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

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PI/PD Name: Josh D Tenenberg

Gender: ☒ Male ☐ Female

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

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

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

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

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

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

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

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PI/PD Name: Dennis J Bouvier

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): ☐

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PI/PD Name: Briana B Morrison

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): ☒

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PI/PD Name: Kathryn E Sanders

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): ☒

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PI/PD Name: Robert D McCartney

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

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

SUGGESTED REVIEWERS:
Henry Walker, Grinnell College

REVIEWERS NOT TO INCLUDE:
Not Listed

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

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

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

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

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

SUGGESTED REVIEWERS:
Not Listed

REVIEWERS NOT TO INCLUDE:
Not Listed

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 04-23

NSF 06-608 **01/23/07**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

CNS - CPATH

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0721821

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/22/2007	5	05050000 CNS	7640	605799469	02/16/2007 9:23am S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

916001537

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

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

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

University of Washington

AWARDEE ORGANIZATION CODE (IF KNOWN)

0037986000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

1100 NE 45th St, Suite 300
SEATTLE, WA 98105-4683

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

University of Washington, Tacoma

PERFORMING ORGANIZATION CODE (IF KNOWN)

5300017879

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

Univ. of WA, Tacoma
1900 Commerce Street
Tacoma, WA 98402-1900

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **118,361**	**36** months	**09/01/07**	

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

☐ BEGINNING INVESTIGATOR (GPG I.A)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.1)
☐ VERTEBRATE ANIMALS (GPG II.D.5) IACUC App. Date _____
☒ HUMAN SUBJECTS (GPG II.D.6)
Exemption Subsection _____ or IRB App. Date **Pending**
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT

Computing and Software Systems

PI/PD FAX NUMBER

253-692-5862

PI/PD POSTAL ADDRESS

1900 Commerce Street
Box 358426
Tacoma, WA 98402
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Josh D Tenenberg**	**PhD**	**1988**	**253-692-4521**	**jtenenbg@u.washington.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

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 04-23. 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 **Jim Enriquez**	**Electronic Signature**	**Jan 22 2007 4:25PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
206-543-4043	**cje01@u.washington.edu**	**206-685-7165**

*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.

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 04-23

NSF 06-608 **01/23/07**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

CNS - CPATH

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0721850

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
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EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

370986220

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☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

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

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Southern Illinois University at Edwardsville

AWARDEE ORGANIZATION CODE (IF KNOWN)

0017590000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Southern Illinois University at Edwardsville
Campus Box 1046
Edwardsville, IL. 620261046

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

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

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ 96,003	36 months	09/01/07	

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

☒ BEGINNING INVESTIGATOR (GPG I.A)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
☐ SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.1)
☐ VERTEBRATE ANIMALS (GPG II.D.5) IACUC App. Date _____
☒ HUMAN SUBJECTS (GPG II.D.6)
Exemption Subsection _____ or IRB App. Date **Pending**
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Computer Science

PI/PD FAX NUMBER
618-650-2555

PI/PD POSTAL ADDRESS
SIUE Box 1656

Edwardsville, IL 62026
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Dennis J Bouvier**	**PhD**	**1994**	**618-650-2369**	**djb@acm.org**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

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 04-23. 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 ☒

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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 **Stephen L Hansen**	**Electronic Signature**	**Jan 22 2007 4:39PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
618-650-3162	**shansen@siue.edu**	**618-650-3523**

*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.

0721850

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 04-23

NSF 06-608 **01/23/07**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

CNS - CPATH

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0721306

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/19/2007	5	05050000 CNS	7640	062092457	02/16/2007 9:24am S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

581391294

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

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

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Southern Polytechnic State University

AWARDEE ORGANIZATION CODE (IF KNOWN)

5300010092

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Southern Polytechnic State University
1100 S. Marietta Parkway
Marietta, GA. 30060

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

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

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative Research: CPATH CB: Disciplinary Commons in Computing Education**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **92,533**	**36** months	**09/01/07**	

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

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☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)
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☒ HUMAN SUBJECTS (GPG II.D.6)
Exemption Subsection _____ or IRB App. Date **Pending**
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_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Computer Science

PI/PD FAX NUMBER
678-915-5527

PI/PD POSTAL ADDRESS
1100 S. Marietta Parkway

Marietta, GA 300600289
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Briana B Morrison**	**MS**	**1995**	**678-915-4295**	**bmorriso@spsu.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

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(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.

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AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **Dawn Ramsey**	**Electronic Signature**	**Jan 19 2007 3:19PM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
	dramsey@spsu.edu	

*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.

0721306

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 04-23

NSF 06-608 **01/23/07**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

CNS - CPATH

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0721437

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/22/2007	5	05050000 CNS	7640	075707588	02/16/2007 9:24am S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

056016315

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

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

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Rhode Island College

AWARDEE ORGANIZATION CODE (IF KNOWN)

0034074000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Rhode Island College
600 MOUNT PLEASANT AVE
PROVIDENCE, RI. 029081924

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

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

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
☐ SMALL BUSINESS ☐ MINORITY BUSINESS
☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative Project: CPATH CB: Disciplinary Commons in Computing Education**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **103,600**	**36** months	**09/01/07**	

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

☐ BEGINNING INVESTIGATOR (GPG I.A)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.C)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG I.B, II.C.1.d)
☐ HISTORIC PLACES (GPG II.C.2.j)
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☐ VERTEBRATE ANIMALS (GPG II.D.5) IACUC App. Date _____
☒ HUMAN SUBJECTS (GPG II.D.6)
Exemption Subsection _____ or IRB App. Date **Pending**
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES INVOLVED (GPG II.C.2.j)
_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Mathematics and Computer Science

PI/PD FAX NUMBER
401-456-4695

PI/PD POSTAL ADDRESS
600 Mount Pleasant Avenue

Providence, RI 029081924
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Kathryn E Sanders**	**PhD**	**1995**	**401-456-9634**	**ksanders@ric.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

Certification for Authorized Organizational Representative or Individual Applicant:

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Drug Free Work Place Certification

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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 ☒

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AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME **Anne M Pascucci**	**Electronic Signature**	**Jan 22 2007 9:47AM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
401-456-8228	**apascucci@ric.edu**	**401-456-9558**

*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.

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 04-23

NSF 06-608 **01/23/07**

FOR CONSIDERATION BY NSF ORGANIZATION UNIT(S) (Indicate the most specific unit known, i.e. program, division, etc.)

CNS - CPATH

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

0721506

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
01/22/2007	5	05050000 CNS	7640	614209054	02/16/2007 9:24am S

EMPLOYER IDENTIFICATION NUMBER (EIN) OR TAXPAYER IDENTIFICATION NUMBER (TIN)

060772160

SHOW PREVIOUS AWARD NO. IF THIS IS
☐ A RENEWAL
☐ AN ACCOMPLISHMENT-BASED RENEWAL

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

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

University of Connecticut

AWARDEE ORGANIZATION CODE (IF KNOWN)

0014175000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

University of Connecticut
438 Whitney Road Extension
Storrs, CT. 062691133

NAME OF PERFORMING ORGANIZATION, IF DIFFERENT FROM ABOVE

PERFORMING ORGANIZATION CODE (IF KNOWN)

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

IS AWARDEE ORGANIZATION (Check All That Apply) (See GPG II.C For Definitions)
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☐ FOR-PROFIT ORGANIZATION ☐ WOMAN-OWNED BUSINESS

☐ IF THIS IS A PRELIMINARY PROPOSAL THEN CHECK HERE

TITLE OF PROPOSED PROJECT **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PRELIMINARY PROPOSAL NO. IF APPLICABLE
$ **89,205**	**36** months	**09/01/07**	

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

☐ BEGINNING INVESTIGATOR (GPG I.A)
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_____
☐ HIGH RESOLUTION GRAPHICS/OTHER GRAPHICS WHERE EXACT COLOR REPRESENTATION IS REQUIRED FOR PROPER INTERPRETATION (GPG I.G.1)

PI/PD DEPARTMENT
Computer Science & Engineering

PI/PD FAX NUMBER
860-486-4817

PI/PD POSTAL ADDRESS
191 Auditorium Road

Storrs, CT 062693155
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Robert D McCartney**	**PhD**	**1988**	**860-486-5232**	**robert@cse.uconn.edu**
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				
CO-PI/PD				

Electronic Signature

CERTIFICATION PAGE

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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 **AnnMarie V White**	**Electronic Signature**	**Jan 22 2007 11:52AM**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
860-486-3622	**preaward@uconn.edu**	**860-486-3726**

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0721506

Project Summary

The goals of the Disciplinary Commons in Computing Education are to fundamentally transform computing education and the scholarship of teaching, develop educational leaders to drive this transformation, and build regional and national communities of computing educators. Transformation does not happen by fiat: the way to transform computing education is to transform computing educators. We believe that transformative change occurs from the bottom up, emerging from the active exchange of ideas between computing educators at a variety of institutions, from research universities to community colleges, even high schools. Opportunities for these exchanges do not spontaneously emerge, however, and education-focused communities seldom have the mix of skills and resources to sustain themselves: they need organization and leadership. That leadership and that organization are what we propose to create.

In the proposed project, we will run four Disciplinary Commons in different regions of the US, with groups of computing educators from a variety of institutions. In each region, 10-15 educators will meet face-to-face for half-day meetings monthly throughout the academic year, where they will discuss the teaching and learning that occurs within their classrooms. This shared, critical engagement will be driven by the development of individually-constructed course portfolios. The course portfolio focuses on a single course, connecting course objectives, instructional design, and design rationale to actual student performance, and is a well-known method for advancing reflective teaching practice and improving student learning. By meeting monthly, working together on a common task, having paired site-visits, and sharing and criticizing materials and resources, these educators will build a community within each region, as well as having connections to the educators with the shared experiences in the other regions.

This approach was piloted and evaluated in the 2005-6 academic year: in the US with 10 educators by Josh Tenenberg, and in the UK with 17 educators by Sally Fincher.

Intellectual merit: This model has intellectual merit both in its theoretical grounding and its empirical validation. It is theoretically based in the reflective practices associated with individual development and professional artistry as described by Dewey and Schön. Documenting teaching practice and reflections in the form of course portfolios is likewise grounded in the Scholarship of Teaching and Learning literature. Empirically, this model has been piloted and evaluated twice.

Broader impacts: The specific outcomes will include an Internet-accessible archive of course portfolios produced by regional participants in the Disciplinary Commons. The existence of a rigorous, peer-reviewed, and publicly available archive of portfolios across a range of courses will have a broad impact on the culture of computing education. The more important impacts, however, are on the regional participants. Participants in a Disciplinary Commons create a community with a shared experience, shared interests in education, and a heightened awareness of educational computing issues. They have a broad perspective about other institutions (in the region and/or disciplinary area) and knowledge of differences between student populations at a deeper level than it is possible to obtain in any other way. This unusual breadth of knowledge means participants are well-positioned to be the driving forces behind significant reform in computing education: they will know what to look at, they will have a community to work with, and they will have the broader perspective to move toward systemic change on a regional and national scale. Impact will also be broadened through the dissemination of the Disciplinary Commons model as a means for building communities of engaged and innovative computing educators. Impact will be broadened as well by connecting this project to a parallel Disciplinary Commons proposed by Sally Fincher to the UK National Teaching Fellowship Scheme initiative.

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The *Disciplinary Commons* in Computing Education

1. Vision and Goals

We propose to transform computing education from the ground up, by:

- Building communities of computing educators in four different regions of the United States and four different areas of the computing curriculum
- Nurturing leaders among and within those communities
- Engaging participants in critical reflection on their own and one another's practice , and
- Sharing the resultant insights and innovations with the broader community

The nature of transformation

Transformation does not happen by fiat, and the only way to transform computing education is to transform computing educators. Noting the historically low transformation rate of the top-down conference publication mode of educational materials and experience exchange, we believe that transformative change occurs from the bottom up. It emerges from the active exchange of ideas between computing educators at a variety of institutions, from research universities to community colleges and high schools. Opportunities for these exchanges do not spontaneously emerge, however, and education-focused communities seldom have the mix of skills and resources to sustain themselves: they need organization and leadership. That leadership and that organization are what we propose to create.

2. Objectives and Outcomes

The strategic objectives of this project are to:

1. fundamentally transform computing education in a sustainable fashion, by transforming computing educators
2. develop educational leaders to drive this transformation
3. build regional and national communities of computing educators

Specific outcomes will include an archive of *course portfolios* produced by participants in the *Disciplinary Commons*. These will be rigorous, peer-reviewed, and publicly available. The existence of such an archive will have a large effect on the culture of computing education.

More important are effects on the participants. Participants in a *Disciplinary Commons* create a community with a shared experience, shared interests in computing education, and a heightened awareness of emergent issues in computing education that require responses beyond what any individual educator or single institution can provide. These participants have a broad perspective about other institutions (in the region and/or disciplinary area) and knowledge of differences between student populations at a deeper level than it is possible to obtain in any other way. This unusual breadth of knowledge means participants are well-positioned to be the driving forces behind significant reform in computing education: they will know what to look at, they will have a community to work with, and they will have the broader perspective to move toward systemic change on a regional and national scale.

3. Implementation Plan

3.1 **Plan summary**

This proposal builds directly on the *Disciplinary Commons*, jointly developed by Josh Tenenberg (University of Washington, Tacoma) and Sally Fincher (University of Kent, UK), and implemented in parallel in both the USA and the UK in the 2005-06 academic year (Tenenberg and Fincher 2007). This proposal is being made in parallel with one to the UK National Teaching Fellowship Scheme (NTFS) initiative with Sally Fincher as PI. Our aim is to continue to work in parallel, to link our archives, to work jointly on evaluation and development of the model and on indexing and accessing the portfolio archive for long-term usability. We consider the 2005-2006 *Disciplinary Commons* to be a pilot for this proposal.

In the rest of section 3 we present the structure and rationale for the Disciplinary Commons model. In section 4 we detail the roles of the participating institutions and in section 5 the qualifications of the senior investigators for undertaking this project. We describe our evaluation and dissemination plans in sections 6 and 7 respectively. Finally, we discuss the merit and impact of this proposal, how the model in total will satisfy the C-PATH objectives, and summarize the expected outcomes. A timeline that indicates the significant milestones is included as a Supplementary Document. We are also providing letters of support as Supplementary Documents. One is from Mark Guzdial, Professor at Georgia Institute of Technology and a leader in Computer Science Education who will be replicating and adapting the *Disciplinary Commons* model during the next academic year for their NSF *Broadening Participation in Computing* project "Georgia Computes!". The other is from Jennifer Robinson, Director of the Scholarship of Teaching and Learning program at Indiana University, who indicates that our model puts Computer Science Education at the forefront of disciplines seeking to apply scholarly approaches to teaching and learning.

3.2 What is the *Disciplinary Commons*?

The *Disciplinary Commons* is a model for pedagogical progress in computing education. It has three primary components:

1. *reflection* by individual educators on their own teaching practices, including relationships to student learning and institutional goals (e.g. departmental, university, and disciplinary);
2. *participation* by computing educators in regional networks of other educators engaged in reflective practices; and
3. *reification* of these reflections in documents that are individually written, regionally peer-reviewed, and broadly disseminated among the computing education community.

Much of the strength of the *Commons* model is in the manner in which these three aspects are combined through the development of *course portfolios*.

The course portfolio, well known as a method for advancing teaching practice and improving student learning (Bernstein et al. 2006, Hutchings 1996), is a set of documents that "focuses on the unfolding of a single course, from conception to results" (Hutchings 1998). The purpose of the course portfolio "is in revealing how teaching practice and student performance are connected with each other" (Bernstein 1998). Course portfolios typically include a course's learning objectives, its contents and structure, a rationale for how the course design meets its objectives, and the course's role in a larger degree program. Importantly, the portfolio also includes

evaluations of student work throughout the term, indicating the extent to which students are meeting course objectives and the type and quantity of feedback they are receiving. The empirical focus on student work can lead to insights into how this course might be taught differently in the future and so achieve greater student learning.

3.2.1 Reflection

Reflection as a set of cognitive practices has its roots in the work of John Dewey, particularly his book *How We Think* (1933). Rodgers summarizes Dewey's conception of reflection as being characterized by four criteria:

1. Reflection is a meaning-making process that moves a learner from one experience into the next with deeper understanding of its relationships with and connections to other experiences and ideas. It is the thread that makes continuity of learning possible, and ensures the progress of individual and, ultimately, society. It is a means to essentially moral ends.
2. Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry.
3. Reflection needs to happen in community, in interaction with others.
4. Reflection requires attitudes that value the personal and intellectual growth of oneself and of others. (Rodgers 2002)

We take all four of these meanings as important socio-cognitive practices for individual and collective engagement in teaching and learning.

Schön (1987) discusses a notion similar to Dewey's, what he calls *reflection-on-action*, to provide an account for the development of skilled professional practice. But Schön argues as well that skilled practice - "professional artistry" - also relies on *knowing-in-action*, the ability to embody domain-specific knowledge that is enacted in practice: "I shall use knowing-in-action to refer to the sorts of know-how we reveal in our intelligent action … We reveal it by our spontaneous, skillful execution of the performance; and we are characteristically unable to make it verbally explicit." Many teachers develop this mastery through years of classroom experience. But how are they to pass on this knowledge to others if they are unable to verbalize it? How can teachers acquire the skills and practices of the masterful teachers around them? How are teachers to move "from one experience to the next with deeper understanding", from knowing-in-action to reflection-on-action, iterating in cycles of continuous development?

This skilled practice can be developed by exposing our tacit knowledge about teaching to ourselves and others so that it becomes available for critical scrutiny and improvement. Within the context of teaching, this knowledge is what Jerome Bruner calls "folk pedagogies" (1986), those tacit beliefs that we each hold about how our students think and learn that largely determine the ways in which we teach our courses. Paradoxically, this tacit knowledge, by its nature, may not be directly accessible through deliberate acts of reflection; one must sometimes get at one's own beliefs "through the back door".

In the *Commons*, we help participants make this tacit knowledge explicit by having them examine and reflect both individually and *as a group* upon artifacts generated from teaching a single course, artifacts such as syllabi, exams, assignments, and comments to students. By examining existing artifacts generated through their own practice, participants are able to unearth the assumptions and commitments that comprise their tacit pedagogies. And in doing so, they make these pedagogies available to critique and change. Bob Broad expresses this strategy for self-

reflection when he states “people (including instructors) do not have satisfactory access to their educational values by sitting and reflecting on them. Instead, people need to enter into discussion and debate of actual, specific performances in an effort to reach decisions about them (i.e., to judge them).” (Broad 2003)

This reflection is one of the main catalysts of change. As one of the participants in the pilot project stated in evaluative interviews undertaken at the end of the project: “what it did was it forced me to reconsider the whole approach I take to my lectures.” Another commented that “all aspects of course preparation and delivery have now come under closer scrutiny since I've been through this project.”

3.2.2 Participation

Participation in the *Commons* involves groups of educators within the same discipline—perhaps even teaching the same course—meeting face-to-face for one-half day each month during an academic year. During monthly meetings, participants collaboratively share, critique and peer-review one another’s portfolio-in-progress. They discuss the critical issues in teaching disciplinary knowledge, the ways in which students encounter and overcome obstacles, the relationship between the teaching that is enacted and the learning that occurs. Over the course of the year, participants also peer-observe one another in the classroom to support one another’s practice-in-action, and to develop an understanding of differences in institutional context. In this way, the model overcomes institutional isolation, putting practitioners together with colleagues who teach the same subject and so face similar issues and difficulties. At the same time this participation facilitates reflective comparison of individual and institutional difference across all participants. Because the *Commons* draws from a wide variety of institutions, participants gain a breadth of knowledge of practice in other departments that is unusual, even unique, in higher education – and obtainable in no other fashion. This engagement within a group of colleagues with similar concerns, mutually engaged in the same task, provides support for engagement in the broader community of computing educators. Many present their insights obtained through *Commons* participation in disciplinary conferences and symposia.

It is this participation that evokes the sense of community. One participant in the pilot project stated “[T]he main thing is just the sense of community that came out of this over a series of a dozen meetings or so that this group of very different people came together.” Another said “one significant result has been the increased rapport with the other members of the Disciplinary Commons.” A third commented “There is a sense of esteem, a renewed esteem, it's a sense of belonging to that larger community and still connected to it.” And it is this sense of authentic community that leads to sustained engagement, even after the end of the monthly meetings. As one participant stated “the key thing for me was this building of community ... These are the folks that I'm still connected with, and, now talking about doing collaborative things. In fact, we've got a couple of proposals ..,” As one participant summarized “I've got this sort of world of other people to look to. ...That got me really fired up for it. In fact, it kept me going.”

3.2.3 Reification

We borrow this terminology from Wenger (1998), who was concerned with the ways in which individuals construct identity and become members in social groups among other individuals with whom they share common practices in specific settings (e.g. teacher, computer scientist, software developer, scholar). “I will use the concept of reification very generally to refer to the process of giving form to our experience by producing objects that congeal this experience into ‘thingness’.”

The use of portfolios to reify practice among groups of educators from different disciplines has been previously reported (Hutchings 1998, Robinson 2004). Our use of course portfolios differs from these efforts by being carried out by faculty within a single discipline, indeed in a single course. We believe that this is especially powerful. One of the recognized problems with *teaching* portfolios is that they are produced by individuals, normally for benchmark or personal development purposes: rarely do they contain reference to a wider context (either institutional or disciplinary), and they are individualistic in form. Not only that, but they are scattered across all subject areas – drawing, psychology, mathematics – and so are both hard to navigate and difficult to use with respect to a given subject or situation.

However, the power of the portfolio approach is multiplied when there are several examples available for a single disciplinary aspect, and they have some commonality of approach and form. *Disciplinary Commons* portfolios, though individually authored, are created through interaction with others in a regional community, not only reifying individual practice but embodying participation within a scholarly community. In this way the *Commons* contributes unique texts to the broader teaching and learning body of knowledge, helping to ameliorate the dearth of public, peer-reviewed examples of teaching excellence that characterizes the legacy of even the most recognized teachers "Aside from his syllabi and fading memories, he had no real record of what happened in those award winning courses" (Huber 2002).

Thus the strength of the *Commons* is in its combination of all of these aspects: *reflection* provides the raw material that participants can bring to their colleagues and to fuel individual – and collective – transformative change; *participation* builds a knowledgeable community of scholars who can engage with and support each others' reflective practice, *reification* provides a foundation for this dialogue to extend to other teachers, over time.

And it is this combination that leads to transformational change. One participant in the pilot discussed this transformation of both identity and practice.

> Teaching is such a lonely job, really. If you're on your own in a classroom with a group of students, you don't necessarily know what your colleagues teach or how they teach. Because we don't really have any forums for discussing our teaching and comparing it. So the Disciplinary Commons was a real breath of fresh air, and inspired a rather jaded, cynical teacher who's been doing the job for years, and almost felt … I tried everything I thought, and I stuck with what was the best, but it really wasn't.

As a result, participants in the pilot projects began to be more innovative in their approach: "[T]his year I feel a different person in my teaching because I know that I'm trying things out, and … I feel a bit more rejuvenated in my attitude to ... innovation."

4. Extending the *Commons*

This project will extend the pilot *Commons* in three fundamental ways:

1. adapt the model to different regions, to additional disciplinary areas and practices, and to a wider range of institutions,
2. create a cadre of *Commons* leaders, and
3. interlink *Commons* communities.

In broad outline, year one of the grant will involve meetings among leaders, participant recruitment and planning; year two will run *Commons* within each region (including site visits between leaders), and year three will involve sustaining and disseminating the *Commons* model as well as extending current work with regard to indexing into the portfolios to maximize their long-term utility. A detailed timeline is provided in the Supplementary Documents.

4.1 Replication and Adaptation

The *Commons* model uses a set of scholarly, collaborative practices that have been successful in discipline-based research as a basis for improving the practice of computing educators. In doing so, it posits personal networks and the development of social capital within geographic regions as a key mechanism for both knowledge diffusion as well as knowledge creation. The regional basis enables educators to meet face-to-face on a regular basis, throughout an entire academic year. The outcomes from the two pilot instantiations provide strong evidence that this model develops and deepens participants' individual reflective practices, allows for the sharing of innovative practice across institutional boundaries, and encourages participation in the discourse of the broader computing education community through both conference presentations and contributions to a persistent, publicly accessible portfolio archive.

Each of these *Commons* will involve ten to fifteen educators recruited from educational institutions within the Co-PI's region. Each is designed by the respective PI to be sensitive to local conditions and requirements. In education there is no single "best": what works at a large research institution may be entirely inappropriate for a community college. What is shared across these projects is a model of critical academic practice that engages, supports and sustains educators in examining, sharing and evolving their teaching. Each of these adaptations uniquely extends the *Commons* along one or more dimensions:

The *Data Structures* and *Software Engineering Commons* will recruit from educators teaching in the same subject area. This extends the existing model to new disciplinary areas, beyond CS1 to engage a wider spectrum of practitioners.

The *Rhode Island Commons* takes the initial teaching of programming as its subject matter, but investigates its delivery and impact across a "vertical" range of institutions, from high school to University. In this way the insights and experience at each level of education will be exposed and articulation between them critically examined.

The *Engineering Computing Commons* will focus on disciplinary boundaries and differences, on how Computing material is presented to students whose primary focus is not computation. Practice on these boundaries is seldom examined, and yet when looking for innovation and transformation, it is wise to look at the edges and boundaries – innovation rarely happens in the middle of the road.

Data Structures *Commons*

The *Data Structures Commons* will be held in the southeast United States and led by Briana Morrison, Assistant Professor at Southern Polytechnic State University. Participants will be recruited from all over the region, including Tennessee, the Carolinas, Alabama, Florida, and Georgia. Meetings will be held at Southern Polytechnic State University, centrally located for the region, just outside of Atlanta, Georgia.
Data Structures is arguably one of the most important courses in a computer science curriculum. The course often has multiple objectives: to teach the students about different common data structures (stacks, queues, trees, etc.), to instruct students on how

to select the appropriate data structure for the application, and to improve their programming skills by having them actually implement the data structures (Lister et al. 2004). With the proliferation of language libraries that include the most frequently used data structures, the question has been raised on whether the instruction should shift to a more in-depth understanding of the use of the specific data structures versus the implementation of the data structures (the "usage versus the under-the hood" debate (Collins et al 2003)).

The Data Structures *Commons* seeks to explore both methods of implementation of the Data Structures course to more specifically define a common set of learning outcomes for the course that can be satisfied with either path of instruction. By thoroughly defining the existing teaching methods and reflecting upon the current instruction methodologies through writing course portfolios, a common set of outcomes can be explored.

Mid-America *Commons*: Software Engineering

The Mid-America Commons will be led by Dr. Dennis Bouvier, an Assistant Professor of Computer Science teaching Software Engineering at Southern Illinois University-Edwardsville (SIUE). Dr. Bouvier has been teaching computer science since 1994, and has conducted and published computing education research since 1998. The focus of the Mid-America commons is on the teaching of Software Engineering. Participants will be recruited from the degree granting institutions in the mid-west of the US.

Software Engineering is typically considered a core course in computer science at the junior or senior level, and can be taught in a wide variety of ways. For example a course can focus on any one of dozens of specific software development processes, or survey some sub-set of processes. A software engineering course may involve extensive group projects, or be a theory-based 'reading' course.

St. Louis is ideally situated to serve as the focal point for a *Disciplinary Commons* serving computing educators from Missouri and Illinois and other mid-western states. The St. Louis metro area is home to SIUE and six other universities that offer the BS degree in Computer Science. Many other universities offering that degree are located within three hours drive of St. Louis.

Rhode Island *Commons*: Introductory Programming Across Levels

The *Rhode Island Commons* will be led by Dr. Kate Sanders, Chair of the Mathematics and Computer Science Department at Rhode Island College (RIC). This *Commons* will seek to include instructors from all levels -- high school, community college, and college -- who teach introductory programming in Rhode Island. Rhode Island has a strong sense of identity and is small enough that any point in the state can be reached from any other in less than an hour. Rhode Island has a wide variety of institutions, from inner-city high schools to Ivy League Brown University and the Rhode Island School of Design. And yet there is little communication across institutions among those teaching computer science.

RIC is well-placed to take the lead in building a stronger state-wide community such as the *Disciplinary Commons*. RIC is the only state college in Rhode Island, and since its founding in 1854 has maintained a strong reputation for teacher education. Many of the state's teachers are RIC graduates, and the Math/CS Department, as the alma mater of many of the state's secondary math teachers, has strong connections with the high-school

math teachers who often also teach the programming courses. Dr. Sanders holds her PhD in computer-science from Brown University and recently co-authored a CS1 textbook with Dr. Andries van Dam of Brown. As chair, she also meets regularly with faculty from the community college (CCRI) and the state university (URI)

Engineering Computing *Commons*: Computing for Engineers in New England

The *Engineering Computing Commons* will be led by Dr. Robert McCartney of the University of Connecticut. In this *Commons*, we will bring together a number of people teaching computing to engineering students—courses where most students are not expected to be computing majors. The use of computers to solve problems is standard practice in engineering and science, so it is expected that students become capable computer users. At many institutions there are engineering versions of computing courses, in part due to the practical needs of engineering students—the need to learn particular applications and tools, e.g., in part due to the tradition of some engineering schools to have their own versions of core courses in cognate areas such as Math and Physics, and in part due to other local factors. .These courses vary widely in languages, offering patterns, and goals, but they are all meant to provide the background needed for technical computer users.

Engineering is a large and important part of the technological workforce; in 2000, there were approximately 60,000 engineering graduates and 37,000 computer science graduates out of approximately 400,000 graduates total in science and technology fields (National Science Board, 2004). Improvements in how computing is taught in this area will have positive effects on both engineering and other technical fields with similar goals, but a less-developed tradition.

The instructors will be recruited in New England, so that the travel distance to meetings will be reasonable. As there are 35 schools with accredited engineering programs in New England, we expect to recruit participants from a diverse set of institutions—large and small, public and private.

Supporting *Commons* Leaders

The overall project will be organized and facilitated by the leaders of the pilot projects, Josh Tenenberg and Sally Fincher. There are a number of sequenced activities that each regional leader will need to undertake, which can be daunting even for educators with leadership experience. These include recruiting participants (which might involve arranging for substitutes for teaching or complete course buyouts); negotiating monthly meeting times among many participants with conflicting schedules; arranging meeting venues; designing individual *Commons* activities (adapting existing *Commons* structure and materials); planning individual meetings; monitoring the progress and contributions of the participants—both during and outside meetings; surveying the participants both formatively and summatively for evaluative feedback; and working with the other leaders on project evaluation and dissemination. Support from the pilot leaders and mutual support among the new leaders will form a community of leadership through the sharing of ideas, designs, and materials.

This support will mirror the kinds of participation and reification that will occur among regional *participants*. That is, just as individual teachers will benefit by extending their practice beyond

the boundaries of their own classrooms, so will the leaders benefit by working collaboratively throughout the duration of the project. Particular activities will include:

- Semi-annual meetings among the leaders and the project facilitators during each year of the project
- Site visits among the leaders so that each leader will visit at least one other site and each will be visited by at least one other leader. Site visits will include a peer observation of one of the monthly *Commons* meetings facilitated by the visited leader, as well as discussions and review of one another's project plans and documents;
- Monthly debriefing phone meetings among leaders for the previous monthly regional meeting, and planning for the upcoming regional meeting.
- Electronically-mediated peer review of project materials authored by each of the leaders throughout the project.

4.3 Sustaining the Regional Communities

Participants from the piloted *Commons* found the community-building to be the most important aspect of the project, and many commented that they wanted community-oriented activities to continue. A key feature of the current proposal is to make community sustenance a key objective and to design specific activities to ensure this. One way in which we propose to instantiate this is to interlink participants across regions, so that they can interact directly with members of the broader *Commons* community. There are two main ways in which regional participants will be linked with those in other regions. The first is through the peer review of portfolios across regions, where participants in one region review portfolios of participants from another region. The other form of linkage will be in hosting joint meetings among all participants in all regional *Commons* at the annual SIGCSE national symposium during the third year of this project, i.e. following the year in which participants meet regionally. Meeting face-to-face will provide cross-fertilization of ideas across *Commons* and will introduce a larger set of colleagues with shared vocabulary and repertoire with which to collaborate.

More important than the interlinking across regions is the development of a set of sustaining activities within each *Commons* following the year of monthly meetings. As part of its planned activities, each *Commons* will adopt individual plans for sustaining its individual community, though we anticipate that these are likely to share a common model. We expect that these plans will include some (or all) of the following: annual or semi-annual participant meetings; new collaborative projects; jointly-authored papers and presentations related to the *Commons* (discussed in the Dissemination section below); analysis of the participant portfolios; and discussions related to articulations between institutions. All of these activities emerged from the pilot projects; however the exact nature of these activities will be developed by each regional *Commons* by the end of the year of funded meetings, in response to their own needs and constraints, and shared between the different *Commons* leaders.

5. The Proposing Research Team

The proposing research team includes all of the Principal Investigators and Sally Fincher, who will serve as external consultant. The team as a whole is leveraging the strength of the relationships that they have already established in their work together as leaders of and participants in the *Scaffolding* and *Bootstrapping* projects described below. Each of the Principal

Investigators is a full-time faculty member in a computing department in an American university, and Sally Fincher is a full-time faculty member in a UK University. The universities represented span a range from predominantly research institutions to four-year comprehensive universities with a teaching focus. The investigators have a broad set of disciplinary expertise within computing, including artificial intelligence, human-computer interaction design, software engineering, and computer graphics. All Principal Investigators have been active in computer science education research. In addition, Sally Fincher is editor-in-chief of the journal *Computer Science Education* and Josh Tenenberg and Robert McCartney are co-editors-in-chief of ACM's *Journal on Educational Resources in Computing*.

Josh Tenenberg and Sally Fincher were co-leaders (along with Marian Petre) of the NSF-funded projects *Bootstrapping Research in Computer Science Education Research* and *Scaffolding Research in Computer Science Education* (see below). They also co-developed and ran pilot instantiations of the *Disciplinary Commons* in 2005-06. They will organize and facilitate all meetings between the regional leaders, as well as do the advance planning for the meeting among all *Commons* participants at the 2008 and 2009 SIGCSE national symposia. Josh Tenenberg will serve as coordinator for both dissemination of results and for project evaluation.

Each of the Co-Principal Investigators will serve as a leader of one of the regional *Disciplinary Commons*. Their roles include participant recruitment, planning and facilitating each monthly meeting, meeting with the other regional leaders, and documenting and evaluating their *Commons* instantiation. Additional details of their roles are provided in the Supporting Regional *Commons* Leaders section.

Because of the relative autonomy of each leader in the organization and running of its meetings, having the administrative and budgetary independence that a collaborative proposal from multiple institutions affords will greatly simplify the overall project management. Each leader/Co-PI will be responsible for budgeting for their regional meetings, as well as for leader travel to the semi-annual meetings with the other leaders.

6. Evaluation

Each of the project goals will be evaluated formatively and summatively, with the evaluation building on the evaluation of the pilot projects. The following lists the data to be collected, followed by a cross-reference matrix linking data to project objectives.

1. Formative evaluation using:
    a. monthly debriefing notes by each leader
    b. notes and discussions from site visits between regional leaders
    c. notes and discussions from semi-annual leader meetings
2. Summative evaluation using
    a. Comparison and analysis of pre and post-workshop participants surveys addressing teaching identity and practices.
    b. Post-workshop participant survey and interview addressing value and impact of participation in the *Commons*. Leaders will perform selected interviews with participants from other regions.
3. Broader Impact & sustainability
    a. Follow-up survey of participants one year after participation addressing impact of participation, and any continuation of the *Commons* communities

Table 1: Cross Reference Matrix

	Leader debriefing notes	Site visit notes	Semi-annual meeting notes	Pre/post workshop surveys	Post-workshop interviews	Follow-up survey
Participant reflective practice	☑	☑		☑	☑	☑
Cross-institutional knowledge dissemination	☑		☑	☑	☑	☑
Regional Community Building	☑	☑		☑	☑	☑
Support of Regional Leaders	☑		☑			
Sustaining Regional Communities			☑	☑	☑	☑

7. Dissemination

Dissemination is not a unitary activity. We recognize three levels of dissemination: awareness of the *Commons* as a practice and community resource; knowledge of the project so that other educators can become involved; and use of - adoption of – *Commons* practices and deliverables.

7.1 Dissemination of Awareness

One of our key dissemination mechanisms is the participants themselves: their engagement with the project and their individual engagement with, and presentation of their portfolios. Because portfolios reflect teaching practice as it is situated within a particular context, colleagues within a participant's department stand to gain considerable benefit through examination of individual portfolios. Not only do these portfolios document specific teaching and learning but they also model the use of scholarly practices within the teaching of computing. To expose other computing educators to the collection of *Commons* participants and *Commons* portfolios exposes them to the awareness of change and transformation in their own practice.

7.2 Dissemination of Knowledge

Once educators have awareness of the project, they require deeper knowledge of its process and product to know whether they want to be involved further.

Within each of the pilot instantiations, participants initiated dissemination of the instantiation to colleagues within regional conferences (Cutts et al 2006; Fincher et al 2006; Tenenberg et al 2006). This kind of dissemination will continue, and each *Commons* will plan its own dissemination activities as part of its plan for sustaining the community. The CCSC conferences,

SIGCSE regional chapters, regional conferences on the Scholarship of Teaching and Learning, and local university consortia meetings will all serve as likely media of dissemination.

The portfolio archive will also be broadly disseminated, facilitated by its being made publicly-accessible via the Internet. Its wider use, however, will require notice of its presence through mechanisms such as the SIGCSE Bulletin and email list, as well as its mention in publications associated with the *Commons* mentioned below.

7.3 Dissemination of Use

Dissemination of use is the most difficult area. Transformation in teaching and learning is neither generated nor encouraged by prescription and it is consequently difficult to require the adoption of new methods or techniques. Equally, this is the hardest area in which to discover the effectiveness of dissemination efforts, as feedback is frequently patchy, and largely concerned with complaint, not plaudit.

A primary activity of the third year of this project will be indexing the portfolio archive so that other computing educators can quickly access and compare teaching approaches across portfolios and regions in response to specific inquiries that they might have.

Use of the *Commons* is not restricted to participants in this project, and in the final year the leaders will be engaged in dissemination of the *Commons* model (via traditional publications in computing education conferences and journals). In addition, we will broaden the impact of this project by disseminating the model to educators within other disciplines, particularly the STEM disciplines.

8. Results from Previous NSF support

Josh Tenenberg served as Principal Investigator for two closely related NSF grants: *Bootstrapping Research in Computer Science Education* (DUE-0122560, $97,114, 8/15/01 – 7/31/05) and *Scaffolding Research in Computer Science Education* (DUE-0243242, $164,180, 5/15/03 – 4/31/07). Sally Fincher and Marian Petre (Open University, UK) were co-leaders on both grants. *Scaffolding* was a replication and extension of *Bootstrapping*, having the same goals and structure along with the goal of bringing both cohorts of participants in these projects into collaborative interaction.

Each funded project had the same key objectives: to develop skills in the design, conduct and management of Computer Science Education (CS Ed) research of computer science educators, and to establish and maintain research relationships that extend beyond the duration of the workshops, contributing to a research community able to sustain a constructive discourse as well as ongoing collaboration. For each grant, the mechanism for achieving this was a pair of week-long intensive workshops attended by computer science faculty offered one year apart, centered on the theory and methods of educational research, and put into practice through a shared empirical research study (what we termed an *experiment kit*). The study design and protocol was presented at the first workshop, carried out by participants in their local contexts during the intervening year, and the data was aggregated, analyzed, and interpreted during the capstone workshop, along with the planning of publication and follow up research. In total, there are 21 in the Bootstrapping cohort and 18 in the Scaffolding cohort, and each cohort included international participants. The *Bootstrapping* and *Scaffolding* model has been used in Australia and Sweden and influenced the Institute for Scholarship on Engineering Education (NSF-ESI-0227558).

What we have called an *experiment kit* is a research problem and associated data collection and evaluation materials defined by a principal investigator (in this case the workshop leaders). The experiment kit provides scaffolding for researchers new to computer science education. It includes theoretical grounding, methodological assumptions, participant recruitment guidelines, data collection protocols, evaluation protocols, and relevant literature. The experiment kit used in *Bootstrapping* was focused on the conceptual foundations (meaning-making) of programming skills in first- and second-year undergraduate students. On completion, the resultant data corpus contained 275 research subjects from 21 institutions from 6 countries, making it one of the largest research studies ever undertaken in CS Ed, notable not only for its size but for being multi-institutional and multi-national in breadth. The experiment kit used in *Scaffolding* was focused on understanding characteristics of student-generated software designs, student recognition of requirement ambiguities, and students' valuation of key design criteria. There were 314 subjects from 21 institutions in 4 countries within the data corpus.

This model of ``bootstrapping'' both individual research expertise and a community of research practitioners in discipline-specific educational research was successful in meeting its objectives, along a range of criteria. Participants reported the workshops as bootstrapping their development and practice educational researchers and in its providing them with an ongoing research community. Participants have subsequently engaged in a number of CS Ed infrastructure activities, including taking key roles in both local CS Ed initiatives in their home institutions and in international CS Ed conferences and symposia, in seeking funding for CS Ed research, in developing new research relationships, and in disseminating the *Bootstrapping* model. Many of the participants are actively engaged in joint research projects, and there has been considerable cross-fertilization of research interests and collaboration across the two cohorts, facilitated by joint meetings at the SIGCSE national symposium in 2004, 2005, and 2006. This current proposal leverages the jointly-developed knowledge and skills as well as the "social capital" developed among participants in the *Scaffolding* and *Bootstrapping* projects. It thus leverages and extends beyond prior NSF support.

To date, *Bootstrapping/Scaffolding* participants and workshop leaders have authored over 30 refereed publications describing analyses of the experiment kit data, new collaborative research undertaken by participants initiated through their participation in these projects, and dissemination of this model for research-capacity building. Key publications are (Bouvier et al., 2003), (Eckerdal et al., 2006), (Fincher et al., 2005), (Fincher and Tenenberg, 2006), (Lewandowski et al, 2005), (Sanders et al, 2005), and (Tenenberg et al, 2005) as listed in the "References Cited" document.

Robert McCartney was Principal Investigator for the NSF grant entitled *Academic Diversity in Computer Science* (DUE-9987199, $165,000, 7/1/00 – 12/31/03). This project was a CSEMS grant that provided financial aid and academic support to 36 students. Of these 36, 34 completed their degrees in a STEM discipline at UConn.

Kate Sanders is Principal Investigator for the NSF grant entitled *A Radical Approach to Object-Oriented Programming*, with Co-PI Ann Moskol (DUE-0410546, $62,476, 7/1/04 – 6/30/07). This ongoing project involves adapting an approach for teaching object-oriented programming developed at Brown University, for use at Rhode Island College, a small state college, and by doing so, making it accessible to a broad range of institutions. A textbook has been published (Kathryn E. Sanders and Andries van Dam, *Object-oriented programming in Java: A graphical approach,* Addison Wesley, 2006), and a complete set of labs are now available on the Web

(www.ric.edu/ksanders/cs201). The fourth offering of the course with this approach has just been completed, and we are preparing a final report and detailed summative evaluation.

9. Merit and Impact: addressing the review criteria

The *Disciplinary Commons* builds community through shared reflective practice among regional groups of computing educators, documented in publicly disseminated course portfolios. The members of this community will be in a position to promote reform and improvement in the teaching of computing both locally (within their institutions) and globally (regionally, nationally, and internationally). This could lead to fundamental changes in teaching and learning of computing through a process that is not just sustainable, but increases over time as the portfolio repository and the number of instructors and students affected by it grows.

Intellectual Merit: This model has intellectual merit both in its theoretical grounding and its empirical validation. It is theoretically based in the reflective practices associated with individual development and professional artistry as described by Dewey and Schön. Documenting teaching practice and reflections in the form of course portfolios is likewise grounded in the Scholarship of Teaching and Learning literature, much of this carried out in the last decade under the sponsorship of the Carnegie Foundation for the Advancement of Teaching. Empirically, this model has been piloted in two different contexts, in the UK and in the US.

The materials produced under this proposed work have the potential to change the culture of computing education: the publicly-available evaluated and reviewed course materials will be extremely useful as resources for educators, and will provide a model (and venue) for other educators who want to report their variations and improvements. The team proposing this work is qualified to do the work based on their backgrounds and experience: teaching, doing research in computing education, and collaborating with other researchers over distances.

Broader Impacts: The work proposed here has direct consequence on teaching and learning; while the participants learn to produce and evaluate course portfolios they will be simultaneously be applying what they have learned in the *Commons* to their classes. As the participants bring reflective and collaborative practices back to their home institutions, it will promote local change within a large number of different contexts. Most significantly, the participants will be part of a regional community, with deep understanding of the teaching and learning in classrooms at a variety of other institutions serving different student populations, giving them perspectives that few educators obtain. Collaborations among members of these communities (and others who are brought in) have the potential for innovations that are regional and national in scope.

Integration of Research and Education: The participants in the *Commons* are both teachers (in their discipline), "students" learning reflective practices in teaching, and researchers producing and reviewing materials for publication. The process of building a portfolio is closely tied to the instruction and interactions with students. The portfolios that are produced will be available for others to use and build upon.

Integrating Diversity into NSF Programs, Projects, and Activities: The investigators on this proposal are diverse in terms of geography, gender, academic rank, and age. The real diversity in this project, however, comes from the *Commons* participants, who will be

recruited from as diverse a pool of institutions as is possible for each *Commons*—this leads to results that are more broadly applicable, and leads to communities of educators from more diverse situations.

Additional CPATH CB Review Criteria:

This project *contributes to the realization of the CPATH vision* in two ways. First, it builds communities of educators who can collaborate with each other, with people at their home institutions, and with other educators who are interested in computing. Based on their shared experience and knowledge, these will be the people with a sufficiently broad perspective to address the large non-local issues in computing education—and they will have collaborators with whom they can work.

Second, it will build a public repository of rigorously produced, peer-reviewed course portfolios. These portfolios will inform practice, allowing the dissemination of effective techniques and materials. Moreover, they will provide a starting point for others to build upon this work by producing course portfolios of their own for review and dissemination.

It is likely that this project will realize its proposed vision, goals, objectives, and outcomes. The *Disciplinary Commons* has had two pilot implementations, one in the US and one in the UK, where the sorts of outcomes we predict were observed—in particular, the participants gained a broad perspective and developed into communities based on this experience. Whether the portfolio repository will lead to a cultural shift in computing education is harder to predict, but having educators from 40-60 institutions contributing and promoting it makes it more likely.

The individuals—leaders and participants—will all be educators teaching *in the CISE disciplines.*

Transforming computing education requires transforming computing educators; this project will transform educators in multiple regions of the country. These educators will gain an increased awareness of how to evaluate the impact of changes on learning, and will be situated in communities that will support the collaborations needed to effect fundamental change.

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Biographical Sketch

Josh Tenenberg, Principal Investigator

a. Professional Preparation

San Francisco State University	Music	B.M, 1980
University of Rochester	Computer Science	M.S., 1984
University of Rochester	Computer Science	Ph.D., 1988
University of Rochester	Artificial Intelligence	Postdoctoral Research, 1988 – 1992

b. Appointments

2006-Present	Professor, Computing and Software Systems, University of Washington, Tacoma
2000-2005	Associate Professor, Computing and Software Systems, University of Washington, Tacoma
1999-2000	Associate Chair, Dept. of Mathematics and Computer Science, Indiana University South Bend
1998-1999	Associate Professor, Dept. of Mathematics and Computer Science, Indiana University South Bend
1992-1998	Assistant Professor, Dept. of Mathematics and Computer Science, Indiana University South Bend

c. Publications

i. Publications related to proposed project

a. J. Tenenberg and S. Fincher, "Opening the Door of the Computer Science Classroom: The Disciplinary Commons", *SIGCSE '07: Proceedings of the 38th SIGCSE Technical Symposium on Computer Science Education*, 2007.
b. S. Fincher and J. Tenenberg, "Using Theory to Inform Capacity-Building: Communities of Practice in Engineering Education Research", *Journal of Engineering Education*, October, 2006.
c. J. Tenenberg and L. Murphy, "Knowing what I know: an investigation of undergraduate knowledge and self-knowledge of Data Structures", *Computer Science Education*, 15(4), 2005.
d. J. Tenenberg and Q. Wang, "Using course portfolios to create a disciplinary commons across institutions," *Seventh Annual Northwestern Regional Conference of the Consortium for Computing Sciences in Colleges*, Bothell, WA, October 2005. Proceedings in *The Journal of Computing Sciences in Colleges*, 2005.
e. .J. Tenenberg, S. Fincher, K. Blaha, D. Bouvier, T. Chen, D. Chinn, S. Cooper, A. Eckerdal, H. Johnson, R. McCartney, A. Monge, J. Moström, M. Petre, K. Powers, M. Ratcliffe, A. Robins, D. Sanders, L. Schwartzman, B. Simon, C. Stoker, A. Elliott Tew, T. VanDeGrift, "Students Designing Software: a Multi-National, Multi-Institutional Study", *Informatics in Education*, 4(1), 143-162, 2005.

ii. Other significant publications

a. Bacchus, F., Tenenberg, J., and Koomen, H., "A Non-Reified Temporal Logic," *Artificial Intelligence* 52(1), 1991.
b. Allen, J., Kautz, H., Pelavin, R., and Tenenberg, J., *Reasoning about Plans*, Morgan Kaufmann, 1991.
c. Tenenberg, J., "Abandoning the Completeness Assumptions: A Statistical Approach to Solving the Frame Problem," *International Journal of Expert Systems*, 3(3,4), 1991.
d. Whitehead, S., Karlsson, J., Tenenberg, J., "Learning Multiple Goal Behavior via Task Decomposition and Dynamic Policy Merging," in *Robot Learning*, Sridhar and Connel (eds.), MIT Press, 1993.
e. Yang, Q., Tenenberg, J., and Woods, S., "On the Implementation and Evaluation of Abtweak," *Computational Intelligence*, 12, 1996.

d. Synergistic Activities

- ***i.*** Co-Editor-in-Chief, *Journal on Educational Resources in Computing,* Association of Computing Machinery, June 2006-present.
- ***ii.*** PI for DUE-0122560, *Bootstrapping Research in Computer Science Education* and DUE-0243242, *Scaffolding Research in Computer Science Education.*
- ***iii.*** Nominated to Faculty Colloquium on Excellence in Teaching (FACET), 1997, and received Teaching Excellence Recognition Award, 1997, 1998, Indiana University South Bend (peer-awarded).
- ***iv.*** Review of papers and proposals for Computer Science Education, International Journal of the Commons, International Computing Education Research Workshop, Australasian Computing Education Conference, W.M. Keck Foundation, NSF Division of Undergraduate Education, Journal of Engineering Education, Annual Midwest Small College Computing Conference, National Conference on Artificial Intelligence, International Joint Conference on Artificial Intelligence, International Conference on Tools for Artificial Intelligence, International Conference on Temporal Representation and Reasoning, Florida AI Symposium, Artificial Intelligence, Expert Systems: Research & Applications, Journal of Logic and Computation, National Science Foundation, Journal of Experimental and Theoretical Artificial Intelligence, IEEE Transactions on Systems, Man and Cybernetics, Journal of the Association for Computing Machinery, 1986-present.
- ***v.*** Founding faculty sponsor, student chapter of the Association of Computing Machinery at Indiana University, 1992-1998. Focus on attracting non-traditional students to the discipline.

e. Collaborators & Other Affiliations

i. Collaborators and Co-editors

Richard Anderson, University of Washington; Ruth Anderson, University of Virginia; Dennis Bouvier, Saint Louis University; Sue Fitzgerald, Metropolitan State University ; Alicia Gutschow, Blue Ridge Community College; Susan Haller, University of Wisconsin, Parkside ; Diane Horton, University of Toronto, Canada; Gary Lewandowski, Xavier University; Raymond Lister, University of Technology, Sydney, Australia; Renee Mccauley, College of Charleston; John Mctaggart, Drake University; Briana Morrison, Southern Polytechnic State University; Laurie Murphy, Pacific Lutheran University; Christine Prasad, UNITEC Institute of Technology, New Zealand; Brad Richards, Vassar College; Kathryn Sanders, Rhode Island College; Terry Scott, University of Northern Colorado; Dermot Shinners-Kennedy, University of Limerick, Ireland; Lynda Thomas, University of Wales, Aberystwyth, UK; Suzanne Westbrook, University of Arizona; Carol Zander, University of Washington, Bothell; Marian Petre, Open University, UK; Sally Fincher, University of Kent at Canterbury, UK; Tammy VanDeGrift, University of Washington; Anna Eckerdal, Uppsala University; Robert McCartney, University of Connecticut; Alvaro Monge, California State University Long Beach; Hubert Johnson, Montclair State University; Tzu-Yi Chen, Pomona College; Leslie Schwartzman, Roosevelt University; Anthony Robins, University of Otago, New Zealand; Mark Ratcliffe, University of Wales, Abersytwyth; Donald Chinn, University of Washington, Tacoma; Jan Erik Mostrom, Umea University; Beth Simon, University of San Diego; Ken Blaha, Pacific Lutheran University; Dean Sanders, Northwest Missouri State University; Allison Elliott Tew, Georgia Institute of Technology; Steve Cooper, St. Joseph's University; Kris Powers, Berry College; Carol Stoker, Azusa Pacific University; Jeffrey Weiss, Frank Russell Company; Janet Ash, Green River Community College; Qi Wang, Tacoma Community College; Ravi Gandham, Bellevue Community College; Phyllis Topham, Shoreline Community College; Richard Hoagland, South Sound Community College; John Staneff, Pierce Community College; Michael Gelotte, Bellevue Community College; Tony Clear, Auckland University of Technology, New Zealand; Ilona Box, University of Western Sydney, Australia; Phil Prins, Seattle Pacific University; William Collins, Lafayette College;
(all affiliations are at time of co-authorship or co-editorship and might not be current)

ii. Graduate and postdoctoral advisors

Graduate Advisor:	Dana Ballard	University of Rochester, Rochester, NY, USA
Postdoctoral sponsor:	James Allen	University of Rochester, Rochester, NY, USA

iii. Thesis advisor and postgraduate-scholar sponsor

None.

Dennis J Bouvier
Southern Illinois University – Edwardsville
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Professional preparation

University of New Orleans	electrical engineering	BSEE 1985
University of New Orleans	engineering	MS 1989
University of Louisiana-Lafayette	computer science	MS 1991
University of Louisiana-Lafayette	computer engineering	PhD 1994

Appointments

2006-	Assistant Professor, Southern Illinois University-Edwardsville
2001-2005	Assistant Professor, Saint Louis University
2000-2001	Assistant Professor, University of Houston-Clear Lake
1999-2000	Assistant Professor, University of Houston-Downtown
1997-1998	Assistant Professor, Grand Valley State University
1995-1997	Assistant Professor, University of Arkansas
1994-1995	Visiting Assistant Professor, University of Arkansas
1990-1993	Teaching Assistant, University of Louisiana - Lafayette

Most Closely Related Publications:

[1] Kate Sanders, Sally Fincher, Dennis Bouvier, Gary Lewandowski, Briana Morrison, Laurie Murphy, Marian Petre, Brad Richards, Josh Tenenberg, and Lynda Thomas. A multi-institutional, multi-national study of programming concepts using card sort data. *Expert Systems*, 22(3):121-128, July 2005.

[2] Josh Tenenberg, Sally Fincher, Ken Blaha, Dennis Bouvier, Tzu-Yi Chen, Donald Chinn, Stephen Cooper, Anna Eckerdal, Hubert Johnson, Robert McCartney, and Alvaro Monge. Students designing software: a multi-national, multi-institutional study. *Informatics in Education*, 4(1):143-162, May 2005.

[3] Sally Fincher, Marian Petre, Josh Tenenberg, Ken Blaha, Dennis Bouvier, Tzu-Yi Chen, Donald Chinn, Stephen Cooper, Anna Eckerdal, Hubert Johnson, and Robert McCartney. A multi-national, multi-institutional study of student-generated software designs. In *4th Finnish/Baltic Sea Conference on Computer Science Education*, pages 1-8, October 2004.

[4] Sally Fincher, Marian Petre, Josh Tenenberg, Ken Blaha, Dennis Bouvier, Tzu-Yi Chen, Donald Chinn, Stephen Cooper, Anna Eckerdal, and Hubert Johnson. A multi-national, multi-institutional study of student-generated software. In Ari Korhonen and Lauri Malmi, editors, *Kolin Kolistelut - Koli Calling Proceedings*, pages 20-28, September 2004.

[5] Bouvier, Dennis. Pilot Study: Living Flowcharts in an Introduction to Programming Course. *ACM SIGCSE Bulletin*, pages 293-295, February 2003.

Other Significant Publications:

[1] Dennis Bouvier. Integrating Graphics and Visual Computing Topics into the CS Curriculum. *Journal of Consortium of Computer Sciences in Colleges*. 19:1. pages 159 – 165. October 2003.

[2] Bouvier, D., "Assignment: Scene Graphs", paper published in Conference Abstracts and Applications of the 29th Annual Conference on Computer Graphics and Interactive Techniques (SIGGRAPH 2002), pages 42 – 45. July 2002.

[3] Dennis Bouvier. From Pixels to Scene Graphs: The Evolution of Computer Graphics Courses. *Conference Abstracts and Applications of the 28th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2001), Los Angeles, CA, pages 52 - 55. August 2001.
[4] Dennis Bouvier. Interpolative Initiation: An Efficient Volume Rendering Algorithm. *Proceedings of the International Conference on Imaging Science, Systems, and Technology*, July 1998.
[5] Dennis Bouvier. Versions and Standards of HTML. *ACM Applied Computing Review*, 3:2, Special Issue on the World Wide Web, pages 9-15. 1995.

Synergistic Activities:

NSF Workshop participant: *Integrating Human Computer Interaction in Computing Curricula* (2003)
NSF Workshop participant: *Bootstrapping Research in Computer Science Education* (2002-2003)
Local Arrangements Chair, 2005 ACM SIGCSE (St. Louis)

Collaborators: (last 48 months)

Richard Anderson, University of Washington, Seattle; Ruth Anderson, University of Virginia; Elizabeth Adams, James Madison University; Dennis Bouvier, Southern Illinois University; Tzu-Yi Chen, Pomona College; Anna Eckerdal, Uppsala University (Sweden); Sally Fincher, University of Kent (UK); Sue Fitzgerald, Metropolitan St. University; Tim Fossum, SUNY Potsdam; Alicia Gutschow, Blue Ridge Community College; Susan Haller, SUNY Potsdam; John Hamer, University of Auckland (NZ); Matt Jadud, University of Kent (UK); Gary Lewandowski, Xavier University; Raymond Lister, University of Tech., Sydney (Australia); Robert McCartney, University of Connecticut; Renée McCauley, Coll. of Charleston; John McTaggart, Drake University; Briana Morrison, Southern Polytechnic State University; Jan Erik Moström, Umeå University (Sweden); Laurie Murphy, Pacific Lutheran University; Christine Prasad, UNITEC Institute of Technology (NZ); Mark Ratcliffe, University of Wales, Aberystwyth (UK); Brad Richards, University of Puget Sound; Marian Petre, Open University (UK); Terry Scott, University of Northern Colorado; Otto Seppälä , Helsinki University of Tech.(Finland); Dermot Shinners-Kennedy, University of Limerick (Ireland); Elizabeth Simon, U.C. San Diego; Josh Tenenberg, University of Washington, Tacoma; Lynda Thomas, University of Wales, Aberystwyth; Suzanne Westbrook, University of Arizona; Carol Zander, University of Washington, Bothell.

Graduate advisor:

Dennis R. Moreau

Postdoctoral and Thesis advisors and Postgraduate-Scholar Sponsor:

None.

Briana Morrison
Southern Polytechnic State University
Marietta, Georgia

Professional Preparation

Tulane University	Computer Engineering	BSE, 1987
Southern Polytechnic State University	Computer Science	MS, 1995

Appointments

2001 -	Assistant Professor, Southern Polytechnic State University
1996 – 2001	Lecturer, Southern Polytechnic State University
1995	Graduate Teaching Assistant, Southern Polytechnic State University
1987 – 1994	Staff Programmer, IBM Corporation
1986	Software Engineer Intern
1985	Teaching Assistant, Tulane University

Most Closely Related Publications

[1] R. Lister, I. Box, B. Morrison, J. Tenenberg, and S. Westbrook. "The Dimensions of Variation in the Teaching of Data Structures" In *Proceedings of ITiCSE '04,* Leeds, United Kingdom. (June 2004), pages 92-96.

[2] R. McCauley, L. Murphy, S. Westbrook, S. Haller, C. Zander, T. Fossum, K. Sanders, B. Morrison, and B. Richards. "What do successful computer science students know? An integrative analysis using card-sort measures and content analysis to evaluate graduating students' knowledge of programming concepts." *Expert Systems*. 22:3 (2005), pages 139–146.

[3]K. Sanders, S. Fincher, D. Bouvier, G. Lewandowski, B. Morrison, L, Murphy, M. Petre, B. Richards, J. Tenenberg, L. Thomas, Richard Anderson, Ruth Anderson, S. Fitzgerald, A. Gutschow, S. Haller, R. Lister, R. McCauley, J. McTaggart, D. Prasad, T. Scott, D. Shinners-Kennedy, S. Westbrook, and C. Zander. "A multi-institutional multinational study of programming concepts using card sort data" *Expert Systems*. 22:3 (2005), pages 121–128.

[4]L. Murphy, R. McCauley, S. Westbrook, T. Fossum, S. Haller, B. Morrison, B. Richards, K. Sanders, C. Zander, and Ruth Anderson. "A Multi-Institutional Investigation of Computer Science Seniors' Knowledge of Programming Concepts" In *Proceedings of the 36th SIGCSE Technical Symposium,* (February, 2005), pages 510-514.

[5]L. Murphy, R. McCauley, S. Westbrook, B. Richards, B. Morrison, and T. Fossum. "Women Catch Up: Gender Differences in Learning Programming Concepts" In *Proceedings of the 37th SIGCSE Technical Symposium,* (March, 2006), pages 17-21.

Other Significant Publications

[1] B. Bernal-Thomas and B. Morrison. "Ventures into Capturing Effort in Programming" In 2002 ASEE Southeast conference proceedings, March 2002.

[2] B. Bernal-Thomas and B. Morrison. "The Educational Quest of Capturing Effort in Programming" In 2001 ASEE Southeast conference proceedings, March 2001.

Synergistic Activities

- Participant in *Bootstrapping Research in Computer Science Education,* a two-year workshop supported by NSF grant DUE-0122560, 2002- 2003.

- Faculty lead for successful ABET accreditation for BSCS degree, visit in Fall 2005.
- Participant in *Enhancement Workshop for Integrating Visualizations into Computer Science Education* supported by NSF grant DUE-0341148. August 2005.

Collaborators and Co-editors (last 48 months)

Richard Anderson, University of Washington, Seattle; Ruth Anderson, University of Virginia; Dennis Bouvier, Southern Illinois University; Ilona Box, University of Technology, Sydney; Venu Dasigi, Southern Polytechnic State University; Sally Fincher, University of Kent (UK); Sue Fitzgerald, Metropolitan St. University; Tim Fossum, SUNY Potsdam; Alicia Gutschow, Blue Ridge Community College; Susan Haller, SUNY Potsdam; Matt Jadud, University of Kent (UK); Gary Lewandowski, Xavier University; Raymond Lister, University of Tech., Sydney; Ren´ee McCauley, Coll. of Charleston; John McTaggart, Drake University; Laurie Murphy, Pacific Lutheran University; Christine Prasad, UNITEC Institute of Technology (NZ); Brad Richards, University of Puget Sound; Marian Petre, Open University (UK); Kathryn Sanders, Rhode Island College; Terry Scott, University of Northern Colorado; Dermot Shinners-Kennedy, University of Limerick (Ireland); Josh Tenenberg, University of Washington, Tacoma; Lynda Thomas, University of Wales, Aberystwyth; Suzanne Westbrook, University of Arizona; Carol Zander, University of Washington, Bothell.

Graduate and Postdoctoral Advisors:

Graduate advisor: Dr. Michael Murphy, Southern Polytechnic State University
Postdoctoral advisor: None.

Thesis Advisor and Postgraduate-Scholar Sponsor

None.

Kate Sanders
Rhode Island College
Providence, Rhode Island

Professional Preparation

Brown University	Greek and Latin literature; English	AB 1977
Harvard Law School	law	JD 1982
Brown University	computer science	ScM 1988, PhD 1995
University of Maryland	computer science	Postdoc 1994-1995

Appointments

2005–	Chair, Mathematics and Computer Science Dept., Rhode Island College.
2004–	Associate Professor, Rhode Island College.
1999–2004	Assistant Professor, Rhode Island College.
Fall 1998	Adjunct Professor, University of Rhode Island.
1997–1998	Visiting Assistant Professor, University of Connecticut.
1995–1997	Senior Analyst, Computing and Information Services, Brown University.
1994–1995	Postdoc, University of Maryland, College Park.
1992–1993	Research scientist, University of Massachusetts, Amherst.
1987–1992	Research assistant, Computer Science Department, Brown University.
1982–1984	Attorney, Bingham, Dana, & Gould, Boston.

Most Closely Related Publications

[1] B. Simon, T.-Y. Chen, G. Lewandowski, R. McCartney, and K. Sanders. Commonsense Computing: what students know before we teach (episode 1: sorting). In *Proceedings of the Second Annual Conference on Computer-Science Education Research.* (Canterbury, UK). (2006).

[2] R. Lister, A. Berglund, T. Clear, J. Bergin, K. Garvin-Doxas, B. Hanks, L. Hitchner, A. Luxton-Reilly, K. Sanders, C. Schulte, and J. L. Whalley. Research Perspectives on the Objects-Early Debate. *SIGCSE Bulletin.* 38:4 (2006), pages 146–165.

[3] K. Sanders and A. van Dam. *Object-Oriented Programming in Java: a graphical approach.* Addison-Wesley. (2006).

[4] R. McCartney, J.-E. Moström, K. Sanders, and O. Seppälä. Take Note: the effectiveness of novice programmers' annotations on examinations. *Informatics in Education.* 4:1 (2005), pages 69–86.

[5] K. Sanders, D. Bouvier, S. Fincher, G. Lewandowski, B. Morrison, L. Murphy, M. Petre, J. Tenenberg, L. Thomas, R. J. Anderson, R. E. Anderson, S. Fitzgerald, A. Gutschow, S. Haller, M. Jadud, R. Lister, R. McCauley, J. McTaggart, C. Prasad, B. Richards, T. Scott, D. Shinners-Kennedy, S. Westbrook, and C. Zander. What are they thinking?: a multi-institutional study of novice programmers' understanding of computer-science concepts using card-sort data. *Expert Systems.* 22:3 (2005), pages 121–128.

Other Significant Publications

[1] J. Boustedt, A. Eckerdal, R. McCartney, J.-E. Moström, M. Ratcliffe, K. Sanders, and C. Zander. Threshold concepts in computer science: do they exist and are they useful? In *Proceedings of SIGCSE-07.* (Covington, Kentucky). (2007). (to appear).

[2] A. Eckerdal, R. McCartney, J.-E., Moström, M. Ratcliffe, K. Sanders, and C. Zander. Putting Threshold Concepts into Context in Computer-Science Education. In *Proceedings of ITiCSE-06.* (Bologna, Italy). (2006).

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[3] Renée McCauley, Laurie Murphy, Suzanne Westbrook, Susan Haller, Carol Zander, Timothy Fossum, Kate Sanders, Briana Morrison, Brad Richards, and Ruth Anderson. What Do Successful Computer Science Students Know? An integrative analysis using card-sort metrics and content analysis to evaluate graduating students' knowledge of programming concepts. *Expert Systems.* 22:3 (2005), pages 147–159.

[4] G. Lewandowski, A. Gutschow, R. McCartney, K. Sanders, and D. Shinners-Kennedy. What Novice Programmers Don't Know. In *Proceedings of the First International Computing Education Research Workshop.* Seattle, Washington (2005).

[5] R. Lister, E. Adams, S. Fitzgerald, W. Fone, J. Hamer, M. Lindholm, R. McCartney, J. Moström, K. Sanders, O. Seppälä, B. Simon, and L. Thomas. A multi-national study of reading and tracing skills in novice programmers. *SIGCSE Bulletin.* Vol. 36, No. 4, pp. 119–150 (December 2004).

Synergistic Activities

2002-2003	Participant, NSF-supported Workshop "Bootstrapping Computer Science Education" (DUE-0122560) (Tacoma, WA, June 7-11, 2003 and June 2002).
2002-2003	Local Arrangements Co-Chair, CCSCNE-03
1994	Advisor, Richard Montgomery High School team, Second Annual University of Maryland Robotics Competition

Collaborators and Other Affiliations

(a) Collaborators and Co-Editors:

Elizabeth Adams, James Madison University; Ruth Anderson, University of Virginia; Richard Anderson, University of Washington, Seattle; Joe Bergin, Pace University; Anders Berglund, University of Uppsala (Sweden); Jonas Boustedt, Högskolan i Gävle (Sweden); Dennis Bouvier, St. Louis University; Tzu-Yi Chen, Pomona College; Tony Clear, Auckland University of Technology (NZ); Anna Eckerdal, University of Uppsala (Sweden); Sally Fincher, University of Kent (UK); Sue Fitzgerald, Metropolitan State University; William Fone, Staffordshire University (UK); Timothy Fossum, SUNY Potsdam; Kathy Garvin-Doxas, University of Colorado; Alicia Gutschow, Blue Ridge Community College; Susan Haller, SUNY Potsdam; John Hamer, University of Auckland (NZ); Brian Hanks, Fort Lewis College; Lew Hitchner, California Polytechnic State University; Matthew Jadud, University of Kent (UK); Gary Lewandowski, Xavier University; Morten Lindholm, University of Aarhus (Denmark); Raymond Lister, University of Technology, Sydney (Australia); Andrew Luxton-Reilly, University of Auckland (NZ); Renée McCauley, College of Charleston; Robert McCartney, University of Connecticut; John McTaggart, Drake University; Briana Morrison, Southern Polytechnic State University; Ann Moskol, Rhode Island College; Jan-Erik Moström, Umeå University, Sweden; Laurie Murphy, Pacific Lutheran University; Marian Petre, Open University (UK); Christine Prasad, UNITEC Institute of Technology (NZ); Mark Ratcliffe, University of Wales (UK); Brad Richards, University of Puget Sound; Terry Scott, University of Northern Colorado; Otto Seppälä, Helsinki University of Technology (Finland); Dermot Shinners-Kennedy, University of Limerick (Ireland); Carsten Shulte, Freie Universität, Berlin (Germany); Beth Simon, University of California, San Diego; Josh Tenenberg, University of Washington, Tacoma; Lynda Thomas, University of Wales (UK); Andries van Dam, Brown University; Suzanne Westbrook, University of Arizona; Jacqueline Whalley, Auckland University of Technology (NZ); Carol Zander, University of Washington Bothell.

(b) Graduate and Postdoctoral Advisors

Graduate advisor: Professor Tom Dean, Brown University.
Postdoctoral advisor: Professor James Hendler, University of Maryland.

(c) Thesis Advisor and Postgraduate-Scholar Sponsor: none.

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Robert McCartney

Professional preparation

University of Michigan	Natural Resources	B.S., 1973
University of Michigan	Natural Resources	M.S., 1976
Brown University	Computer Science	Sc.M., 1984
Brown University	Computer Science	Ph.D., 1988

Appointments

Associate Professor
Department of Computer Science and Engineering
University of Connecticut , Storrs, Connecticut (1993 - present)

Visiting Faculty (Sabbatical)
Department of Computer Science
University of Maryland , College Park, Maryland (1999)

Assistant Professor
Department of Computer Science and Engineering
University of Connecticut , Storrs, Connecticut (1987 - 1993)

Statistician
Radiation Biology Laboratory, Smithsonian Institution
Rockville, MD (1976 - 1982)

Publications (related)

Categorizing student software designs: Methods, results, and implications. Anna Eckerdal, Robert McCartney, Jan Erik Moström, Mark Ratcliffe, and Carol Zander. *Computer Science Education,* 16(3):197-209, September 2006.

Commonsense computing: what students know before we teach (episode 1: sorting). Beth Simon, Tzu-Yi Chen, Gary Lewandowski, Robert McCartney, and Kate Sanders. In *Proc. of the 2006 int'l workshop on computing education research (ICER '06),* pp. 29–40, Canterbury, UK, 2006.

Putting threshold concepts into context in computer science education. Anna Eckerdal, Robert McCartney, Jan Erik Moström, Mark Ratcliffe, Kate Sanders, and Carol Zander. In *Proc. of the 11th Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE 2006)*, 103–107, Bologna, Italy, June 2006.

What novice programmers don't know. Gary Lewandowski, Alicia Gutschow, Robert McCartney, Kate Sanders, and Dermot Shinners-Kennedy. In *Proc. of the 1st International Computing Education Research Workshop (ICER 2005)*, pp. 1–12, Seattle, WA, October 2005.

Take note: the effectiveness of novice programmers annotations on examinations. Robert McCartney, Jan Erik Moström, Kate Sanders, and Otto Seppälä. *Informatics in Education,* 4(1):69–86, 2005.

Publications (other)

Reasoning with geometric information in digital space. Passent El-Kafrawy and Robert McCartney. *Knowledge-based Systems* 18(3-4):179–186, August 2005.

Exploring the relationship between knowledge and algorithm performance in discrete optimization. Xiaomin Zhong, Eugene Santos Jr., and Robert McCartney. In *Proc. of the 16th IEEE Int. Conf.*

on Tools with AI (ICTAI04), pp. 604–611, Washington, D.C., 2004

Inter-diagrammatic reasoning and digital geometry. Robert McCartney and Passent El-Kafrawy. In *Proc. of Third International Conference, Diagrams 2004,* pages 199–215, Cambridge, UK, 2004.

Diagram processing: computing with diagrams. Michael Anderson and Robert McCartney, *Artificial Intelligence* 145(1-2):181–226, 2003.

Synergistic Activities:

Participant in *Scaffolding research in computer science education*, a two-year workshop supported by NSF grant DUE-0243242, 2003–2004.

Co-editor-in-chief of ACM journal *Journal on Educational Resources in Computing*

Member of editorial board of journal *Computer Science Education.*

Collaborators and Co-editors: (last 48 months)
Elizabeth Adams, James Madison Univ.; Michael Anderson, Univ. of Hartford; Ken Blaha, Pacific Lutheran Univ.; Jonas Boustedt, Högskolan i Gävle; Dennis Bouvier, S. Illinois Univ.; Tzu-Yi Chen, Pomona College; Donald Chinn, Univ. of WA; Stephen Cooper, St. Joseph's Univ.; Anna Eckerdal, Uppsala Univ.; Passent El-Kafrawy, Univ. of CT; Sally Fincher, Univ. of Kent; Sue Fitzgerald, Metropolitan St. Univ.; William Fone, Staffordshire Univ.; Alicia Gutschow, Blue Ridge C.C.; John Hamer, Univ. of Auckland; Hubert Johnson, Montclair St. Univ. Paivi Kinunnen, Helsinki Univ. of Tech.; Gary Lewandowski, Xavier Univ.; Morten Lindholm, Univ. of Aarhus; Raymond Lister, Univ. of Tech., Sydney; Lauri Malmi, Helsinki Univ. of Tech.; Renee McCauley, Coll. of Charleston; Alvaro Monge, Cal. St. Univ. Long Beach; Briana Morrison, S. Poly. St. Univ.; Jan Erik Moström, Umeå University; Laurie Murphy, Pacific Lutheran Univ.; Mark Ratcliffe, Univ. of Wales; Timothy Revello, Naval Undersea Warfare Center; Anthony Robins, Univ. of Otago; Marian Petre, Open Univ.; Kris Powers, Tufts Univ.; Kathryn Sanders, Rhode Island College; Dean Sanders, NW Missouri St.; Eugene Santos, Dartmouth Univ.; Leslie Schwartzman, Roosevelt Univ.; Otto Seppälä, Helsinki Univ. of Tech.; Dermot Shinners-Kennedy, Univ. of Limerick; Beth Simon, Univ. of CA, S.D.; Carol Stoker, Azuza Pacific College; Allison Tew, Georgia Tech.; Josh Tenenberg, Univ. of WA; Lynda Thomas, Univ. of Wales; Tammy VanDeGrift, Univ. of Portland; Titus Winter, Univ. of CA, Riverside; Carol Zander, Univ. of WA; Xiaomin Zhong, Univ. of CT

Graduate and postdoctoral advisors:
Gary W. Fowler, University of Michigan
Eugene Charniak, Brown University

Graduate students (thesis) advised (Major advisor): (12)
Passent El-Kafrawy (Ph.D. 2006)(Minoufia Univ.). Timothy Revello (Ph.D. 2005)(NUWC). Karl Wurst (M.S. 1991, Ph.D. 2004)(Worcester St. College). Jung-jin Lee (Ph.D. 1998) (Catholic Univ. of Korea). Michael Anderson (Ph.D., 1995)(Univ. of Hartford), Lisa Purvis (Ph.D. 1995) (Xerox), Barbara Cuthill (Ph.D., 1992) (NIST), Christian Netter (M.S. 1998)(United Technologies). Dale Fish (M.S. 1995) (Worcester St. College), Madeleine Pukinskis (M.S. 1993) (Industry), David Towers (M.S. 1992). Robert Clark (M.S. 1992).

Current PhD Students: (2)
Bryan Bentz, Gregory Johnson.

SUMMARY PROPOSAL BUDGET YEAR 1

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

ORGANIZATION: **University of Washington**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Josh D Tenenberg**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Josh D Tenenberg - none**	0.00	0.00	0.00	$ 0	$
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	0.00	0	
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. (1) GRADUATE STUDENTS				3,600	
4. (0) UNDERGRADUATE STUDENTS				0	
5. (0) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				0	
6. (0) OTHER				0	
TOTAL SALARIES AND WAGES (A + B)				3,600	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				482	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				4,082	
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)				3,099	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 8,460					
3. SUBSISTENCE 1,226					
4. OTHER 1,000					
TOTAL NUMBER OF PARTICIPANTS (5) TOTAL PARTICIPANT COSTS				10,686	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				500	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				5,500	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				4,008	
TOTAL OTHER DIRECT COSTS				10,008	
H. TOTAL DIRECT COSTS (A THROUGH G)				27,875	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **MDTC (Rate: 56.0000, Base: 17189)**					
TOTAL INDIRECT COSTS (F&A)				9,626	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				37,501	
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)				$ 37,501	$

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

PI/PD NAME: **Josh D Tenenberg**

ORG. REP. NAME*: **Jim Enriquez**

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

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET YEAR 2

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

ORGANIZATION: **University of Washington**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Josh D Tenenberg**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Josh D Tenenberg - Professor**	**0.00**	**0.00**	**0.50**	$ **6,629**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**0.50**	**6,629**	
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)				**6,629**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**1,578**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**8,207**	
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)				**3,622**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **4,320**					
3. SUBSISTENCE **826**					
4. OTHER **1,240**					
TOTAL NUMBER OF PARTICIPANTS (**4**) TOTAL PARTICIPANT COSTS				**6,386**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**5,500**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**2,031**	
TOTAL OTHER DIRECT COSTS				**7,531**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**25,746**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **MDTC (Rate: 56.0000, Base: 19359)**					
TOTAL INDIRECT COSTS (F&A)				**10,841**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**36,587**	
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)				$ **36,587**	$

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

PI/PD NAME: **Josh D Tenenberg**

ORG. REP. NAME*: **Jim Enriquez**

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

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET YEAR 3

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

ORGANIZATION: **University of Washington**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Josh D Tenenberg**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Josh D Tenenberg - Professor**	**0.00**	**0.00**	**0.50**	$ **6,894**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**0.50**	**6,894**	
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)				**6,894**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**1,641**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**8,535**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**4,077**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **4,800**					
3. SUBSISTENCE **826**					
4. OTHER **3,480**					
TOTAL NUMBER OF PARTICIPANTS (**4**) TOTAL PARTICIPANT COSTS				**9,106**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**7,900**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**2,031**	
TOTAL OTHER DIRECT COSTS				**9,931**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**31,649**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **MDTC (Rate: 56.0000, Base: 22542)**					
TOTAL INDIRECT COSTS (F&A)				**12,624**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**44,273**	
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)				$ **44,273**	$

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

PI/PD NAME: **Josh D Tenenberg**

ORG. REP. NAME*: **Jim Enriquez**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION: **University of Washington**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Josh D Tenenberg**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Josh D Tenenberg - none**	**0.00**	**0.00**	**1.00**	$ **13,523**	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**1.00**	**13,523**	
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. (**1**) GRADUATE STUDENTS				**3,600**	
4. (**0**) UNDERGRADUATE STUDENTS				**0**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**17,123**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**3,701**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**20,824**	
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)				**10,798**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **17,580**					
3. SUBSISTENCE **2,878**					
4. OTHER **5,720**					
TOTAL NUMBER OF PARTICIPANTS (**13**) TOTAL PARTICIPANT COSTS				**26,178**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**18,900**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**8,070**	
TOTAL OTHER DIRECT COSTS				**27,470**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**85,270**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**33,091**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**118,361**	
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)				$ **118,361**	$

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

PI/PD NAME: **Josh D Tenenberg**

ORG. REP. NAME*: **Jim Enriquez**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget justification: Josh Tenenberg
CPATH proposal for 9/1/07-8/31/10

- A (Senior Personnel): This is for 1/2 month of summer salary for the PI during the second and third years of the grant. The rate of pay is based on his current salary plus expected 4% COL adjustment.

- B (Graduate Student): This is for 300 hours of work by a graduate student assistant during the first year of the grant at $12/hour. Work will include collation of existing materials and setting up computational infrastructure to be used for archiving and indexing portfolios.

- C (Fringe benefits): Calculated at the standard UW rate of 13.4% for graduate students and 23.8% for faculty.

- E (Travel):

  Travel is calculated as follows:

  Year 1: $3099.

  - $1000 for PI to attend SIGCSE conference (5 days) in Portland, OR (Car Rental, Food, Lodging)
  - $1131 for PI to attend Kick-off meeting of all regional leaders and consultant, Port Townsend, Washington. (Local transportation, lodging, and food at scheduled rates).
  - $968 for PI to attend Planning meeting of all regional leaders and consultant, Providence, Rhode Island. (Airfare, lodging, and food at scheduled rates).

  Year 2: $3622

  - $1470 for PI to attend SIGCSE conference (5 days) on East Coast (Airfare, Food, Lodging)
  - $1088 for PI to attend planning meeting of all regional leaders and consultant, Washington. (Local transportation, lodging, and food at scheduled rates).
  - $1064 for PI to attend Retrospective meeting of all regional leaders and consultant, Washington. (Local transportation, lodging, and food at scheduled rates).

  Year 3: $4077

  - $1470 for PI to attend SIGCSE conference (5 days) (Airfare, Food, Lodging)
  - $1543 for PI to attend ICER workshop (5 days) (Airfare, Food, Lodging)
  - $1064 for PI to attend Summary and Future Plans meeting of all regional leaders and consultant, Washington. (Local transportation, lodging, and food at scheduled rates).

  Note: all conference attendance will also involve a one- or two-day meeting with all regional leaders and project organizers before or after the conference.

- F. Participant support costs

  These are costs spent directly on the regional leaders who will participate in each of the "leaders" meetings as indicated above.

  Year 1: $10686

- $5346 for regional leaders to attend Kick-off meeting of all regional leaders and consultant, Port Townsend, Washington. (Airfare, local transportation, lodging, and food at scheduled rates).
- $5340 for regional leaders to attend Planning meeting of all regional leaders and consultant, Providence, Rhode Island. (Airfare, lodging, and food at scheduled rates).

Year 2: $6386

- $5646 for regional leaders to attend Retrospective meeting of all regional leaders and consultant, Washington. (Airfare, local transportation, lodging, and food at scheduled rates).
- $740 for room rental and food for each of the regional leaders to attend one-day meeting at SIGCSE symposium.

Year 3: $9106

- $2000 for room rental and food for all regional leaders and regional participants to attend one-day meeting at SIGCSE conference
- $980 for room rental and food for regional leaders to attend two-day meeting at ICER workshop
- $6126 for regional leaders to attend Summary and Future Plans meeting of all regional leaders and consultant, Washington. (Airfare, local transportation, lodging, and food at scheduled rates).

- G (Other direct costs): Year 1: $10008
  - $500 for computer video camera and headphones for computer-mediated conference calls among regional leaders and organizers, electronic storage media devoted to project, and digital tape recorder.
  - $5500 for external consultant, Sally Fincher: 10 days at $550/day.
  - $4008 for consultant travel to Kickoff and Planning meetings at Port Townsend (airfare from England, food and lodging as above)

  Year 2: $7531

  - $5500 for external consultant, Sally Fincher: 10 days at $550/day.
  - $2031 for consultant travel to Retrospective meeting (airfare from England, food and lodging as above)

  Year 3: $9931

  - $5500 for external consultant, Sally Fincher: 10 days at $550/day.
  - $2031 for consultant travel to Summary and Future Plans meeting (airfare from England, food and lodging as above)
  - $2400 for transcriptionist services for transcribing one-hour evaluative interviews with 20 regional participants sampled from across the different regions ($120 per transcription)
- I (Indirect costs): The University of Washington indirect rate of 56% is applied to all of the above direct costs.

SUMMARY PROPOSAL BUDGET

YEAR 1

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

ORGANIZATION
Southern Illinois University at Edwardsville

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Dennis J Bouvier

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Dennis J Bouvier - none**	**0.00**	**0.00**	**1.00**	$ **7,416**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**1.00**	**7,416**	
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)				**7,416**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**2,210**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**9,626**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,150**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**400**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**400**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**12,176**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **TDC (Rate: 43.0000, Base: 12176)**					
TOTAL INDIRECT COSTS (F&A)				**5,236**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**17,412**	
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)				$ **17,412**	$

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

PI/PD NAME
Dennis J Bouvier

ORG. REP. NAME*
Stephen Hansen

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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

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

ORGANIZATION
Southern Illinois University at Edwardsville

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Dennis J Bouvier

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Dennis J Bouvier - none**	**0.00**	**1.10**	**1.00**	$ **16,041**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**1.10**	**1.00**	**16,041**	
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)				**16,041**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**4,699**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**20,740**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**1,700**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **19,250**					
3. SUBSISTENCE **1,500**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**10**) TOTAL PARTICIPANT COSTS				**20,750**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**43,690**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **MTDC (Rate: 43.0000, Base: 22940)**					
TOTAL INDIRECT COSTS (F&A)				**9,864**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**53,554**	
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)				$ **53,554**	$

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

PI/PD NAME
Dennis J Bouvier

ORG. REP. NAME*
Stephen Hansen

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

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

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

ORGANIZATION
Southern Illinois University at Edwardsville

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Dennis J Bouvier

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Dennis J Bouvier - none**	**0.00**	**0.00**	**1.00**	$ **7,867**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**1.00**	**7,867**	
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)				**7,867**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**2,265**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**10,132**	
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)				**3,100**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **1,750**					
3. SUBSISTENCE **150**					
4. OTHER **3,500**					
TOTAL NUMBER OF PARTICIPANTS (**10**) TOTAL PARTICIPANT COSTS				**5,400**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**500**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**19,132**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **MTDC (Rate: 43.0000, Base: 13732)**					
TOTAL INDIRECT COSTS (F&A)				**5,905**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**25,037**	
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)				$ **25,037**	$

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

PI/PD NAME
Dennis J Bouvier

ORG. REP. NAME*
Stephen Hansen

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

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION
Southern Illinois University at Edwardsville

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Dennis J Bouvier

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Dennis J Bouvier - none**	**0.00**	**1.10**	**3.00**	$ **31,324**	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**1.10**	**3.00**	**31,324**	
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)				**31,324**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**9,174**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**40,498**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**6,950**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **21,000**					
3. SUBSISTENCE **1,650**					
4. OTHER **3,500**					
TOTAL NUMBER OF PARTICIPANTS (**20**) TOTAL PARTICIPANT COSTS				**26,150**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**900**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**500**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**1,400**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**74,998**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**21,005**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**96,003**	
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)				$ **96,003**	$

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

PI/PD NAME
Dennis J Bouvier

ORG. REP. NAME*
Stephen Hansen

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

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification: Dennis Bouvier
CPATH proposal for 9/1/07-8/31/10

A. Senior Personnel

The amounts listed for senior personnel include 1 month summer salary for the PI in each of the three years of the project and 1.1 months academic month salary in the second year, which is the year of the commons activity. The rate is based on his current salary, plus the expected 3% annual salary increase each year.

C. Fringe Benefits

Fringe benefits are based on the salary and the fringe benefit rate of 12.27% plus the cost of group insurance for each year.

E. Travel

Travel is calculated as follows. Note that the asterisked travel items are conferences at which the Co-PIs will meet before and/or after the conference.

Year 1: $2,150

- $1,500 for SIGCSE conference* (5 days) in Portland, OR; (registration, airfare, food, lodging).
- $500 for regional computing education conference(s) (e.g., CCSC-Central Plains, CCSC-Midwest, etc.) for the purpose of participant recruiting. (registration, food, lodging, and travel cost)
- $150 for non-conference related recruited visits in the Mid-West (food, mileage).

Year 2: $1,700

- $1,200 for SIGCSE conference* (5 days) somewhere on east cost; (registration, airfare, food, lodging).
- $500 for peer observation visit (airfare, food, lodging)

Year 3: $3,100

- $1,500 for ICER conference* (5 days) in San Diego, CA; (registration, airfare, food, lodging).
- $1,200 for SIGCSE conference* (5 days) somewhere on in Mid-west; (registration, airfare, food, lodging).
- $400 for regional computing education conference(s) (e.g., CCSC-Central Plains, CCSC-Midwest, etc.) for the dissemination of results. (registration, food, lodging, and travel cost)

F. Participant support costs

These funds are spent directly on participants who will take part in the Commons.

Year 2: $20,750

- $17,100 for 9 monthly meetings at SIUE; $15,750 for travel (an average of $175 per participant per meeting), and $1,350 for food (lunch at meetings at an average of $150 per meeting).
- $3,650 for participant observations – each Commons participant will make 1 visit to another participant's institution, averaging $350 for travel and $15 for lunch.

Year 3: $5,400

- $1,900 for 1 re-group meeting at SIUE; $1,750 for travel (an average of $175 per participant per meeting), and $150 for food.
- $3,500 toward attendance at regional conferences, $350 per participant.

G. Other direct costs

Year 1: $400

- $400 materials and supplies in preparation for meetings.

Year 2: $500

- $500 materials and supplies for use at 9 monthly meetings with participants.

Year 3: $500

- $500 for transcription services to transcribe interview data (interviewing Commons participants).

I. Indirect costs

The SIUE indirect rate of 43% is applied to all eligible costs.

SUMMARY PROPOSAL BUDGET

YEAR 1

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

ORGANIZATION
Southern Polytechnic State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Briana B Morrison

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Briana B Morrison - none**	**0.00**	**0.00**	**0.50**	$ **5,915**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**0.50**	**5,915**	
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)				**5,915**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**1,045**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**6,960**	
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)				**3,415**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**250**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**250**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**10,625**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Salaries & wages only (Rate: 48.0000, Base: 5915)**					
TOTAL INDIRECT COSTS (F&A)				**2,839**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**13,464**	
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)				$ **13,464**	$

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

PI/PD NAME
Briana B Morrison

ORG. REP. NAME*
Dawn Ramsey

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

1 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

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

ORGANIZATION: **Southern Polytechnic State University**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Briana B Morrison**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Briana B Morrison - none**	**0.00**	**1.66**	**1.00**	$ **18,476**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**1.66**	**1.00**	**18,476**	
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)				**18,476**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**4,313**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**22,789**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,470**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **16,800**					
3. SUBSISTENCE **2,080**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**12**) TOTAL PARTICIPANT COSTS				**18,880**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**300**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**300**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**44,439**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Salaries & wages only (Rate: 48.0000, Base: 18476)**					
TOTAL INDIRECT COSTS (F&A)				**8,868**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**53,307**	
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)				$ **53,307**	$

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

PI/PD NAME: **Briana B Morrison**

ORG. REP. NAME*: **Dawn Ramsey**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

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

ORGANIZATION
Southern Polytechnic State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Briana B Morrison

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Briana B Morrison - none**	**0.00**	**0.00**	**1.00**	$ **9,607**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**1.00**	**9,607**	
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)				**9,607**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**1,697**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**11,304**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**4,747**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **1,800**					
3. SUBSISTENCE **400**					
4. OTHER **2,400**					
TOTAL NUMBER OF PARTICIPANTS (**12**) TOTAL PARTICIPANT COSTS				**4,600**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**500**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**500**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**21,151**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Salaries & wages only (Rate: 48.0000, Base: 9607)**					
TOTAL INDIRECT COSTS (F&A)				**4,611**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**25,762**	
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)				$ **25,762**	$

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

PI/PD NAME
Briana B Morrison

ORG. REP. NAME*
Dawn Ramsey

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

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION
Southern Polytechnic State University

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Briana B Morrison

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Briana B Morrison - none**	**0.00**	**1.66**	**2.50**	$ **33,998**	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**1.66**	**2.50**	**33,998**	
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)				**33,998**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**7,055**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**41,053**	
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)				**10,632**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **18,600**					
3. SUBSISTENCE **2,480**					
4. OTHER **2,400**					
TOTAL NUMBER OF PARTICIPANTS (**24**) TOTAL PARTICIPANT COSTS				**23,480**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,050**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**1,050**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**76,215**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**16,318**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**92,533**	
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)				$ **92,533**	$

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

PI/PD NAME
Briana B Morrison

ORG. REP. NAME*
Dawn Ramsey

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Date Checked	Date Of Rate Sheet	Initials - ORG

C ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

Budget Justification:

The following is the budget justification for the request for funds for the three year NSF Proposal entitled: Collaborative Research: CPATH-CB; Disciplinary Commons in Computing Education

The grant request is to fund the following line items:

Senior Personnel:

- **Project Director, Briana Morrison will expend an equivalent of 25% effort during the summer months of year one on the activities of this program. She will expend an equivalent of 50% effort during the summer months and 17% effort during the academic year of year two on the activities of this program. She will expend an equivalent of 50% effort during the summer months of year three on the activities of this program. Salaries are expected to increase by 5% each year.**
- **Summer Benefits on the above are calculated at 17.67% and Academic Year Benefits are calculated at 29%.**

Travel:

Year One:

- **Travel for the PI to travel to the SIGCSE conference being held in Portland, Oregon - 5 days – to meet with collaborators before and/or after conference (registration, airfare, food and lodging)**
- **Travel for the PI to travel to 2 regional conferences for participant recruitment- 5 days - (registration, airfare, food and lodging)**

Year Two:

- **Travel for the PI to travel to the SIGCSE conference being held at an east coast site TBD – 5 days- to meet with collaborators before and/or after conference (registration, airfare, food and lodging)**
- **Travel for the PI to travel to another regional PI 's worksite for peer Review of participant meetings (RI site is most likely)- 2 days - (airfare, food and lodging)**

Year Three:

- **Travel for the PI to travel to the SIGCSE conference being held the in the mid-west, site TBD – 5 days- to meet with collaborators before and/or after conference (registration, airfare, food and lodging)**
- **Travel for the PI to travel to ICER conference being held in San Diego, California - 5 days - to meet with collaborators before and/or after conference (registration, airfare, food and lodging)**

- **Travel for the PI to travel to a regional conference for Project dissemination and regrouping meeting of participants- 3 days - (registration, airfare, food and lodging)**

Participant Support:

- **During year two, the twelve grant participants will each attend eight working meetings and one peer participant observation meeting. Travel is estimated between $150-$200 each/meeting, and sustenance is estimated between $15-$20 each/meeting.**
- **During year three, support for participants to attend a local conference for project dissemination and regrouping meeting (travel estimated at $150 and conference registration estimated at $200).**

Other Direct Costs:

- **Materials and supplies are estimated at $250 year one, $300 for year two and $500 for year three. These supplies include paper, flip charts, pens etc. for use during planning and participant meetings.**

Indirect costs:

- **Indirect costs will be calculated at 48% of salaries and wages as allowed. This renegotiated rate with the NIH remains the same for all 3 years.**

SUMMARY PROPOSAL BUDGET YEAR 1

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

ORGANIZATION: **Rhode Island College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Kathryn E Sanders**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kathryn E Sanders - Associate Professor**	**0.00**	**0.00**	**1.00**	$ **7,084**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.00**	**1.00**	**7,084**	
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)				**7,084**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**0**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**7,084**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ **0**					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,070**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**1,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**1,000**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**10,154**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **Total salaries and wages (Rate: 68.0000, Base: 7084)**					
TOTAL INDIRECT COSTS (F&A)				**4,817**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**14,971**	
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)				$ **14,971**	$

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

PI/PD NAME: **Kathryn E Sanders**

ORG. REP. NAME*: **Anne Pascucci**

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

1 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

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

ORGANIZATION: **Rhode Island College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Kathryn E Sanders**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kathryn E Sanders - Associate Professor**	**0.00**	**1.12**	**1.00**	$ **15,506**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**1.12**	**1.00**	**15,506**	
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)				**15,506**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**3,284**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**18,790**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ **0**					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**2,920**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **6,264**					
3. SUBSISTENCE **1,200**					
4. OTHER **30,000**					
TOTAL NUMBER OF PARTICIPANTS (**15**) TOTAL PARTICIPANT COSTS				**37,464**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**2,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**2,000**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**61,174**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
Total salaries and wages (Rate: 68.0000, Base: 15506)					
TOTAL INDIRECT COSTS (F&A)				**10,544**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**71,718**	
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)				$ **71,718**	$

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

PI/PD NAME: **Kathryn E Sanders**

ORG. REP. NAME*: **Anne Pascucci**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 3

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

ORGANIZATION: **Rhode Island College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Kathryn E Sanders**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kathryn E Sanders - Associate Professor**	**0.00**	**0.38**	**0.50**	$ **6,576**	$
2.					
3.					
4.					
5.					
6. (**0**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**1**) TOTAL SENIOR PERSONNEL (1 - 6)	**0.00**	**0.38**	**0.50**	**6,576**	
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)				**6,576**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**1,127**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**7,703**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ **0**					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				**3,840**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **446**					
3. SUBSISTENCE **450**					
4. OTHER **0**					
TOTAL NUMBER OF PARTICIPANTS (**15**) TOTAL PARTICIPANT COSTS				**896**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**0**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**0**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**0**	
6. OTHER				**0**	
TOTAL OTHER DIRECT COSTS				**0**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**12,439**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
Total salaries and wages (Rate: 68.0000, Base: 6576)					
TOTAL INDIRECT COSTS (F&A)				**4,472**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**16,911**	
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)				$ **16,911**	$

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

PI/PD NAME: **Kathryn E Sanders**

ORG. REP. NAME*: **Anne Pascucci**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION: **Rhode Island College**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Kathryn E Sanders**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Kathryn E Sanders - Associate Professor**	0.00	1.50	2.50	$ 29,166	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	1.50	2.50	29,166	
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)				29,166	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				4,411	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				33,577	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) $ 0					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				8,830	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 6,710					
3. SUBSISTENCE 1,650					
4. OTHER 30,000					
TOTAL NUMBER OF PARTICIPANTS (30) TOTAL PARTICIPANT COSTS				38,360	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				3,000	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				3,000	
H. TOTAL DIRECT COSTS (A THROUGH G)				83,767	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				19,833	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				103,600	
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)				$ 103,600	$

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

PI/PD NAME: **Kathryn E Sanders**

ORG. REP. NAME*: **Anne Pascucci**

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INDIRECT COST RATE VERIFICATION		
Date Checked	Date Of Rate Sheet	Initials - ORG

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Rhode Island Disciplinary Commons Budgetary Justification
CPATH proposal for 9/1/07-8/31/10, Kathryn Sanders, PI

- A (Senior Personnel):

  1. **Summer salary and course release.** The heart of this proposal is the year-long workshop to be held in Year 2. Considerable time will be spent during Year 1 planning this workshop, and support is requested for a month in the summer. Then, during Year 2, the PI requests 3 credits of course release, enabling her to teach approximately one fewer course while running the workshop. This course release is critical to the project, given Rhode Island College's teaching load of twelve credits per semester. At the end of Year 2, the PI requests another month in the summer, to be used in debriefing, data analysis, and writing. Finally, in Year 3, one credit of release time and 0.5 months in the summer are requested to sustain the community developed by the workshop, work with the other PIs to complete publication and dissemination, and plan for the future. The rate of pay is based on the PI's current salary, plus expected 3% increases each year.

- C (Fringe benefits):

  Fringe benefits are based on a fringe benefit rate of 40% of the academic year salary; no fringes are charged on the summer salary.

- E (Travel):

  Travel is calculated as follows:

  Year 1: $2200.

  - $1920 for SIGCSE conference* (5 days) in Portland, OR (Registration, Airfare, Food, Lodging)
  - $150 for recruiting visits to schools in Rhode Island (mileage)

  Year 2: $2920

  - $1920 for SIGCSE conference* (5 days)somewhere on East Coast, (Registration, Airfare, Food, Lodging)
  - $1000 for Peer observation visit (1 day) (Airfare, Food, Lodging)

  Year 3: $3840

  - $1920 for ICER conference* (5 days), San Diego CA, (Registration, Airfare, Food, Lodging)
  - $1920 for SIGCSE conference* (5 days)somewhere in Midwest, (Registration, Airfare, Food, Lodging)

  Note: all *'ed items involve meetings with collaborators before or after conference.

- F. Participant support costs

  These are costs spent directly on the participants who will take part in the Commons. There are costs in years 2 and 3:

  Year 2: $37,464

- $4768 for 8 monthly meetings at RIC. $3568 for mileage (average of 62 miles roundtrip x $0.48 = $29.73 per participant per meeting), plus $1200 for food (lunch at meetings, average $10 per person per meeting).
- $446 for participant observations–each participant will make 1 visit, averaging $29.73 mileage.
- $2250 – each participant travels to regional (CCSCNE) conference.
- $30,000. This item is to fund course release or (in the case of high-school teachers) substitute teachers to enable applicants to participate in the workshops. It is critical to include instructors from all levels, and experience has shown that it is difficult or impossible to get participants from high schools or the Community College, given their high teaching loads, without such assistance.

Year 3: $896

- $896 for final wrap-up meeting at RIC; $29.73 mileage and $30 lunch and snacks for each participant.

- G (Other):
  - Materials and supplies are $1000 in year 1 and another $2000 in year 2 for things like paper, flip charts, pens, etc to be used at 8 meetings with participants at RIC, plus the cost of duplicating the portfolios.
- I (Indirect costs):

  The RIC indirect rate of 68% applies *only* to Item A1 above, Salary and Course Release.

SUMMARY PROPOSAL BUDGET

YEAR 1

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

ORGANIZATION: **University of Connecticut**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Robert D McCartney**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Robert D McCartney - Associate Professor**	0.00	0.00	1.00	$ 11,239	$
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.00	11,239	
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)				11,239	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,023	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				13,262	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ 0					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				2,250	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 0					
3. SUBSISTENCE 0					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (0) TOTAL PARTICIPANT COSTS				0	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				0	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				0	
H. TOTAL DIRECT COSTS (A THROUGH G)				15,512	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **A,C,E (Rate: 52.0000, Base: 15512)**					
TOTAL INDIRECT COSTS (F&A)				8,066	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				23,578	
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)				$ 23,578	$

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

PI/PD NAME: **Robert D McCartney**

ORG. REP. NAME*: **AnnMarie White**

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Date Checked	Date Of Rate Sheet	Initials - ORG

 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

YEAR 2

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

ORGANIZATION
University of Connecticut

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR
Robert D McCartney

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Robert D McCartney - Associate Professor**	0.00	0.00	1.00	$ 11,801	$
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.00	11,801	
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)				11,801	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,242	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				14,043	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ 0					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				1,770	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 6,350					
3. SUBSISTENCE 1,230					
4. OTHER 500					
TOTAL NUMBER OF PARTICIPANTS (10) TOTAL PARTICIPANT COSTS				8,080	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				0	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				0	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				0	
H. TOTAL DIRECT COSTS (A THROUGH G)				23,893	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
A,C,E,G (Rate: 53.0000, Base: 15813)					
TOTAL INDIRECT COSTS (F&A)				8,381	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				32,274	
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)				$ 32,274	$

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

PI/PD NAME
Robert D McCartney

ORG. REP. NAME*
AnnMarie White

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INDIRECT COST RATE VERIFICATION		
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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET YEAR 3

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

ORGANIZATION: **University of Connecticut**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Robert D McCartney**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Robert D McCartney - Associate Professor**	0.00	0.00	1.00	$ 12,391	$
2.					
3.					
4.					
5.					
6. (0) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	1.00	12,391	
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)				12,391	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				2,478	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				14,869	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
equipment item 1 $ 0					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				3,313	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 4,650					
3. SUBSISTENCE 120					
4. OTHER 0					
TOTAL NUMBER OF PARTICIPANTS (10) TOTAL PARTICIPANT COSTS				4,770	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				0	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				500	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				500	
H. TOTAL DIRECT COSTS (A THROUGH G)				23,452	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **A,C,E,G (Rate: 53.0000, Base: 18682)**					
TOTAL INDIRECT COSTS (F&A)				9,901	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				33,353	
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)				$ 33,353	$

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

PI/PD NAME: **Robert D McCartney**

ORG. REP. NAME*: **AnnMarie White**

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INDIRECT COST RATE VERIFICATION		
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 ***ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION: **University of Connecticut**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Robert D McCartney**

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 CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Robert D McCartney - Associate Professor**	0.00	0.00	3.00	$ 35,431	$
2.					
3.					
4.					
5.					
6. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	0.00	0.00	0	
7. (1) TOTAL SENIOR PERSONNEL (1 - 6)	0.00	0.00	3.00	35,431	
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)				35,431	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				6,743	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				42,174	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) $ 0					
TOTAL EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)				7,333	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ 0					
2. TRAVEL 11,000					
3. SUBSISTENCE 1,350					
4. OTHER 500					
TOTAL NUMBER OF PARTICIPANTS (20) TOTAL PARTICIPANT COSTS				12,850	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				0	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				0	
3. CONSULTANT SERVICES				500	
4. COMPUTER SERVICES				0	
5. SUBAWARDS				0	
6. OTHER				0	
TOTAL OTHER DIRECT COSTS				500	
H. TOTAL DIRECT COSTS (A THROUGH G)				62,857	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				26,348	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				89,205	
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)				$ 89,205	$

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

PI/PD NAME: **Robert D McCartney**

ORG. REP. NAME*: **AnnMarie White**

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

C *ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

Budget justification: Robert McCartney
CPATH proposal for 9/1/07-8/31/10

- A (Senior Personnel):

  1. This is for 1 month summer salary for the PI each year. The rate of pay is based on his current salary, plus expected 5% increases each year on July 1.

- C (Fringe benefits):

  Fringe benefits are based on a fringe benefit rate of 18% in the first summer (2008), 19% in the second summer, 20% in the third summer.

- E (Travel):

  Travel is calculated as follows:

  Year 1: $2200.

  - $1650 for SIGCSE conference* (5 days) in Portland, OR (Registration, Airfare, Food, Lodging)
  - $400 for ASEE-New England regional meeting
  - $200 for recruiting visits to schools in New England (mileage for 3-4 trips)

  Year 2: $1770

  - $1350 for SIGCSE conference* (5 days)somewhere on East Coast, (Registration, Airfare, Food, Lodging)
  - $420 for Peer observation visit (1 day) (Airfare, Food, Lodging). This is a visit by PI to observe the commons run in parallel at one of the other collaborating PI's institution, either Georgia or Illinois.

  Year 3: $3313

  - $1793 for ICER conference* (5 days), San Diego CA, (Registration, Airfare, Food, Lodging)
  - $1120 for SIGCSE conference* (5 days)somewhere in Midwest, (Registration, Airfare, Food, Lodging)
  - $400 for ASEE-New England regional meeting

  Note: all *'ed items involve meetings with collaborators before or after conference.

- F. Participant support costs

  The participants are the 10 educators being recruited from schools in New England. They will come to Storrs, CT for monthly half-day meetings during the academic year 2008-9 to meet and exchange information as part of this project. Each participant will also travel to the institution of one other participant to observe his or her teaching. They will receive no compensation for their participation: we provide transportation costs (mileage) to meetings, and will provide lunch at the Storrs meetings; we provide some travel support toward the participants attending a regional education conference in year 3.

These are costs spent directly on the participants who will take part in the Commons. There are costs in years 2 and 3:

Year 2: $8080

- $7,430 for 9 monthly meetings in Storrs. $5850 for mileage (average of $65 per participant per meeting), $1080 for food (lunch at meeting, $120 from University food services), $500 for other meeting expenses (photocopying supplies, flip charts, markers, etc.)–there will be a large amount of photocopying involved, expecially in support of the course portfolios and their reviews.
- $650 for participant observations–each participant will make 1 visit, averaging $50 mileage and $15 for lunch.

Year 3: $4770

- $770 for regrouping meeting at Storrs; $65 mileage average for each participant, $120 for lunch.
- $4000 toward attendance at ASEE regional conference, $400 per participant.

- G (Other):
  - Consultant services: $500 is budgeted in year 3 for transcription services to transcribe interview data (interviews with participants). This estimate is based on approximately 5 hours of transcribed interviews; the best current rates I have found (and used) is $1.50/minute; the $500 leaves room for 10% increase betwen now and 2009-2010.
- I (Indirect costs):

  The UConn indirect rate of 52% in year 1 and 53% in years 2 and 3 is applied to all of the above direct costs except for item F, participant support costs.

Current and Pending Support

(See GPG Section II.C.2.h 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: **Josh Tenenberg**	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title: **Portfolio Commons**

Source of Support: **Association of Computing Machinery, INC**
Total Award Amount: $ **4,990** Total Award Period Covered: **08/31/05 - 04/30/07**
Location of Project: **University of Washington, Tacoma**
Person-Months Per Year Committed to the Project. Cal:**0.48** Acad: **0.00** Sumr: **0.00**

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title: **Scaffolding Research in Computer Science Education**

Source of Support: **NSF**
Total Award Amount: $ **164,180** Total Award Period Covered: **05/01/03 - 04/30/07**
Location of Project: **University of Washington, Tacoma**
Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.27** Sumr: **0.75**

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title: **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

Source of Support: **National Science Foundation**
Total Award Amount: $ **118,361** Total Award Period Covered: **09/01/07 - 08/31/10**
Location of Project: **University of Washington, Tacoma**
Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.50** Sumr: **0.50**

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Summ:

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

Current and Pending Support

(See GPG Section II.C.2.h 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: **Dennis Bouvier**	Other agencies (including NSF) to which this proposal has been/will be submitted.

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

Project/Proposal Title: **Explorations in Parallel Volume Visualization**

Source of Support: **Unviersity of Southern Illinois - Edwardsville (SIUE)**

Total Award Amount: $ **8,000** Total Award Period Covered: **05/15/07 - 08/15/07**

Location of Project: **SIUE, Edwardsville, Illinois**

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

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

Project/Proposal Title: **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

Source of Support: **NSF**

Total Award Amount: $ **95,210** Total Award Period Covered: **09/01/07 - 08/31/10**

Location of Project: **SIUE**

Person-Months Per Year Committed to the Project. Cal: **0.00** Acad: **0.40** Sumr: **1.00**

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Current and Pending Support

(See GPG Section II.C.2.h 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: **Briana Morrison**	Other agencies (including NSF) to which this proposal has been/will be submitted.

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

Project/Proposal Title: **DUE: S-STEM: Computing Scholarships for the Economically Disavantaged and Underserved Student Population**

Source of Support: **NSF**

Total Award Amount: $ **600,000** Total Award Period Covered: **10/01/07 - 09/30/12**

Location of Project: **Southern Polytechnic State University**

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

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

Project/Proposal Title: **Collaborative research: CPATH CB: Disciplinary Commons in Computing**

Source of Support: **NSF**

Total Award Amount: $ **92,533** Total Award Period Covered: **09/01/07 - 08/31/10**

Location of Project: **Southern Polytechnic State University**

Person-Months Per Year Committed to the Project. Cal: **2.00** Acad: **0.50** Sumr: **1.50**

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Current and Pending Support

(See GPG Section II.C.2.h 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: **Kathryn Sanders**	Other agencies (including NSF) to which this proposal has been/will be submitted.

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

Project/Proposal Title: **Collaborative Research: CPATH CB: Disciplinary Commons in Computing Education**

Source of Support: **NSF: CISE: CPATH (this proposal)**
Total Award Amount: $ **103,600** Total Award Period Covered: **09/01/07 - 08/31/10**
Location of Project: **Rhode Island College**
Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.50** Sumr: **0.83**

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

Project/Proposal Title: **Collaborative Research: Commonsense Computing: what students know before we teach**

Source of Support: **NSF: DUE: CCLI**
Total Award Amount: $ **30,247** Total Award Period Covered: **01/01/07 - 12/31/08**
Location of Project: **Rhode Island College**
Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.00** Sumr: **0.92**

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

Project/Proposal Title: **A radical approach to teaching object-oriented programming**

Source of Support: **NSF: DUE: A&I grant #0410546 (done before this is to start)**
Total Award Amount: $ **62,476** Total Award Period Covered: **07/15/04 - 06/30/07**
Location of Project: **Rhode Island College**
Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.00** Sumr: **0.00**

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

Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

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

Project/Proposal Title:

Source of Support:
Total Award Amount: $ Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Summ:

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

Current and Pending Support

(See GPG Section II.C.2.h 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: **Robert McCartney**

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

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

Project/Proposal Title: **Collaborative research: CPATH CB: Disciplinary Commons in Computing Education**

Source of Support: **NSF (CNS-- CPATH CB)**

Total Award Amount: $ **89,205** Total Award Period Covered: **09/01/07 - 08/31/10**

Location of Project: **University of Connecticut**

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

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

Project/Proposal Title: **Collaborative research: Commonsense computing: what students know before we teach**

Source of Support: **NSF (DUE -- CCLI Exploratory)**

Total Award Amount: $ **30,858** Total Award Period Covered: **01/01/07 - 12/31/08**

Location of Project: **University of Connecticut, Storrs, CT**

Person-Months Per Year Committed to the Project. Cal:**0.00** Acad: **0.00** Sumr: **0.45**

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

Project/Proposal Title: **Uconn-Dubai Initiative**

Source of Support: **Dubai Education Council**

Total Award Amount: $ **450,514** Total Award Period Covered: **02/01/07 - 01/31/08**

Location of Project: **University of Connecticut**

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

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

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

FACILITIES, EQUIPMENT & OTHER RESOURCES

FACILITIES: Identify the facilities to be used at each performance site listed and, as appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Use "Other" to describe the facilities at any other performance sites listed and at sites for field studies. USE additional pages as necessary.

Laboratory:

Clinical:

Animal:

Computer:

Office: **Required resources from the host institution (the University of Washington) include administrative support for administering the grant and for carrying out the meetings among the Co-PI's. The University of Washington, one of the premier research institutions in the United States,**

Other:

MAJOR EQUIPMENT: List the most important items available for this project and, as appropriate identifying the location and pertinent capabilities of each.

OTHER RESOURCES: Provide any information describing the other resources available for the project. Identify support services such as consultant, secretarial, machine shop, and electronics shop, and the extent to which they will be available for the project. Include an explanation of any consortium/contractual arrangements with other organizations.

OFFICE FACILITIES (continued):

has extensive experience with all aspects of grant administration. There has been a significant commitment of statewide funds for supporting the growth of UW Tacoma's new Institute of Technology, in which the Principal Investigator is a faculty member. As such, there are highly skilled local administrative personnel to support all aspects of meeting organization.

FACILITIES, EQUIPMENT & OTHER RESOURCES

FACILITIES: Identify the facilities to be used at each performance site listed and, as appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Use "Other" to describe the facilities at any other performance sites listed and at sites for field studies. USE additional pages as necessary.

Laboratory: **Possible use of Usability Lab to record participant meetings. Capacity of 20, ability to video-tape, sound record meetings. Available with prior reservation.**

Clinical: **None.**

Animal: **None.**

Computer: **None.**

Office: **None.**

Other:

MAJOR EQUIPMENT: List the most important items available for this project and, as appropriate identifying the location and pertinent capabilities of each.

None.

OTHER RESOURCES: Provide any information describing the other resources available for the project. Identify support services such as consultant, secretarial, machine shop, and electronics shop, and the extent to which they will be available for the project. Include an explanation of any consortium/contractual arrangements with other organizations.

FACILITIES, EQUIPMENT & OTHER RESOURCES

FACILITIES: Identify the facilities to be used at each performance site listed and, as appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Use "Other" to describe the facilities at any other performance sites listed and at sites for field studies. USE additional pages as necessary.

Laboratory: **N/A**

Clinical: **N/A**

Animal: **N/A**

Computer: **N/A**

Office: **N/A**

Other: **RIC has all the facilities needed for this project: pleasant meeting rooms with AV equipment, conveniently located near the dining facilities, and parking for the participants.**

MAJOR EQUIPMENT: List the most important items available for this project and, as appropriate identifying the location and pertinent capabilities of each.

See above.

OTHER RESOURCES: Provide any information describing the other resources available for the project. Identify support services such as consultant, secretarial, machine shop, and electronics shop, and the extent to which they will be available for the project. Include an explanation of any consortium/contractual arrangements with other organizations.

N/A

FACILITIES, EQUIPMENT & OTHER RESOURCES

FACILITIES: Identify the facilities to be used at each performance site listed and, as appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Use "Other" to describe the facilities at any other performance sites listed and at sites for field studies. USE additional pages as necessary.

Laboratory:

Clinical:

Animal:

Computer: **The PI has a number of personal computers, and access to a networked file system maintained by Engineering Computing Services. The internet access (wired and wireless) is sufficient for online teleconferencing with collaborators.**

Office: **The PI has his own office, plus access to facilities in his department office (which is directly across a hallway).**

Other: **In CSE Department space there are meeting rooms with wireless internet access, projectors, and whiteboards available for the monthly meetings in Storrs.**

MAJOR EQUIPMENT: List the most important items available for this project and, as appropriate identifying the location and pertinent capabilities of each.

OTHER RESOURCES: Provide any information describing the other resources available for the project. Identify support services such as consultant, secretarial, machine shop, and electronics shop, and the extent to which they will be available for the project. Include an explanation of any consortium/contractual arrangements with other organizations.

There is secretarial support in the department office to provide help with photocopying, dealing with meeting arrangements, handling money and making travel arrangements. Additionally there is a scanner for scanning written documents for analysis and electronic distribution.

Georgia Institute of Technology
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(404) 894-3152
Fax: (404) 853-9378

Mark Guzdial
guzdial@cc.gatech.edu
(404) 894-5618

January 4, 2007

Dr. Josh Tenenberg
Computing and Software Systems
Institute of Technology
University of Washington, Tacoma
Campus Box 358426
1900 Commerce St
Tacoma WA 98402-3100

Dear Josh:

I am very happy to provide a letter of support for the Disciplinary Commons proposal to NSF CPATH. I believe this has great potential to transform the attitudes and approaches of computing educators.

Although unable to participate in this proposal, we intend to work with the consortium, with a goal of mirroring their work by running a "vertical" Commons. Computing education as a field is at a critical point in its development. Students misperceive what computing is about, at the same time that computing education is taking room in high schools across the country. There is an important need to have university and high school teachers communicate about how to teach and what to teach in computing. Our goal is to engage computing educators teaching at all levels in the State of Georgia as part of our NSF *Broadening Participation in Computing* project "Georgia Computes!". This will be similar in constituency to the model of the Rhode Island Commons, and we would expect to share ideas and experiences with the Commons leaders.

In this way, we shall be able to sustain the work of the Disciplinary Commons financially as well as providing intellectual support.

Sincerely,

Dr. Mark Guzdial
Professor, Director of Undergraduate Programs
College of Computing
Georgia Institute of Technology

INDIANA UNIVERSITY

OFFICE OF THE
VICE CHANCELLOR FOR
ACADEMIC AFFAIRS
AND DEAN OF THE
FACULTIES

December 18, 2006

Professor Josh Tenenberg
Computing and Software Systems
Institute of Technology
University of Washington, Tacoma
Campus Box 358426
1900 Commerce St
Tacoma WA 98402-3100

Dear Professor Tenenberg,

I am writing in enthusiastic support of your proposal to the National Science Foundation for a "Disciplinary Commons in Computing Education." As the director of the Scholarship of Teaching and Learning Program at Indiana University and as vice president of the International Society for that Scholarship of Teaching and Learning, I can speak to the strong potential in such a commons for the advancement of teaching and thus the advancement of learning in diverse disciplines. This initiative would put computer science at the forefront of the movement to understand the relationship between teaching and learning and the ways of moving higher education faculty toward more intentional teaching practice. The shape of the initiative is strategic and offers a structure that can serve as a model for other disciplines.

My experience with course portfolios, through the Pew Charitable Trust-funded Peer Review of Teaching Project, supports your use of this mechanism to document and share what higher education faculty know about teaching and student learning. The highly structured form of course portfolios, together with the purposeful dissemination described in your project, will allow computing educators to share what they know with their colleagues. Moreover, gathering in groups to write these course portfolios will allow the faculty members access to a social structure that supports meaningful teaching development through reflection, critique, and revision.

The movement to situate questions of learning and teaching within the disciplines is a promising one for higher education being taken up all over the world. Your project positions computer science take a lead in these discussions. I hope that you will keep myself and Indiana University apprised of your work so that we can use the insights into computer science education and also adapt the more broadly transferable components that will no doubt be generated by the portfolios and the public Internet archive.

Sincerely,

Jennifer Meta Robinson, Ph.D.
Campus Instructional Consulting, Director
Dept. of Communication and Culture, Lecturer
Indiana University
Franklin Hall 004
Bloomington, Indiana 47405-1223

Bryan Hall 109
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812-855-2809
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Timeline for *Disciplinary Commons*

Year 1: Planning the *Commons* (Sept. 1, 2007 – Aug. 31, 2008)		
When/Where	**What/Who**	**To do**
Meeting 1 January, 2008 Port Townsend, WA	Kick-off meeting: 4 days. Project organizers and regional leaders	• Recruitment: possibilities & strategies • *Commons* content: possibilities & variations • Local adaptations/instantiations of the common *Commons* model
Meeting 2 March, 2008 Portland, OR	Touch base: 1-day at SIGCSE symposium Project organizers and regional leaders	• Examining evaluation requirements • Sharing recruitment strategies
Meeting 3 July/August, 2008 Providence, RI	Planning meeting: 2 days Project organizers and regional leaders	• Timetables: Month-to-month planning • Settle on evaluation plan "common core"
Year 2: Running the *Commons'* (Sept. 1, 2008 – Aug. 31, 2009)		
When	**What/Who**	**To do?**
Monthly meetings Within each region	Doing the job: Meetings of regional participants facilitated by regional leader.	Running our *Commons*
Meeting 4. Distributed At some time within each region	"Peer Observation". Each regional leader to do an observation of another regional leader's *Commons*.	Site visits to observe, review and reflect on each others' instantiations. This will require careful and documented attention: extensive field notes.
Meeting 5 March 2009 US East Coast	Touch base: 1-day at SIGCSE symposium Project organizers and regional leaders	How's it going & *crisis de nerfs*
Meeting 6	Retrospective meeting: 4 days	• Meta-portfolio presentations (i.e. our portfolios of what

June/July, 2009 Port Townsend, WA	Project organizers and regional leaders	we each did in our own *Commons*) • Retrospective (what went well, what didn't) • First look at exit-survey data (initial evaluation) • Sharing "regional" sustainability plans
		• Map year three • Not everyone works on everything • Choose thematic aspect (possible candidates: evaluation, dissemination of "results", dissemination of model, indexing & accessibility of portfolios & their content) • Concrete plans

Year 3: Extending the *Commons* (Sept. 1, 2009 – Aug. 31, 20010)

When	What	To do?
Meeting 7 September, 2009 San Diego, CA	Leaders update: 2-days at ICER Project organizers and regional leaders	Update one another on the "thematic aspects" as identified in Meeting 6: evaluation, dissemination, indexing. Specific publication plans
Interlinking regional participants at SIGCSE March, 2010 US Midwest	Participants' cross-*Commons* meeting (optional) On-going "regional" dissemination events – conference presentations; departmental & institutional events etc.	Build participants' sense of extended community & engender potential extended collaborations
Meeting 8 March, 2010, Midwest	Leaders update: 1-day at SIGCSE Project organizers and regional leaders	Update on progress on thematic aspects
Meeting 9 June, 2010 Port Townsend, WA	Summary and future plan meeting; 4 days Project organizers and regional leaders	Joint work to complete publication, reports, indexing, evaluation. Plans for extending the *Commons* in future.

Data Structures Commons

Data Structures is arguably one of the most important courses in a computer science curriculum. The course often has multiple objectives: to teach the students about different common data structures (stacks, queues, trees, etc.), to instruct students on how to select the appropriate data structure for the application, and to improve their programming skills by having them actually implement the data structures. With the proliferation of language libraries that have the most frequently used data structures already implemented, the question has been raised as to whether or not the focus of the data structures course should shift to a more in-depth understanding of the use of the specific data structures versus the implementation of the data structures (the "usage versus under-the-hood" debate).

The Data Structures *Commons* seeks to explore both methods of implementation of the Data Structures course to more specifically define a common set of learning outcomes for the course that can be satisfied with either path of instruction. By thoroughly defining the existing teaching methods and reflecting upon the current instruction methodologies through writing course portfolios, a common set of outcomes can be explored.

The Data Structures Commons will be held in the southeast United States and led by Briana Morrison, Assistant Professor at Southern Polytechnic State University. Participants will be recruited from all over the region, including Tennessee, the Carolinas, Alabama, Florida, and Georgia. Meetings will be held at Southern Polytechnic State University, centrally located for the region, just outside of Atlanta, Georgia.

SOUTHERN POLYTECHNIC STATE UNIVERSITY
University System of Georgia

SCHOOL OF COMPUTING & SOFTWARE ENGINEERING
1100 South Marietta Parkway
Marietta, GA 30060-2896
Tel: 678-915-5572 Fax: 678-915-5577
Website: http://cse.spsu.edu E-mail: computing@spsu.edu

January 11, 2007

Professor Briana Morrison
Department of Computer Science & Software Engineering
School of Computing & Software Engineering
Southern Polytechnic State University
1100 South Marietta Parkway
Marietta, GA 30060-2855

Dear Professor Morrison:

I strongly support your proposal to the National Science Foundation to fund *Data Structures Commons*, which is a component in a broader C-PATH Collaborative entitled *Disciplinary Commons in Computing Education*. Given the pivotal role of Data Structures in the computer science curriculum, this investigation will be a valuable contribution. Your proposal is well thought out, timely, and building on a strong base of previous work. I am pleased that you have taken the initiative to carefully prepare and submit this proposal.

You can count on my support and assistance in implementing this project. Thank you again for advancing the research and pedagogical agenda at SPSU.

Sincerely,

Michael G. Murphy, Ph.D., Dean and Professor

0721306

Rhode Island Board of Governors
for Higher Education
301 Promenade Street
Providence, Rhode Island 02908–5748

Telephone 401 222-6560
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RIBGHE

December 13, 2006

Commissioner
Jack R. Warner

To Whom It May Concern:

I strongly support Dr. Kathryn Sanders's request for National Science Foundation (NSF) funding to support the Rhode Island Disciplinary Commons. The Commons seeks to build a community of computing educators – and future educational leaders – in the state of Rhode Island, connecting four-year institutions, the community college, and high schools. Educators from different levels, all of whom teach introductory programming, will meet once a month during the course of an academic year to create detailed course portfolios to be shared with the larger community. The participants will reflect on their own teaching, learn from each other, create a tangible product, and become members of a community of educational leaders.

Computing education is extremely important to the future of the state of Rhode Island. We need a highly educated and computer-fluent workforce, and we particularly need to provide high quality high-tech education. This project has the potential to transform computing education in the state. I am very enthusiastic about this proposal, and will strongly encourage faculty in the state to participate.

Sincerely,

Dr. Jack Warner
Commissioner of Higher Education

The Board of Governors is an Equal Opportunity/Affirmative Action Employer

Franklin W. Olin College of Engineering

21 January 2007

Robert McCartney
Computer Science & Engineering Department
University of Connecticut
371 Fairfield Road
Unit 2155
Storrs, CT 06269-2155

Dear Robert,

I am pleased to support your CPATH Community Building proposal, "Disciplinary Commons in Computing Education." You have assembled a strong team and put together a program that is a model of what community building efforts towards revitalizing computing education should be. Your project is likely to have significant impact on the participants in the individual disciplinary commons that you create – indeed, it will *transform* its participants *into communities* – and, through them, to create a platform for national change in computing education.

Your proposal identifies the need and the opportunity for curricular change in several areas of computing education. In each of the topic areas that you have chosen, you will engage a regional community of educators in a year-long activity of mutual support, collaborative learning, and active participation in the creation of an online repository of public, peer-reviewed curricular materials. The project is carefully designed to leverage these individual efforts to create materials of broad utility, but the most significant outcome of your efforts will surely be the creation of these communities themselves. Any significant transformation of computing education must start locally and grow; your project involves the infrastructure and processes necessary to leverage these individual efforts into regional and ultimately national efforts.

We have especially discussed your efforts in the area of engineering computing and the disciplinary commons that you will lead. Over the nearly two decades that I have been a faculty member in computer science at engineering institutions, I have seen the disconnect that can occur between computing education when taught as a service course for engineers and the best of current computer science education. Too often, computing for engineers focuses solely on tools and not on the key ideas of abstraction and representation; too often it becomes a dry course focused on problem drills rather than an active learning opportunity in which students build intuitions about the broad applicability of computational thinking. In short, this is an area ripe for innovation and, in our New England region alone, there are a handful of small scale efforts in this direction. Your engineering commons would provide the support needed to grow these

isolated efforts into a more powerful community endeavor and create the infrastructure needed to nourish and spread these innovations.

I strongly support your overall proposal for disciplinary commons as well as the specific regional effort in engineering computing. I believe that this kind of community building effort is precisely what the CPATH program is about.

Sincerely,

Lynn Andrea Stein
Professor of Computer and Cognitive Science
Franklin W. Olin College of Engineering

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