research: Previous activities within the three participating departments to recruit and retain students have focused on undergraduate research. All three departments have long-established REU Site projects where undergraduates participate in research projects with department faculty. These REU projects have been effective tools in the recruitment and retention of talented students to these programs, but the audience reached has been limited. The CSEMS project will permit Hope to reach out to a broader range of students, including those whose initial interest may not be in pursuing scientific research.

Phelps Scholars: Every August since 1999, approximately fifty new students, strangers to each other, have come to Hope to begin their first year of college as Phelps Scholars. The Phelps Scholars Program is a multicultural program available to Hope College freshmen from all racial/ethnic backgrounds, designed to facilitate an enjoyable transition to Hope College and provide the foundation for productive years as members of our student body. The activities of these Phelps Scholars include:

- First-Year Seminar in the fall term
- Encounter with Cultures in the spring
- Bi-monthly meetings on many different topics, such as "Cross-Cultural Communication" and "The Role of Race in American Sports"
- Field trips to numerous destinations, including Detroit's Holocaust Memorial, Chicago's World Music Festival, and the Underground Railroad re-enactment at Conner Prairie near Indianapolis
- Sponsoring a Christmas party for elementary students in Hope's CASA program
- Informal gatherings-dinners, parties, and get-togethers just for fun

The CSEMS project will benefit from the experiences of and interaction with the Phelps Scholars program at Hope College.

e. CSEMS Project Management Plan

Personnel

The ongoing operation and management of this program will be the responsibility of the Project Leadership Team. This team will be chaired by the PI, Herbert Dershem, who is Professor of Computer Science. Professor Dershem served as chair of the Hope College Computer Science Department for 28 years and has directed the Hope College Computer Science REU Site program for 12 years. He has also served as the admissions liaison for the Hope College Computer Science Department for the past 25 years. In that capacity, he meets with many high school students, their parents, and high school counselors each year for the purpose of recruiting these students to Hope College.

Also on the Project Leadership Team will be the co-PIs, Roger Veldman, Assistant Professor of Engineering and Aaron Cinzori, Assistant Professor of Mathematics. This team will therefore have one representative from each of the three departments participating in this project. Each member will serve as a liaison with his department, informing members about CSEMS activities, soliciting the assistance of departmental faculty, and coordinating CSEMS activities with their department chairs.

In addition, an oversight committee will implement and evaluate the CSEMS program. This committee will consist of the three members of the Project Leadership Team plus the following members of the Hope College community:

- James Gentile, Dean of the Natural Sciences
- James Bekkering, Vice President for Admissions
- Phyllis Kleder Hooyman, Director of Financial Aid
- Vanessa Greene, Director of Multicultural Life

The oversight committee will meet at the conclusion of each semester to review the CSEMS program, evaluate its success in meeting its objectives, and determine adjustments that need to be made. This committee will be convened by the PI, who will be responsible for presenting a report for the committee's review at each meeting.

In addition, each of the departments of Computer Science, Engineering, and Mathematics will review the CSEMS project at one department meeting each year to assess the CSEMS program from the departmental viewpoint and to recommend changes to the Hope CSEMS program. The departmental recommendations will then go to the oversight committee for further consideration and action.

Recruiting

Recruiting CSEMS scholars will be coordinated by the Project Leadership Team. For the Recruitment Scholarships, high schools within a fifty mile radius of Hope College that have high minority enrollments will be targeted for recruiting candidates. The following high schools are presently on the target list:

- Muskegon High School
- Muskegon Heights High School
- Grand Rapids Creston High School

- Grand Rapids Union High School
- Grand Rapids Central High School
- Grand Rapids Ottawa Hills High School
- Kalamazoo Loy Norrix High School
- Kalamazoo Central High School
- Benton Harbor High School
- South Haven High School
- Holland High School
- Holland West Ottawa High School

Mathematics teachers at the targeted high schools will receive a personal contact by no later than September of each year from a member of the Project Leadership Team. During this contact, the Hope College representative will explain the objectives of the CSEMS Recruitment Scholarships. Each high school mathematics teacher will be asked to submit the names of high school seniors who are good candidates for a CSEMS Recruitment Scholarship. The names of seniors gathered through this process will then be forwarded to the Hope College Admissions Office, which will then pursue the nominated students with special attention to the students' candidacy for a CSEMS Recruitment Scholarship. A brochure describing these scholarships and the Hope CSEMS program will be prepared for use by admissions counselors. The Hope College admissions counselors will also inform other potential candidates for these scholarships through normal recruiting channels. The PI will also make a personal contact with each CSEMS Recruitment Scholarship candidate as advised and directed by the admissions counselors. In particular, during each candidate's campus visit, the candidate will meet with the PI to discuss the CSEMS program.

The recruitment for the Retention Scholarships will be initiated in introductory level courses in the three disciplines. The targeted courses are:

- CSCI 114, Introduction to Computer Science
- CSCI 225, Software Design and Implementation
- ENGS 100, Introduction to Engineering
- ENGS 170, Introduction to Computer Aided Design
- MATH 131, Calculus I
- MATH 132, Calculus II

Each semester that these scholarships are awarded, immediately after midterm a member of the project leadership team will meet with each professor who is teaching one of the introductory courses above to identify possible candidates for Retention Scholarships. The Project Leadership Team member will then determine the eligibility for each nominated student and meet with each eligible nominee to discuss the CSEMS program and invite the student to apply for a CSEMS Retention Scholarship.

Selection

CSEMS scholarship candidates from each of the two pools will be invited to submit an application for a CSEMS scholarship. For the Recruitment Scholarships, the deadline for application will be April 1. All candidates will be interviewed by the PI, either in person

or by phone. In addition, each candidate will be asked to provide contact information for a high school teacher, who will be contacted as a reference by the PI. The Project Leadership team will also review all of the admissions materials submitted by the candidates with their college application and will apply the eligibility and selection criteria given in Section f to determine the recipients of the scholarships. An ordered list of qualified alternates will be maintained to provide a pool of recipients in the case where successful applicants decide to attend a school other than Hope College.

The candidates for Retention Scholarships will be required to submit their applications in late October and early March each year. Again, the PI will determine eligibility and interview each candidate. Final selection of recipients will be made by the Project Leadership Team, in consultation with the applicants' instructors, applying the eligibility and selection criteria found in Section f.

Record Maintenance and Reporting

The PI will be responsible for collecting all data needed for eligibility determination, assessment of the project, reporting to the Hope College oversight committee, and reporting to the National Science Foundation.

Student Support Services Oversight

The support services of the CSEMS project, described in Section g, will utilize services already present on the Hope campus. In many cases, Hope students who could benefit from these services fail to do so because they fail to take the initiative required, do not know the service exists, or are unaware that they could benefit from the service.

The PI will have the responsibility for making all CSEMS recipients aware of the support services provided by the college in conjunction with the CSEMS program. He will also work with the offices providing those services to develop appropriate adaptations that are appropriate for the needs of the CSEMS program. He will be aided in this role during the students' first semester on campus by the resources available to him as a First-Year Seminar instructor.

Each CSEMS recipient, after declaring an academic major, will have a faculty academic advisor who is a faculty member in the student's major department. In most cases, this advisor will be a member of the Program Leadership Team. Each CSEMS scholar will meet with her faculty advisor monthly, either individually or in a group.

The PI will also coordinate mentoring, research, and internship activities with the three CSEMS departments by working closely with the department chairs, each department's internship coordinator, and each department's undergraduate research coordinator.

The academic support program for CSEMS scholars will be run through the Hope College Academic Support Office. The PI will work with Jacqueline Heisler, the director of that office, to insure appropriate assistance is available through tutoring, academic skills building, or the formation of directed study groups. PI will also work with the

academic advisors to encourage CSEMS scholars to utilize the academic support services that are provided.

The career investigation component of the CSEMS program will be directed by the PI in partnership with Sara Dalman, the Assistant Director of Career Services at Hope College.

Eligibility and Replacement Process

At the time of the selection of CSEMS scholars and at the conclusion of each semester, the PI will determine if each candidate or scholar meets the eligibility requirements as they are listed in Section f.

When a CSEMS scholar becomes ineligible to continue receiving her scholarship, the remaining funds for that scholar will be reallocated to cover the twelve excess scholarship-years that are included in this project. If all of the excess scholarships have already been funded, the Project Leadership Team will reassign the funds for the vacated scholarship to one of the following:

- A student transferring to Hope College who meets the eligibility requirements.
- A student who is already enrolled in one of the CSEMS departmental programs and who meets the eligibility requirements.

These replacement scholarships will be awarded for at least one year, but will not necessarily be renewed until the recipient graduates, even if eligibility requirements continue to be met.

Evaluation and Assessment

The assessment and evaluation plan described in Section i will be directed by the PI in consultation with Scott VanderStoep, Hope College Director of Institutional Assessment. In addition, the evaluations performed by the participating departments and the oversight committee will be coordinated by the PI.

Rationale for Size of Program

The Computer Science Department has determined that it could support 25 majors per graduating class with its present resources. The department presently has 4.58 full-time equivalent faculty. Over the past 5 years the department has averaged 15 graduating majors per year. Therefore, the department could easily accommodate the potential 6 additional majors per class that would result from the CSEMS program.

The Engineering program, with 5 full-time equivalent faculty, also has resources to support 25 majors per year. Their average has been approximately 12 per year with a maximum of 15. Therefore, the current resources could support at least 10 additional majors per graduating class.

The Mathematics Department can support 8-10 additional majors per graduating class with its present staffing level of 10.33 full-time equivalents. The main constraint on additional majors is the number of seats in the upper level required mathematics courses (Bridge to Higher Mathematics, Real Analysis, and Algebraic Structures), but currently there is adequate unused capacity to support the anticipated increase.

Project Administration Calendar

The calendar of events for administration of the CSEMS project is given in the table below.

Hope College CSEMS Project Administrative Calendar			
	Year 1	Year 2	Years 3 - 6
Sept	Contact HS teachers	Contact HS teachers	
Oct	Identify Retention Scholarship Candidates	Identify Retention Scholarship Candidates	
Nov	Retention Scholars selected	Retention Scholars selected	
Dec	Eligibility check Oversight Committee meets	Eligibility check Oversight Committee meets	Eligibility check Oversight Committee meets
Mar	Identify Retention Scholarship Candidates		
Apr	Recruitment and Retention Scholars selected	Recruitment Scholars selected	
May	Eligibility check Oversight Committee meets	Eligibility check Oversight Committee meets	Eligibility check Oversight Committee meets

f. Student Selection Process and Criteria

Recruitment Scholarships

High school seniors will be eligible for a Recruitment Scholarship if they meet the following criteria:

1. The student must meet the eligibility requirements for citizenship and financial need as specified in the CSEMS guidelines.
2. The student must have been accepted for admission to Hope College.
3. The student must have indicated an interest in pursuing a major in one of the CSEMS disciplines.

Each candidate for a Recruitment Scholarship will be required to submit a statement indicating her academic and career goals and stating how the CSEMS scholarship will benefit her in attaining those goals. Each candidate will also be required to submit the name of a high school teacher who will serve as a phone reference for that student. The high school student candidate will also be interviewed by the PI, either in person or by phone.

Retention Scholarships

In order for a student to be offered a Retention Scholarship, she must meet the following eligibility criteria:

1. The student must meet the eligibility requirements for citizenship and financial need as specified in the CSEMS guidelines.

2. The student must be enrolled in an introductory course in one of the CSEMS disciplines and must be recommended for a Retention Scholarship by the instructor of that course.
3. The student must be a first or second year student and must not have a declared major.

All students who are awarded a Recruitment or a Retention Scholarship will be selected from among qualified applicants by the Project Leadership Team using the following criteria:

1. Promise of academic success.
2. Interest in an academic and professional career in one of the CSEMS disciplines.
3. Perceived impact the scholarship will have on the student's pursuing a major in a CSEMS discipline.

Preference will be given to minorities and women when they meet all of the above criteria.

Scholarship Renewal

At the completion of each semester of their academic program, recipients of the Recruitment and Retention Scholarships must meet the following criteria in order to retain their scholarship for the following semester:

1. The student must maintain an overall GPA of 2.5 or better. Hope is on a 4.0 scale.
2. If the student has just completed her first, second, or third semester of college study, she must have successfully completed a course in a CSEMS discipline with a grade of C or higher during the previous semester and be enrolled in a course in a CSEMS discipline in the upcoming semester.
3. If the student has just completed her fourth or later semester, she must have declared a major in one of the CSEMS disciplines and maintain satisfactory progress toward that major.
4. The student must have participated in all CSEMS-sponsored student activities during the semester just completed.

g. CSEMS Student Support Services and Programs

Faculty Advising

Each CSEMS scholar will have a faculty advisor who is a member of one of the CSEMS departments, usually a member of the Project Leadership Team. For first year Recruitment Scholars, this will be the PI. In addition to the usual attention received by an advisee, faculty advisors for CSEMS scholars will be asked to meet at least once each month with their CSEMS advisees, either individually or as a group. Through these meetings, the faculty advisor will monitor the students' academic progress and continued interest in a CSEMS discipline.

Academic Assistance

The Hope College Academic Support Center provides tutoring in specific courses and assistance with a variety of academic skills. All CSEMS scholars will be advised during their first semester of the services provided by the Academic Support Center and the faculty advisors will direct the CSEMS scholars to the Center as appropriate. In addition,

the PI will encourage the formation of CSEMS study groups in courses where such groups will be helpful.

Peer Mentoring

Each CSEMS scholar who is in the first two years of study will be paired with a junior or senior major in the same discipline. The mentor will meet informally with the CSEMS scholar at least once each semester and will also be asked to personally invite the CSEMS scholar to attend departmental events.

Career Services

The CSEMS scholars will be introduced to the resources of the Hope College Career Services Office during their first semester as CSEMS recipients. These resources are useful for the choice of career and for assisting students in the process of finding a job upon graduation. In addition, local graduates of Hope College with majors in CSEMS disciplines will be asked to informally mentor CSEMS scholars during their junior and senior years.

Multicultural Life

The Hope College Office of Multicultural Life works with students of all racial/ethnic backgrounds in a variety of ways, providing personal guidance, assistance with financial aid questions and linking students with campus organizations and departments or offices. CSEMS scholars will be counseled to make use of this resource whenever appropriate.

Internships

Each of the three CSEMS departments has an active internship program. CSEMS scholars will be introduced to the procedures for obtaining internships and encouraged to pursue opportunities for both summer and school year internships. Organizations that provide internship opportunities will be informed of the CSEMS program and its objectives.

Undergraduate Research

Each of the three CSEMS departments has an undergraduate research program with support from the NSF REU program. CSEMS scholars will be encouraged to apply to these programs and to undergraduate research programs at other locations as well.

Community Building

A minimum of two activities will be scheduled each semester that will include all CSEMS scholars, with the objective being to build community among the scholars. These events will alternate between social events and informational sessions, with the emphasis being on informality and enthusiastic participation. When appropriate, students and faculty from the target high schools will be invited to attend these events as well.

h. Quality Educational Programs

The Division of Natural Sciences at Hope includes the departments of Biology, Chemistry, Computer Science, Geological & Environmental Sciences, Mathematics, Nursing, and Physics and totals over 60 FTE faculty. Hope College has a long-standing

commitment to provide students opportunities to learn cutting-edge science in coherent and rigorous laboratory course that stress hands-on, research-based modes of learning, and to work in a collaborative manner with faculty in research. The Division of Natural Sciences at Hope is recognized by Project Kaleidoscope as a whole "Program that Works" and as a model for other institutions, and is one of only one of the 10 liberal arts institutions to be recently recognized by the NSF with an Award for the Integration of Research and Education. Additionally, the undergraduate research program at Hope has been identified in *U.S. News & World Report* as among the leading programs in the nation (ranked 4th among all institutions in 2003).

The mission of the program in science and mathematics at Hope mirrors that of the college to provide an **innovative curriculum**, which intertwines **student learning** and **faculty development**. We operate on the principle that undergraduate research is an essential component of good teaching and effective learning. The collegial culture within the Division of Natural Sciences is the key ingredient in sustaining an intellectually vital learning community for faculty and students. Our community is enriched by several seminar series that bring as many as 3 external speakers/week to campus. In this way students and faculty learn together and take what they have learned back to the classrooms and research laboratories. Students work in a collaborative fashion in a number of ways, and upper-level students serve as mentors and role models for younger students in formal and informal capacities. Faculty are expected to be scholar/educators, and the administration is expected to sustain an infrastructure and environment to support student and faculty activities. On the average, Hope science faculty/administrators write grant proposals that result in awards totaling greater than one million dollars annually in new resources from extramural sources to support our research, educational and outreach programs. Included among current awards are 5 separate NSF-REU site awards (Biology, Chemistry, Computer Science, Mathematics, Physics/Engineering) to support undergraduate research.

Our goal at Hope College is to prepare students to be productive members of the scientific community who are able to pursue a variety of career opportunities. We aim to instill in them an appreciation for the art of the scientific endeavor. Student learning in our programs for the science/mathematics major is embedded in a curriculum that is challenging and provides individual attention to promote scientific growth. It is a research-rich environment in which faculty and students see themselves as partners in the learning process.

We seek to identify and sustain students who have a diversity of ethnic backgrounds. To assist us in this regard we have formed a unique partnership with the University of Michigan to cooperative recruit students of color for fully-supported undergraduate education at Hope College followed by fully-supported graduate and/or medical education at the University of Michigan. This highly successful program, along with outreach programs to K-12 students representing traditionally underrepresented groups in science and mathematics work together to assist us in our goal to provide opportunities for science/mathematics education to all individuals.

We expect students to leave Hope with an ability to understand, communicate, and critically appraise different ways of knowing and to be fully capable of making critical judgments about a fundamental body of knowledge. An unusually high number of students (~40%) enter Hope with an interest in science and mathematics. During their days at Hope we integrate students into a supportive community of learners that provides an environment rich in research-based learning opportunities. On the average, each summer over 120 students do research with faculty, supported in part by separate NSF-REU site awards. Many students indicate that the prospect of doing undergraduate research is a major factor that helped them to identify Hope College as their choice for a college education. Although we do not have a research requirement, ~85% of Hope science and mathematics majors do research. Approximately 33% of seniors graduate with a degree in science or mathematics. Of these, ~30% enter graduate school. According to a recent NSF study, our record in training students who achieve the Ph.D. is one of the strongest nationally. About 35% of our science-mathematics graduates seek to enter professional school. The 10-year acceptance rate for these students is 71%, and it is 90% for students who engage in research while at Hope. The remaining students enter the workforce directly upon graduation, with many entering the teaching profession as K-12 educators.

Faculty and students sustain vitality by engaging in research. Hope College faculty rank 4th of all liberal arts institutions for numbers of faculty research publications and 14th overall for highest impact of those publications as measured by the Science Citation Index. Since 1990 over 300 undergraduate students have co-authored research publications with faculty. Corporate and university recruiters have identified the value-added component of experience in research/teaching laboratories as an important attribute that students carry with them beyond Hope. Research in and out of the class promotes in student's critical thinking, reasoning and problem solving, traits that are essential to success in any endeavor. The success of our research-based education program in science and mathematics is evident in its impact on the college at large. Hope recently instituted a collaborative research program for faculty and students in the humanities, social sciences, and arts, and collaborative research with students is an expected norm of every new faculty hire. This has resulted, in part, in a newly revised institutional core curriculum that emphasizes interdisciplinary learning.

i. Assessment and Evaluation

Assessment of the program will be supported by a number of different activities:

1. *Tracking data for CSEMS participants and all students in computer science, engineering, and mathematics at Hope College.*

Data collected will include progress toward degree, academic performance, participation in internship and research, retention in the major, graduation rate, job placement, and percentage of minorities and females. The data for CSEMS participants will be compared to results prior to CSEMS support and to the results for non-CSEMS supported majors during the period of this project.

2. *Annual survey of all participants.*

- All participants in this program (students, Project Leadership Team members, and faculty advisors) will be surveyed annually to determine the impact of the program.
3. *Exit survey.*
All participants, when exiting the program, will be asked to complete a survey. There will be separate surveys for students who depart the program prior to graduating and for those who graduate as CSEMS scholars.
 4. *Applications from targeted high schools.*
The number of applications received from students at the targeted high schools will be collected each year and compared with counts from years prior to the CSEMS program.

All data collection and survey design will be coordinated by the PI in consultation with Scott VanderStoep, Hope College Director of Institutional Assessment.

All data will be used for evaluation purposes by the oversight committee, which will meet at the end of each semester to evaluate assessment data and recommend adjustments to the program.

Dissemination of the results of this program will be done through the construction of a project web page. This web page will contain complete information about the project, including all assessment data. The availability of this web page will be announced through the mail lists of the appropriate disciplinary organizations (SIGCSE, ASEE, MAA).

Biographical Sketches

Principal Investigator: Herbert L. Dershem

(i) Professional Preparation

B.S. University of Dayton, 1965

M.S. (Computer Science) Purdue University, 1967

Ph.D. (Computer Science) Purdue University, 1969

(ii) Appointments

Hope College, Assistant Professor, 1969-1974, Associate Professor, 1974-1981,
Professor, 1981-present, Chair, Computer Science Dept, 1976-2003.

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

(iii) Publications

Up to 5 publications most closely related to the proposed project:

Dershem, H.L., McFall, R.L., and N. Uti*, "A Linked List Prototype for the Visual Representation of Abstract Data Types," *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning*, 4,2(Oct, 2002).

Dershem, H.L., McFall, R.L., and N. Uti*, "Animation of Java Linked Lists," *SIGCSE Bulletin*, 34,1(Mar, 2001), 53-57.

Dershem, H.L., Dykstra*, J., 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.

Up to 5 other significant publications, whether or not related to the proposed project:

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., Bowsheer*, 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.

(iv) Synergistic Activities

a. Previous grants awarded:

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; 2001-2003, \$163,213.

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.

b. Councilor for the Council on Undergraduate Research:

Councilor, Division of Mathematics and Computer Science, 1994-2000, 2003-present.

Member of consultants committee, 1996-present.

Leader at CUR Proposal Writing Institute, 2002.

c. Member of panels related to 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.

Dershem, H. with McGuffee, J., Lankewicz, L., Lewandowski, G., Lopez, D., and O. Slotterbeck. "Managing Undergraduate CS Research," Thirty-third SIGCSE Technical Symposium on Computer Science Education, Cincinnati, KY, 2002.

(v) Collaborations and Other Affiliations

a. Collaborators and Co-Editors

A list of scientists collaborated with on projects over the last 48 months would include:

Scott Grissom (Grand Valley State University), Michael Jipping (Hope College), Ryan McFall (Hope College), Myles McNally (Alma College), Thomas Naps (University of Wisconsin-Oshkosh), Samuel Rebelsky (Grinnell College), Henry Walker (Grinnell College).

b. Graduate and Postdoctoral Advisors

Robert E. Lynch (Purdue University)

c. Thesis Advisor and Postgraduate-Scholar Sponsor

None

Biographical Sketches

Co-principal Investigator: Aaron C. Cinzori

(i) Professional Preparation

B.S. (Mathematics) Michigan State University, 1990
B.A. (English) Michigan State University, 1990
M.S. (Mathematics) Michigan State University, 1993
Ph.D. (Mathematics) Michigan State University, 1998

(ii) Appointments

Hope College, Assistant Professor of Mathematics , 2001-present
Allegheny College, Assistant Professor of Mathematics, 1998-2001
Michigan State University, Graduate Teaching Assistant, 1990-1992, 1993-1998
E.T. Petroleum, Commodities Analyst, 1992-1993
Michigan State University, Undergraduate Teaching Assistant, 1987-1990

(iii) Publications

Up to 5 publications most closely related to the proposed project:

Cinzori, A.C., “Future polynomial regularization of ill-posed Volterra problems,”
Ph.D. Thesis, (Advisor: Patricia Lamm). August, 1998.
Cinzori, A.C., Lamm, P.K., “Future polynomial regularization of ill-posed Volterra
equations,” *SIAM Journal on Numerical Analysis*, 37 (2000) pp. 949--979,
<http://epubs.siam.org/sam-bin/dbq/article/34735>.

(iv) Synergistic Activities

Mentored students in Hope’s Mathematics REU, 2003.
Developed and taught a first year seminar on the use of mathematics in fiction, drama,
and film, 2003.
Produced course notes for an advanced undergraduate combined ODE/PDE course, 2002.
Participated with a group of mathematicians and engineers in the 100-digit Challenge,
2001.

(v) Collaborators and Other Affiliations

Patricia K. Lamm (Michigan State University) - Collaborator and Ph.D. thesis advisor.
Thomas Scofield (Calvin College) – Collaborator.

Biographical Sketches

Co-principal Investigator: Roger L. Veldman

PROFESSIONAL PREPARATION:

Western Michigan University	Mechanical Engineering,	Ph.D.	2001
Western Michigan University	Mechanical Engineering,	M.S.E.	1995
Ohio University	Engineering Science,	B.S.	1989

APPOINTMENTS:

Assistant Professor of Engineering, Hope College, Holland, MI 1/1998 - Present
Manager- Product Development: Donnelly Corporation, Holland, Michigan, 1996-1998.
Senior Development Engineer: Donnelly Corporation, Holland, Michigan, 1994-1996.
Associate Scientist Materials R&D: Donnelly Corp., Holland, Michigan, 1991-1994.
Manufacturing Engineer: Herman Miller Inc., Holland, Michigan, 1990-1991

RECENT PUBLICATIONS:

DeLine, J.E., Veldman, R.L., Lynam, N.R., "Memory mirror system for vehicle", U.S. Patent No. 6,672,744 (January, 2004).
Kramer, M.E. and Veldman, R.L., "Memory mirror system for vehicle", U.S. Patent No. 6,472,773 (October, 2002).
O'Farrell, D.J., Veldman, R.L., and Schofield, K., "Vehicle mirror digital network and dynamically interactive mirror system", U.S. Patent No. 6,465,904 (October, 2002).
Bos, B.J., Forbes, S.J., and Veldman, R.L., "Interior mirror assembly for a vehicle incorporating a solid-state light source", U.S. Patent No. 6,412,973 (July, 2002).
DeLine, J.E., Veldman, R.L., and Lynam, N.R., "Modular Rearview Mirror Assembly", U.S. Patent No. 6,386,742 (May, 2002).

SYNERGISTIC ACTIVITIES:

Member, American Society of Mechanical Engineers
Member, American Institute of Aeronautics and Astronautics

Presentations:

Effects of Pre-Pressurization on Blast Response of Square Aluminum Plates, R.L. Veldman, J. Ari-Gur, A. DeYoung, J. Folkert, B. Mulder, Response of Structures to Extreme Loading, Toronto, Canada, August 2003.

Enhancing Commercial Aircraft Survivability via Active Venting, R.L. Veldman and J. Ari-Gur, The Federal Aviation Administration's Third International Aviation Security Technology Symposium, Atlantic City, New Jersey, November, 2001.

Determining Aircraft Vent Panel Actuation and Fuselage Decompression Times During Active Venting, R.L. Veldman, Michigan Space Grant Consortium Conference, Ann Arbor, Michigan, October, 1999.

COLLABORATORS & OTHER AFFILIATIONS:

(a) Collaborators:

J. Ari-Gur (Western Michigan University)

(b) Graduate and Postdoctoral Advisors:

J. Ari-Gur (Western Michigan University)

(c) Thesis advisor and postgraduate-scholar sponsor:

None.

SUMMARY PROPOSAL BUDGET YEAR 1

ORGANIZATION Hope College				FOR NSF USE ONLY			
				PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Herbert L Dershem				AWARD NO.	Proposed	Granted	
				A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)			
				CAL	ACAD	SUMR	
1.	Herbert L Dershem - PI			0.00	0.00	0.50	\$ 3,000
2.	Aaron C Cinzori - none			0.00	0.00	0.00	0
3.	Roger L Veldman - none			0.00	0.00	0.00	0
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	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1.	(0) POST DOCTORAL ASSOCIATES			0.00	0.00	0.00	0
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)							3,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							260
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							3,260
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)							0
2. FOREIGN							0
F. PARTICIPANT SUPPORT COSTS							
1.	STIPENDS \$	93,750					
2.	TRAVEL	0					
3.	SUBSISTENCE	0					
4.	OTHER	0					
TOTAL NUMBER OF PARTICIPANTS (30)				TOTAL PARTICIPANT COSTS			93,750
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							500
3. CONSULTANT SERVICES							1,500
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							2,500
H. TOTAL DIRECT COSTS (A THROUGH G)							99,510
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) (Rate: , Base:)							
TOTAL INDIRECT COSTS (F&A)							0
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							99,510
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							\$ 99,510
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Herbert L Dershem				FOR NSF USE ONLY			
ORG. REP. NAME* Tracey arndt				INDIRECT COST RATE VERIFICATION			
		Date Checked		Date Of Rate Sheet		Initials - ORG	

SUMMARY PROPOSAL BUDGET YEAR 2

ORGANIZATION Hope College				FOR NSF USE ONLY			
				PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Herbert L Dershem				AWARD NO.	Proposed	Granted	
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-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1.	Herbert L Dershem - PI			0.00	0.00	0.50	\$ 3,000
2.	Aaron C Cinzori - none			0.00	0.00	0.00	0
3.	Roger L Veldman - none			0.00	0.00	0.00	0
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	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1.	(0) POST DOCTORAL ASSOCIATES			0.00	0.00	0.00	0
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)							3,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							260
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							3,260
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)							0
2. FOREIGN							0
F. PARTICIPANT SUPPORT COSTS							
1.	STIPENDS \$	93,750					
2.	TRAVEL	0					
3.	SUBSISTENCE	0					
4.	OTHER	0					
TOTAL NUMBER OF PARTICIPANTS (30)				TOTAL PARTICIPANT COSTS			93,750
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							500
3. CONSULTANT SERVICES							1,500
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							2,500
H. TOTAL DIRECT COSTS (A THROUGH G)							99,510
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) (Rate: , Base:)							
TOTAL INDIRECT COSTS (F&A)							0
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							99,510
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							\$ 99,510
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Herbert L Dershem				FOR NSF USE ONLY			
ORG. REP. NAME* Tracey arndt				INDIRECT COST RATE VERIFICATION			
		Date Checked		Date Of Rate Sheet		Initials - ORG	

SUMMARY PROPOSAL BUDGET YEAR 3

ORGANIZATION Hope College				FOR NSF USE ONLY			
				PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Herbert L Dershem				AWARD NO.	Proposed	Granted	
A. SENIOR PERSONNEL: PI/PI, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1.	Herbert L Dershem - PI			0.00	0.00	0.50	\$ 3,000
2.	Aaron C Cinzori - none			0.00	0.00	0.00	0
3.	Roger L Veldman - none			0.00	0.00	0.00	0
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	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1.	(0) POST DOCTORAL ASSOCIATES			0.00	0.00	0.00	0
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)							3,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							260
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							3,260
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)							0
2. FOREIGN							0
F. PARTICIPANT SUPPORT COSTS							
1.	STIPENDS	\$	93,750				
2.	TRAVEL		0				
3.	SUBSISTENCE		0				
4.	OTHER		0				
TOTAL NUMBER OF PARTICIPANTS (0) TOTAL PARTICIPANT COSTS							93,750
G. OTHER DIRECT COSTS							
1.	MATERIALS AND SUPPLIES						500
2.	PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION						500
3.	CONSULTANT SERVICES						1,500
4.	COMPUTER SERVICES						0
5.	SUBAWARDS						0
6.	OTHER						0
TOTAL OTHER DIRECT COSTS							2,500
H. TOTAL DIRECT COSTS (A THROUGH G)							99,510
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) (Rate: , Base:)							
TOTAL INDIRECT COSTS (F&A)							0
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							99,510
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							\$ 99,510
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PI NAME Herbert L Dershem				FOR NSF USE ONLY			
ORG. REP. NAME* Tracey arndt				INDIRECT COST RATE VERIFICATION			
		Date Checked	Date Of Rate Sheet			Initials - ORG	

SUMMARY PROPOSAL BUDGET YEAR 4

ORGANIZATION Hope College				FOR NSF USE ONLY			
				PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Herbert L Dershem				AWARD NO.	Proposed	Granted	
				A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)			
				CAL	ACAD	SUMR	
1.	Herbert L Dershem - PI			0.00	0.00	0.50	\$ 3,000
2.	Aaron C Cinzori - none			0.00	0.00	0.00	0
3.	Roger L Veldman - none			0.00	0.00	0.00	0
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	0.00	0.50	3,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1.	(0) POST DOCTORAL ASSOCIATES			0.00	0.00	0.00	0
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)							3,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							260
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							3,260
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)							0
2. FOREIGN							0
F. PARTICIPANT SUPPORT COSTS							
1.	STIPENDS \$	93,750					
2.	TRAVEL	0					
3.	SUBSISTENCE	0					
4.	OTHER	0					
TOTAL NUMBER OF PARTICIPANTS (0)				TOTAL PARTICIPANT COSTS			93,750
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							500
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION							500
3. CONSULTANT SERVICES							1,500
4. COMPUTER SERVICES							0
5. SUBAWARDS							0
6. OTHER							0
TOTAL OTHER DIRECT COSTS							2,500
H. TOTAL DIRECT COSTS (A THROUGH G)							99,510
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) (Rate: , Base:)							
TOTAL INDIRECT COSTS (F&A)							0
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							99,510
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							\$ 99,510
M. COST SHARING PROPOSED LEVEL \$ 0				AGREED LEVEL IF DIFFERENT \$			
PI/PD NAME Herbert L Dershem				FOR NSF USE ONLY			
ORG. REP. NAME* Tracey arndt				INDIRECT COST RATE VERIFICATION			
		Date Checked		Date Of Rate Sheet		Initials - ORG	

SUMMARY PROPOSAL BUDGET Cumulative

ORGANIZATION Hope College				FOR NSF USE ONLY			
				PROPOSAL NO.	DURATION (months)		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR Herbert L Dershem				AWARD NO.	Proposed	Granted	
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-months		Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR	
1.	Herbert L Dershem - PI			0.00	0.00	2.00	\$ 12,000
2.	Aaron C Cinzori - none			0.00	0.00	0.00	0
3.	Roger L Veldman - none			0.00	0.00	0.00	0
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	0.00	2.00	12,000
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1.	(0) POST DOCTORAL ASSOCIATES			0.00	0.00	0.00	0
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)							12,000
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							1,040
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)							13,040
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)							0
2. FOREIGN							0
F. PARTICIPANT SUPPORT COSTS							
1.	STIPENDS \$	375,000					
2.	TRAVEL	0					
3.	SUBSISTENCE	0					
4.	OTHER	0					
TOTAL NUMBER OF PARTICIPANTS (60)							
TOTAL PARTICIPANT COSTS							375,000
G. OTHER DIRECT COSTS							
1.	MATERIALS AND SUPPLIES						2,000
2.	PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION						2,000
3.	CONSULTANT SERVICES						6,000
4.	COMPUTER SERVICES						0
5.	SUBAWARDS						0
6.	OTHER						0
TOTAL OTHER DIRECT COSTS							10,000
H. TOTAL DIRECT COSTS (A THROUGH G)							398,040
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)							
TOTAL INDIRECT COSTS (F&A)							0
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							398,040
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.C.6.j.)							0
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							\$ 398,040
M. COST SHARING PROPOSED LEVEL \$				0	AGREED LEVEL IF DIFFERENT \$		
PI/PD NAME Herbert L Dershem				FOR NSF USE ONLY			
ORG. REP. NAME* Tracey arndt				INDIRECT COST RATE VERIFICATION			
		Date Checked		Date Of Rate Sheet		Initials - ORG	

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget Justification

PI Support: The PI will receive support for 0.5 months during each summer of this program. During this time the PI will conduct planning, assessment, and reporting functions of the CSEMS program. During the first two years of the program, the PI will be given one course credit of release time for the duties associated with this project. This release time will be through his service in the First-Year Seminar program during the fall semester and will be through a reduced teaching load of one course provided as a college contribution during the spring semester. This is equivalent to one-third of the PI's normal teaching load. Fringe benefits for the PI are calculated at 7.65% of the stipend. This will pay the employer's contribution to FICA and MQFE.

Scholarships: There will be an average of 30 scholarships per year offered during this project, though this will vary somewhat due to the late initiation of the program during the first year and the need to insure all recipients funding until they successfully complete four years of college study. These scholarships will be the result of funding two cohort groups in consecutive years consisting of 12 Recruitment Scholarship awardees and 6 Retention Scholarship awardees. This will make a total commitment of 132 scholarships, though funding is only requested for 120. The unused funding for students who fail to maintain scholarship eligibility until graduation will be used to fund the 12 excess scholarships. In the event that attrition does not provide sufficient funds to cover the extra 12 scholarships, those scholarships will be funded as a college contribution.

Program Administration: The \$3,230 annual stipend and fringe benefits paid to the PI for management and administration is included under this category. In addition, \$500 per year of the consultant services category (line G3) will be allocated to the assessment process and \$500 per year in publication costs (line G2) will be spent for advertising and dissemination. Therefore, an amount of \$4,230 per year is budgeted for program administration, which is 4.25% of the total budget.

Student Support Costs: Each year of the project, \$500 has been allocated for materials and supplies (line G1) that will be connected with the student support activities. In addition, \$1,000 of consultant services (line G3) is allocated to fund speakers and mentors who will contribute to the student support activities. This totals \$1,500 per year, which is 1.51% of the total budget.

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: Aaron Cinzori	Other agencies (including NSF) to which this proposal has been/will be submitted.
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: CSEMS Scholarship Program in Computer Science, Engineering, and Mathematics at Hope College	
Source of Support: NSF CSEMS Total Award Amount: \$ 398,040 Total Award Period Covered: 08/01/04 - 07/31/08 Location of Project: Hope College Person-Months Per Year Committed to the Project. Cal: 0.00 Acad: 0.00 Sumr: 0.00	
Support: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *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: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *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: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *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: <input type="checkbox"/> Current <input type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *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.

Proposal Status | MAIN ▶

Organization: Hope College

Proposal Detail:

Proposal Information

Proposal Number: 0849691
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Received by NSF: 08/11/08
Principal Investigator: Herbert Dershem
Performing Organization: Hope College

This Proposal has been Electronically Signed by the Authorized Organizational Representative (AOR).

NSF Program Information

NSF Division: Division of Undergraduate Education
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Program Officer: Stephen C. Cooper
PO Telephone: (703) 292-8670
PO Email: sccooper@nsf.gov

Proposal Status

Status As of Today Dated: **02/18/09**

This proposal has been declined by NSF.

Comments from the cognizant Program Officer:

Dear Dr. Dershem:

As indicated in an e-mail that you will receive from the Director or Deputy Director of NSF's Division of Undergraduate Education, this proposal could not be funded within this year's budget for the NSF Scholarships in Science, Technology, Engineering, and Mathematics Program. We regret to inform you of this decision.

Your proposal was reviewed by a panel of STEM and student-support professionals. The reviews, together with the program officer's evaluation of the proposal, were a major factor in our decision not to fund the proposal. Please understand that individual reviewers' comments do not necessarily reflect NSF's policy or position.

Panelists found several positive aspects in the proposal. They recognized the strong academic programs at Hope College. They liked the strong support structures (especially the peer mentoring, alumni mentoring and first year seminar) in place at the college. They liked the emphasis on scholars participating in undergraduate research. They approved of the recruitment and outreach plans. They appreciated the successes with previous CSEMS/S-STEM grants. However, they also had a few concerns. Their most significant concern was the fact that most of the work fell on the shoulders of you as a single PI. They wanted to see a team, to be able to better distribute the project tasks. Also, they were concerned about your ability to solely manage this project on top of the other two CSEMS/S-STEM grants. Additionally, they struggled with the structure of the first half of the proposal. Reviewers reported getting lost among the figures, without getting the message of a coherent plan.

You are encouraged to revise the proposal to take account of reviewers' comments, and submit the revision to the program's next competition. However, there is no guarantee that a revised proposal will be funded. Revised proposals receive a de novo review, and recommendations for funding take into account both the quality of other proposals received and the availability of program funds.

We appreciate your interest in undergraduate education.

Stephen Cooper
Program Director

Reviews

All of the reviews of your proposal that have been released to you by your NSF program officer can be viewed below. Please note that the Sponsored Project Office (or equivalent) at your organization is NOT given the capability to view your reviews.

Document:	Release Date:
Panel Summary #1	Dec 29 2008 3:11PM
Review #1	Dec 29 2008 3:11PM
Review #2	Dec 29 2008 3:11PM
Review #3	Dec 29 2008 3:11PM
Review #4	Dec 29 2008 3:11PM
Review #5	Dec 29 2008 3:11PM
Review #6	Dec 29 2008 3:11PM
Review #7	Dec 29 2008 3:11PM

Context Statement

National Science Foundation
Directorate for Education and Human Resources
Division of Undergraduate Education
NSF Scholarships in Science, Technology, Engineering, and Mathematics Program

GENERAL INFORMATION FOR APPLICANTS, FY2009

For the August 12, 2008, deadline, the NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program received 277 proposals requesting about \$157 million. It is anticipated that approximately \$50 million will be available to support S-STEM projects in FY2009. These funds will permit support of approximately 85 awards.

Each proposal was evaluated by a panel of reviewers, who had electronic access to the proposals assigned to that panel through NSF's FastLane system. Each reviewer read proposals and wrote individual reviews, and then the panel convened as a group to discuss the proposals under consideration. Following these discussions, reviewers finalized their individual written reviews of each proposal. The written remarks are addressed to NSF and reflect the views of individual reviewers. For each proposal, one member of the panel prepared a summary of the discussion.

Decisions about particular proposals are often difficult, and factors other than reviewers' comments and ratings enter into the decision. Comments by a reviewer must sometimes be considered in the context of other reviews by the same person. The amount of funds available to the program for proposals and general Foundation policies are also important decision factors.

Principal and Co-Principal Investigators may read the Panel Summary and the individual reviews of their proposal via FastLane. Please feel free to contact the cognizant program officer if more information would be helpful. To see the awards that are made as a result of this competition, visit the S-STEM program's home page on NSF's Web site, http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5257, and click on the link "Abstracts of Recent Awards Made Through This Program."

The next deadline for S-STEM proposals is likely to be in August 2009. Please visit the S-STEM program's home page (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5257) to find up-to-date information on the proposal deadline and to view the new program solicitation, which will be published at least three months before the proposal deadline.

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Proposal Status | MAIN ▶

Organization: Hope College

Panel Summary #1

Proposal Number: 0849691

Panel Summary:

Panel Summary

Summary

Hope College Department of Computer Science plans to offer 6 four year scholarships, \$10,000 per year, to entering freshmen in the first two years of the proposed Scholarships for Pursuing Applications and Research in Computer Science (SPARCS) program. The program extends and complements two active CSEMS and S-STEM scholarship programs at the College by focusing solely on computer science majors. The panel suggests the PI resubmit with a more careful presentation of the proposal.

Intellectual Merit:

Strengths

The strong academic programs at Hope combined with the PIs experience with existing CSEMS and S-STEM scholarship programs and associated support structures are good indicators of success for the proposed program. The encouragement to participate in undergraduate research highlights the strong faculty commitment to the program as well as the involvement of all of the computer science faculty in various aspects of the program.

Concerns

The most significant weakness is the presentation style, which is sometimes disorganized, repetitive, and hard to understand. Another major concern is the ability of the lone PI to handle all of the tasks outlined in the proposal given his responsibilities for the two current scholarship programs. A division of labor with additional CO-PIs would be preferable and perhaps more realistic. Finally, the student support services and activities are effective only if students participate in them, and very few of them are required. The panel suggests formally building some of them into the program.

Broader Impacts:

Strengths

The personal contact with high school references was viewed as an effective recruiting strategy with both short and long term benefits.

Concerns

The assessment plan is too general and should be tied to the results of the previous CSEMS program.

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Proposal Status | MAIN ▶

Organization: Hope College

Review #1

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Good

REVIEW:

What is the intellectual merit of the proposed activity?

Intellectual Merit

Strengths û PI has past NSF funding experience with CSEMS Program and has achieved tremendous success in retaining students.

Selected students will receive scholarship support in the amount of \$10,000 with strong academic support , specifically mentoring, community building events, career exposure, research and internship opportunities. These programs provide the framework for student success according to the research.

Good recruitment plan which requires students to provide the name of high school teacher to serve as a reference. This serves as a good tool for future recruitment.

Underrepresented groups given preference û most ineligible because they are over awarded. This is a great problem to have as it is the reverse at most institutions.

Weakness û Single PI performing much of the work of the grant. Oversight team provides advice and evaluation but are not involved in the day-to-day program management.

What are the broader impacts of the proposed activity?

Good assessment and evaluation plan

If successful, project has the potential to provide considerable talent to the CS profession

Internships, professional mentoring and involvement in research provides a clear path to professional careers in CS or the pursuit of graduate studies.

Helps with the overall diversity initiatives at institution.

Summary Statement

Good proposal overall. Not sure that the details of the grant can be accomplished by a single individual.

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Proposal Status | MAIN ▶

Organization: Hope College

Review #2

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Good

REVIEW:

What is the intellectual merit of the proposed activity?

The University is trying hard to make a difference in student's lives. The support services for students are in place from the CSEMS grant. Students will attend a specially designed First-Year seminar; have intensive faculty advising, etc. Students will be recruited from high schools which have financially needy students. Female students will be targeted.

What are the broader impacts of the proposed activity?

Can 12 academically talented and financially needy students succeed in CS with a large scholarship made available to them? If this is true, the broader impact will be known.

Summary Statement

Data from the CSEMS grant is not always clear. In 2005 94% were retained at Hope but 100% were retained in the CSEMS fields. Nor is there any indication of how many of these students were CS majors for this new grant to build on it. The data on the % of females graduation in CS is said to be smaller than the national data, what is the national data. How is the second group being funded for their last year? Is this year six of the grant? CS workshops for HS students will not occur in time to recruit students for this grant.

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Proposal Status | MAIN ▶

Organization: Hope College

Review #3

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Very Good

REVIEW:

What is the intellectual merit of the proposed activity?

Strengths

The institution is currently receiving a CSEMS and S-STEM grants with great success shown on the CSEMS. The proposal models the CSEMS project. A good student and academic support system is in place and will be enhanced. Good description of each program provided. The First Year Seminar course being geared to the participants and the undergraduate research have shown good results and will be maintained. The Academic Support Center will serve the participants well and the Computer Science workshops will add to the recruiting mix. The recruitment plan is well documented. Strong faculty commitment to the field with over 300 undergraduate co-authored publications with faculty since 1990.

What are the broader impacts of the proposed activity?

This project will help to increase the number of underrepresented students interested in the computer science. It will also enhance the partnership with the institution, area high schools and increase the awareness of the field to underrepresented groups. The assessment and evaluation plan would have benefited from base information for assessment. The information was presented in the CSEMS (number of majors, retention, etc) and that information could be used as baseline data for assessment in this plan.

Summary Statement

This was a very well written and supported proposal building off past successes of a CSEMS grant

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Organization: Hope College

Review #4

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Very Good

REVIEW:

What is the intellectual merit of the proposed activity?

Hope has a proven record with a previous CSEMS grant and an S-STEM grant. In particular, they have a record with women and minorities that exceed institutional averages for minorities and national averages for women. All students take a freshman seminar aimed specifically at computer science students. They run a summer CS research program for students. They will rely on peer mentoring with upper level students.

What are the broader impacts of the proposed activity?

They have seen a marked decline in interest in computer science (as has virtually everyone else). . Scholarship money could, of course, help to reverse that trend. As an outreach activity, they will start doing workshops for high school students using Alice.

Summary Statement

This proposal focuses exclusively on computer science. They note that they have the capacity to handle additional computer science majors. They will strive for gender balance in the scholarships. Hope College has always been model for other institutions to emulate. They have a national reputation for doing things well. 40% of their students are interested in science or mathematics.

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Organization: Hope College

Review #5

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Good

REVIEW:

What is the intellectual merit of the proposed activity?

Well-qualified PI and strong CS program. Experience with the current CSEMS and S-STEM projects are beneficial to proposed program, although the success of the current CSEMS program is unclear. Only having one PI and making him personally responsible for many of the details of the implementation seems unrealistic. The proposal would be strengthened by listing more CO-PIs and delegating the work.

Clear processes in place for recruitment and selection of participants, though no specific test score requirements are given. Recruitment activities already underway in anticipation of funding demonstrate a strong commitment to the program.

Effective support activities are available - peer mentoring, alumni mentoring, first year seminar, REU opportunities, social events, and colloquia. Many of these activities are optional and may need to be required to be effective for participants.

What are the broader impacts of the proposed activity?

The entire computer science faculty is involved with various activities of the program showing a strong buy in from the department.

Potential for significant impact on the enrollment in Hope College's computer science program, which continues to show declines.

Students are likely to participate in undergraduate research experiences at Hope or other colleges.

Summary Statement

Overall a strong proposal, but the presentation style is not clean - unclear and sloppy at times. Can the PI effectively direct this program in addition to the two current scholarship programs, CSEMS and S-STEM, for the next year in which all three are active?

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Organization: Hope College

Review #6

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Good

REVIEW:

What is the intellectual merit of the proposed activity?

The program would fund two cohorts of six students majoring in computer science for the life of the project. They currently have some success with a CSEMS project and those participants, who would be seniors when this project starts, would be peer mentors for incoming freshmen. All 6 SPARCS students would be enrolled in a section of a FYS taught by the PI, along with 14 other students who have expressed interest in the field. Recruitment plans are somewhat sketchy, but do include inviting his teachers and students to some of the activities planned for SPARCS students, as well as computer science workshops for high school students based on Alice û which should help increase interest. There is some mention of assigning each student a faculty advisor and an alumni mentor from industry, but this is not spelled out in great detail. The proposal refers to making students aware of certain support services on campus and encouraging them to do certain things, but not much of this is built into the program.

What are the broader impacts of the proposed activity?

There is some mention of increasing participation from females and URM, but no real plan to detail how they will do this. They mention selection criteria, but do not specify what they are. The evaluation plan will be done by the same external evaluator used for CSEMS. This should provide objectivity as well as familiarity with the goals of the program.

Summary Statement

I found the first part of the proposal to be somewhat scattered and disjointed. The latter section which described the quality of the education programs was much more coherent and detailed numerous awards and innovative programs.

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Organization: Hope College

Review #7

Proposal Number: 0849691
Performing Organization: Hope College
NSF Program: S-STEM: SCHOLARSHIPS IN SCI, TECH, ENG, AND MATH
Principal Investigator: Dershem, Herbert L
Proposal Title: Scholarships for Pursuing Applications and Research in Computer Science
Rating: Very Good

REVIEW:

What is the intellectual merit of the proposed activity?

Strengths: Cohort model and peer mentoring are strengths. The College has strong academic program in cs. Overall the College is ranked well nationally. They have shown good success in sending graduates on to advanced degrees. Faculty are well-qualified. Program is strong in undergraduate research.
Weaknesses: Not completely clear how well previous programs performed.

What are the broader impacts of the proposed activity?

Strengths: The recruiting and screening plan are solid.
Weaknesses: Previous projects have not uniformly successful. The number of students reached seems small for the dollars spent.

Summary Statement

Overall a solid proposal from a program with strong academic strengths.

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