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

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPRISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Geoffrey C Fox

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.

WHY THIS INFORMATION IS BEING REQUESTED:

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

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represendted groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPRISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Willie G Brown

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.

WHY THIS INFORMATION IS BEING REQUESTED:

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

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represendted groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPRISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Robert C Lacher

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.

WHY THIS INFORMATION IS BEING REQUESTED:

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

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represendted groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPRISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Sara F Stoecklin

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.

WHY THIS INFORMATION IS BEING REQUESTED:

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

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represendted groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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

Submit only ONE copy of this form **for each PI/PD and co-PI/PD** identified on the proposal. The form(s) should be attached to the original proposal as specified in GPG Section II.B. ***DO NOT INCLUDE THIS FORM WITH ANY OF THE OTHER COPIES OF YOUR PROPOSAL AS THIS MAY COMPRISE THE CONFIDENTIALITY OF THE INFORMATION.***

PI/PD Name: Joe F Thompson

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.

WHY THIS INFORMATION IS BEING REQUESTED:

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

Collection of this information is authorized by the NSF Act of 1950, as amended, 42 U.S.C. 1861, et seq. Demographic data allows NSF to gauge whether our programs and other opportunities in science and technology are fairly reaching and benefiting everyone regardless of demographic category; to ensure that those in under-represendted groups have the same knowledge of and access to programs and other research and educational oppurtunities; and to assess involvement of international investigators in work supported by NSF. The information may be disclosed to government contractors, experts, volunteers and researchers to complete assigned work; and to other government agencies in order to coordinate and assess programs. The information may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records", 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records", 63 Federal Register 268 (January 5, 1998).

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 00-2

NSF99-167 **01/06/00**

FOR NSF USE ONLY

NSF PROPOSAL NUMBER

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

INFORMATION TECHNOLOGY RESEARC

DATE RECEIVED	NUMBER OF COPIES	DIVISION ASSIGNED	FUND CODE	DUNS# (Data Universal Numbering System)	FILE LOCATION
				790877419	

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

596001138

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 ACRONYMS(S)

NAME OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Florida State University

AWARDEE ORGANIZATION CODE (IF KNOWN)

0014894000

ADDRESS OF AWARDEE ORGANIZATION, INCLUDING 9 DIGIT ZIP CODE

Florida State University
Tallahassee, FL. 32306

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

TITLE OF PROPOSED PROJECT **ITR/EWF+IM:Computer Science Curriculum and the Next Generation of Education Technologies**

REQUESTED AMOUNT	PROPOSED DURATION (1-60 MONTHS)	REQUESTED STARTING DATE	SHOW RELATED PREPROPOSAL NO., IF APPLICABLE
$ **3,447,204**	**60** months	**09/01/00**	

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

☐ BEGINNING INVESTIGATOR (GPG 1.A.3)
☐ DISCLOSURE OF LOBBYING ACTIVITIES (GPG II.D.1)
☐ PROPRIETARY & PRIVILEGED INFORMATION (GPG II.D.10)
☐ NATIONAL ENVIRONMENTAL POLICY ACT (GPG II.D.10)
☐ HISTORIC PLACES (GPG II.D.10)
☐ SMALL GRANT FOR EXPLOR. RESEARCH (SGER) (GPG II.D.12)
☐ GROUP PROPOSAL (GPG II.D.12)
☐ VERTEBRATE ANIMALS (GPG II.D.12) IACUC App. Date _____
☐ HUMAN SUBJECTS (GPG II.D.12)
Exemption Subsection _____ or IRB App. Date _____
☐ INTERNATIONAL COOPERATIVE ACTIVITIES: COUNTRY/COUNTRIES _____
☐ FACILITATION FOR SCIENTISTS/ENGINEERS WITH DISABILITIES (GPG V.G.)
☐ RESEARCH OPPORTUNITY AWARD (GPG V.H)

PI/PD DEPARTMENT
Department of Computer Science

PI/PD FAX NUMBER
315-443-4741

PI/PD POSTAL ADDRESS
Northeast Parallel Architectures Center
3-217 Center for Science and Technology
Syracuse, NY 132444100
United States

NAMES (TYPED)	High Degree	Yr of Degree	Telephone Number	Electronic Mail Address
PI/PD NAME **Geoffrey C Fox**	**Ph.D.**	**1967**	**315-443-2163**	**gcf@cs.fsu.edu**
CO-PI/PD **Willie G Brown**	**Ph.D**	**1994**	**601-974-6170**	**wbrown@jsums.edu**
CO-PI/PD **Robert C Lacher**	**Ph.D.**	**1966**	**904-644-4029**	**lacher@cs.fsu.edu**
CO-PI/PD **Sara F Stoecklin**	**Ph.D.**	**1991**	**904-599-3022**	**stoeckli@nu.cs.fsu.edu**
CO-PI/PD **Joe F Thompson**	**Ph.D.**	**1971**	**601-325-8278**	**joe@erc.msstate.edu**

CERTIFICATION PAGE

Certification for Principal Investigators and Co-Principal Investigators:

I certify to the best of my knowledge that:

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

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

Name (Typed)	Signature	Social Security No.*	Date
PI/PD **Geoffrey C Fox**		**SSN's are confidential and are not displayed *ON FASTLANE SUBMISSIONS***	
Co-PI/PD **Willie G Brown**			
Co-PI/PD **Robert C Lacher**			
Co-PI/PD **Sara F Stoecklin**			
Co-PI/PD **Joe F Thompson**			

Certification for Authorized Organizational Representative or Individual Applicant:

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

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

Debt and Debarment Certifications

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

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

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

Certification Regarding Lobbying

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

Certification for Contracts, Grants, Loans and Cooperative Agreements

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

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

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

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

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

AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	SIGNATURE	DATE
NAME/TITLE (TYPED) **Pat Maybin**		**01/03/00**

TELEPHONE NUMBER	ELECTRONIC MAIL ADDRESS	FAX NUMBER
850-644-8948	**pmaybin@mailer.fsu.edu**	**850-644-1464**

*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.

Project Summary for NSF Information Technology Research (ITR) Program
(Information Technology Education and Workforce, and Information Management areas)

Computer Science Curriculum and the Next Generation of Education Technologies

Principal Investigator: Geoffrey Fox (Florida State University)
Co-Investigators: Willie Brown (Jackson State University), Chris Lacher (Florida State University), Sara Stoecklin (Florida A and M University), Joe Thompson (Mississippi State University)
Senior Personnel: Peter Dragovitsch (Florida State University), Nancy McCracken (Syracuse University)

Rapid advances in computer technology require computer science curriculum changes that best prepare students for jobs in business, academia and government. These advances further allow new types of interactive courseware, new learning environments and new business models for educational infrastructure. This proposal weaves these themes together and will develop prototype undergraduate computer science curriculum combined with research and development in the distance and distributed learning environments that could be deployed within the next few years. Our focus is on the particular needs of Historically Black Colleges and Universities (HBCU). We will research architectures that allow modular courseware that integrates different authors and different authoring strategies. Further we assume that learning environments should allow integration of capabilities from multiple academic and commercial sources.

The major components of the project will be

- Development of interactive computer science courseware exploiting the best educational technologies and preparing tomorrow's undergraduates for careers involving computers. This courseware will be integrated into course sequences appropriate for outside use.
- Research in and prototype development of a next generation learning environment exploiting the best academic and commercial ideas in both the education specific and general information areas. This environment will support synchronous, asynchronous and interactive learning models.
- Delivery of the new courses with teachers from the participating universities and a broad-based student body.
- Assessment and evaluation of both the new curriculum material and the information technology used to prepare and deliver it.

A major result will be a networked Computer Science courseware delivery system. This courseware presented over the Internet will supplement on-campus CS curricula at HBCU's with both CS courses from other HBCU's and major CS departments around the country. It will also enable HBCU's to offer, via the Internet, courses in their own universities, which are developed at other universities. This infrastructure will build on experience gained over the last three years from teaching several regular semester Syracuse CS courses at Jackson State (an HBCU) over the Internet. Jackson State now is using this delivery technology to teach their own CS courses at Morgan State. This effort is having a significant effect on the pipeline of minority CS graduates, enhancing the quality of their education and also serving to increase the attraction of a computer science career. We have already shown the potential to be expected from enlarged effort across all the HBCUs, as well as the rewards from involving CS faculty at HBCUs both in the use and enhancement of the underlying information technology. We will enhance this activity by integrating the Florida State distance education CS curriculum into it and adding another HBCU, namely Florida A & M University.

The technology approach will be built around the concept of a collaborative portal with shared events supported in both synchronous and asynchronous mode. We will develop a new system using ideas and components from previous commercial and academic systems such as Syracuse's synchronous TangoInteractive system developed over the last two years. We will also exploit Florida State's experience using the commercial Blackboard technology and a recent evaluation of current practice from Mississippi State. We will use a distributed object framework such as Ninja from UCB or E-Speak from Hewlett-Packard and systematic use of XML metadata conforming to community standards as they are developed. A key requirement and major research issue will the ability to support course modules and tools from multiple sources interoperating with common services and interfaces.

TABLE OF CONTENTS

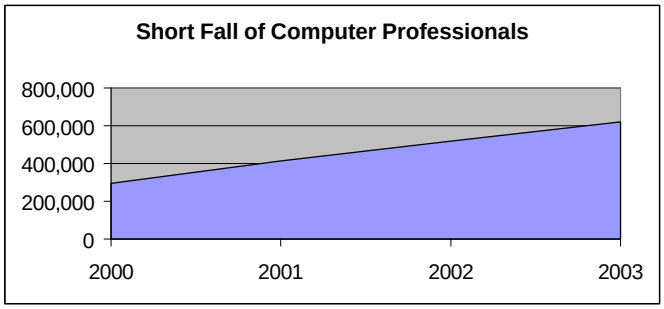
For font size and page formatting specifications, see GPG section II.C.

Section		Total No. of Pages in Section	Page No.* (Optional)*
Cover Sheet (NSF Form 1207 - Submit Page 2 with original proposal only)			
A	Project Summary (not to exceed 1 page)	1	
B	Table of Contents (NSF Form 1359)	1	
C	Project Description (including Results from Prior NSF Support) (not to exceed 15 pages) **(Exceed only if allowed by a specific program announcement/solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**	5	
D	References Cited	2	
E	Biographical Sketches (Not to exceed 2 pages each)	13	
F	Budget (NSF Form 1030, including up to 3 pages of budget justification)	3	
G	Current and Pending Support (NSF Form 1239)	0	
H	Facilities, Equipment and Other Resources (NSF Form 1363)	0	
I	Special Information/Supplementary Documentation	0	
J	Appendix (List below.) **(Include only if allowed by a specific program announcement/ solicitation or if approved in advance by the appropriate NSF Assistant Director or designee)**		
	Appendix Items:		

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

1: Motivation: Workforce, Technology and Education

The continued and growing need for computer professionals is documented in many formal and informal ways. Data from the U.S. Bureau of Labor Statistics suggest the need for a 100% increase in the production of these professionals, and the figure shows this in another way as the expected growth in shortfall [35,38,49]. It is clear that the number of graduates produced by the nation's universities will be insufficient to meet this demand, and we already see an influx of companies hiring non-US citizens who are ready and willing to fill these jobs. Additionally many companies are hiring persons with scientific degrees in other disciplines (math, biology, statistics, etc.) and training them in abbreviated fashion to fill computing jobs. NSF Science Resources Studies, the National Center for Education Statistics and the Commission on Professionals in Science and Technology have documented such trends, and the latter has in particular highlighted the a serious deficiency in the number of minority computing professionals [10]. We suggest that existing universities can only meet this need for computer science graduates by turning to distance education.



It appears that traditional approaches are not adequately addressing these trends and in this proposal we will research novel approaches to computer science education that will both increase the quality of the learning environment and allow the increase of graduating students needed by the nation. The products of the proposed work will be both new computer science curriculum and development and assessment of new technology enhancements for learning. There has been a rapid profusion of commercial training efforts in this arena [12] but we will focus on higher education courses, which have been proven to be more effective pedagogical approach for producing students with lasting knowledge. We have chosen two distinct and important student bodies as testbeds for our curriculum: firstly a network of HBCU's led by project partners JSU and FAMU who have already had substantial success in Internet based curriculum. Secondly, the state of Florida represents one of the fastest growing states with significant large and small computer-based businesses. Here the second major project partner is the FSU Office of Distributed and Distance Learning (ODDL) with institutional responsibility in this area and a new computer science curriculum as a major initial thrust. This testbed reaches in particular non-traditional students and those in the Florida Community College System (FCCS).

Teaching computer science is particularly challenging as the growing student interest is coupled with increasing difficulty in hiring good faculty and the need for constantly updating courses and whole curriculum to maintain relevance in a technology cauldron stirred with Internet time. Our testbeds are set up as institutional networks that naturally allow faculty, mentors and students to participate in the learning process and so increase the pool of qualified teachers. Course content changing with Internet time implies substantially more faculty involvement in the continuing evaluation and upgrading of the curriculum. This accentuates the need for quality learning environments that scale to many more students than a traditional classroom. This naturally suggests Internet-based distance education supported by a hierarchical network of teaching assistants, mentors and faculty. The technology component of our project will research and deploy a mix of academic and commercial capabilities to enable such a learning paradigm.

Several approaches to web-based (distance) education have been developed and applied with some success. These include the largely asynchronous database-linked commercial Blackboard system being deployed by FSU and the synchronous collaboration-based courses delivered over last 3 years between Syracuse (Fox, McCracken) JSU and other HBCU's [37]. Looking to the future, distance education will be the pioneer in the efforts to increase the efficiency of higher education and to adapt curricula to the changing demands of modern society. However, immature technology and historical reasons that are likely to change largely drive current choice between the use of asynchronous and synchronous models.

Synchronous instruction comes with an ongoing high price tag that cannot be reduced due to the human factor (faculty) and his/her limited availability in time. Asynchronous education has a higher up front cost which is a difficulty in a rapidly varying curriculum and where authoring technology is still changing rapidly. We see the needs for unified systems supporting different interactivity models, and further that this choice will be customizable to the individual learner. Indeed five years from now the seemingly oxymoron of providing individualized education in the mass production learning environment of a virtual university should become

reality. The technology component of our proposal will develop a framework that will support the key characteristics of unification of interaction paradigms and the customizability for each learner. This framework must inevitably support a variety of tools coming from a mix of academic and commercial sources. Further, the technology decisions will be structured as relatively short 6-12 month modular projects for the adjustment to a technology and tool environment moving with Internet time.

As we innovate both delivery technology and computer science curriculum, the project is fundamentally centered on its two learning testbeds described in Sec. 2 and the assessment activity of Sec. 3 to evaluate both technology and curriculum. The computer science contributions of this proposal are to both "Education and Workforce" and in research in the distributed system technology to support a virtual university. The latter is described in Sec. 4 while management and budget issues are in Sec. 5 and comments on the team in Sec. 6.

2: HBCU and Florida Testbeds

The project is centered on computer science education in two major testbeds. The largest will be a network of HBCU's starting with our partners JSU and FAMU. An essential idea behind our approach is the scaling of quality educational material by using technology that supports dissemination to many students and simultaneous training of teachers, mentors and assistants. We will implement this by the exchange of material between the participating universities: a concept successfully tested by Syracuse, JSU and Morgan State [3,4]. The next steps in this process include:

1) Identify similarities among curriculum and course content characteristics that allow categorization of courses and places where courses can be shared.
2) Identify candidate course delivery mechanisms.
3) Provide adequate infrastructure at participating colleges/universities.
4) Deliver similar course content with different technologies using flexible multi-source framework of Sec. 4.
5) Evaluate results using the assessment process of Sec. 3. This will lead to an understanding for each of several categories of courses, which technologies/software tools/environments are best suited for course delivery in both distance education and the resident classroom

The HBCU partners in existing programs will seed the network. This includes DoD PET (Programming Environment and Training) partners at ARL, ASC, ERDC and NAVO: Alcorn State University, Central State University, Clark Atlanta University, Grambling State University, Morgan State University, North Carolina A&T University, Southern University, Tennessee State University. The NASA Minority University - Space Interdisciplinary Network (MU-SPIN) Network Resource and Training Sites (NRTS) bring City College of New York (CCNY), Elizabeth City State University, Prairie View A & M University, Morgan State University, South Carolina State University, Tennessee State University, University of Texas at El Paso. The Army High Performance Computing Research Center involves Clark Atlanta University, Howard University, and Florida A & M University. The organization of these partners will be the responsibility of JSU, which has recognized that Web-based distance education technologies offer tremendous potential benefits to the HBCU/MI community, including curricular enhancement, sharing of limited resources, and collaborative teaching/learning. JSU has already developed a university-wide strategic plan for distance education and training which we will leverage in this NSF ITR proposal.

JSU will take responsibility for collaborating with the network partners to ensure that they have an adequate infrastructure to support the innovative course development and delivery. This infrastructure includes 1) suitable physical classroom facilities, 2) a reliable and sufficient connection to the Internet, and 3) on-site human resources. JSU has gained considerable expertise and experience with respect to what is needed, and effective procedures to overcome the barriers to implementation. JSU's role in this project would focus on design, planning, procurement, and installation of required equipment and connections at selected partnership institutions. Also, JSU will facilitate the training of collaborating faculty and staff. A fully equipped, and staffed, teaching and learning laboratory at JSU will allow 1) collaborative course development and 2) cost-effective local and remote instructional training with collaborating schools. Such training and support is essential to the success of this project. We intend to build upon this foundation and develop a national resource for technologies supporting electronic delivery of education and training, which will facilitate inclusion of and broaden the participation of, underrepresented groups in information technology careers. Note we do not intend to supply significant network infrastructure as part of this proposal, as NSF already has in place efforts in this area. There is for example the Educause/NSF PACI EOT Advanced Networking Project with Minority -Serving Institutions (AN-MSI) grant. We hope that membership in our network will encourage universities to upgrade their IT infrastructure, which will of course have far reaching benefits outside our project.

Faculty and staff in the network of universities will develop course content, receive courses from other institutions and deliver courses to partner schools. A result of this process will be:

1) Well-defined principles for course development and delivery.
2) A coalition of HBCU/MI colleges/universities equipped to develop, deliver and receive courses.
3) A large number of faculty, staff, and students who are more IT literate.
4) A large number of students (both students and teaching assistants) better trained for IT careers.

The second network will have some similarities – consisting of Florida community colleges linked to FSU – and is already in place. For this project, we will not actively pursue building the network, as this is the state's responsibility. Rather we will use project curriculum where appropriate and see how the different student demographic and more tightly coupled organization affect the success of our program.

The course material will be primarily aimed at undergraduate computer science students but we will include both middle/high school and graduate level courses where we have success in the past [28]. We will develop (and use pre-existing) interactive material (such as Java applets) and develop common subject specific resources such as quizzes and glossaries. As described in Sec. 4, a major challenge will be to ensure that we have identified the correct places to define standards (in XML). Further we must establish the happy compromise between total freedom in choice of authoring tools and the restrictions imposed by the capabilities of a realistic system framework. For instance, the collaboration and assessment services will support some methodologies (e.g. Java and HTML/XML) better than other specialized authoring formats for which the internal event structure and document object model is either unknown or not in accordance with standards like those of the W3C [52].

3: Assessment Plan

We will assess the effectiveness of technologies, individually and collectively, intrinsically and how they are used, and use the results to continuously improve the essential goal – computer science education for the workforce of the new millennium. Our underlying principle is to provide a flexible learning environment supporting multiple learning styles and allowing dynamic choices to be made by students, faculty, and programs. This assessment theme is very similar to some classical experimental investigations in computer science, for example, in operating systems, where specific algorithms for process management need to be evaluated for effectiveness in the context of real use by real humans. The assessment team will be led by FSU ODDL and FAMU and cover both testbeds.

Research has consistently found little significant difference in learning achievement among various distance learning environments or between distance learning environments and classroom environments [11,45,50]. Further, self-selection by students according to personal learning style needs to be recognized as an important variable. Thus we will assess taking specifically into account the learning style of the students. Our quantitative assessment will be outcomes-based, with three classes of outcomes: *success, efficiency, and satisfaction.*

- *Success outcomes* include learning outcomes, graduation rate, and employment rate.
- *Satisfaction outcomes* include all relevant populations: students (while in a class, after class completion, at program graduation, after x years of postgraduate employment), employers, faculty. We measure satisfaction with learning as well as technology acceptance and usability.
- *Efficiency outcomes* include time invested (by students, faculty, and support team per student credit hour), re-usability of courseware (across institutions as well as over time), and costs of maintenance of technology and courseware.

In two Syracuse Ph.D. theses, Lee and Sen [30,43] have explored the technology needed to track student progress through online material. The capability to monitor and datamine such information is likely to improve as this critical for commercial portals. We will include such assessment techniques in our project as they become useful in practice.

We will supplement the strategies above with a more qualitative assessment thrust, which includes:

- *External peer review:* ODDL is already establishing an external refereeing process for its courses and an external peer assessment process using faculty from peer departments in peer institutions not associated with this project. (This is in addition to, and independent of, the already existing External Advisory Board that has been used to inform ODDL and Computer Science during the setting up of the distance computer science programs for Florida community colleges.) We will expand this process to include both testbeds and

to a broader national community as represented by EOT (Education Outreach and Training) effort of the NSF PACI program and the NSF CILT Learning and Intelligent Systems center [7].

- *Customer feedback*: Using interviews and focus groups from students, faculty, academic programs, and industry to assess customer satisfaction and identify areas for change and improvement.

All of the assessment results will be used in a feedback-improvement loop to continuously improve both the technology and the courseware during and after the project. The availability of useful assessment information and its use for self-improvement, particularly on time scales shorter than a semester, is largely unavailable to standard classroom instruction. Continuous (short and long time scale) self-improvement and opening the process to all possible learning styles simultaneously are two ways in which the new systems can result in better performance over classical systems.

4: Distance Education Technology and Computer Science Research

It is unrealistic today for any one effort to build a complete online education environment. Rather one must integrate a system from a variety of different sources. These could include commercial education software providers like Blackboard [5] and WebCT [53] but even more important will be systems and technologies designed for the much larger Web browsing and e-commerce arenas. Several powerful technologies (such as CORBA and Jini) and systems (such as E-Speak and iPlanet [14,27]) are emerging as candidate frameworks to integrate distributed information systems. We intend to make use of these powerful frameworks to form the base of our virtual university. Currently we expect to use the Ninja system from UCB [36] but we have only just started detailed evaluation and expect the number of possible choices to grow.

We will build education-specific portals as a set of special services on top of this framework. These must support the special collaborative needs of education and special services such as assessment, performance (grading) support, annotation. There are also distinctive "educational objects" – quizzes, homework, glossaries as well as the curriculum pages with appropriate hierarchical structure [18]. These will need special XML support and here we will adopt local standards as necessary and evolve these as international community efforts (such as IMS [26] and the IEEE Learning Technology Standards Committee [25]) mature. We will of course pay attention to support for key capabilities such as displaying mathematics on the Web [21] and standards for graphics (Java3D, VML, X3D etc.). This distributed object based distributed system will be designed to support curriculum material built in any web authoring system and specified either statically or dynamically (from a database). This simple statement is not easy to satisfy, as it requires unification of services such as those for customization, collaboration and events. This is a key research area as such unified services are essential for the basic strategy of allowing components from multiple academic and commercial sources. A simpler version of this challenge is well-defined XML interfaces to allow interoperability of data streams.

We expect commercial portal technology to support user customization of the environment, and we have already indicated that the base service (event logging) is expected to be useful both in assessment and individualization of the learning environment. This includes two types of capabilities. Firstly the capability, probably XML based, to pick and use the components shown on a particular web-page (portal). We have designed a simple "portalML" to describe layout and source of page components and further their collaborative structure [20]. We expect this XML syntax to be a reasonable start but that we will switch to community standards as they become accepted. More interesting than this powerful but straightforward XML specification of dynamic pages, is the methodology for tracking user interactions with the user environment. As discussed in the Syracuse theses of Lee and Sen [30,43], this can be done server side when it reduces to the classic analysis of Web Server accesses logs. More interesting is the tracking of client side events where the challenge is basically datamining user relevant information. We will on one hand build in support for this as part of our event service and research extensions of the simple analyses in the two theses to automatically derive user profile and learning assessment information. This client side event information can be used to support universal access as described by Fox and Gilman from the Wisconsin Trace center [19].

Our web-based virtual university approach implies that collaboration is a service that shares web-based distributed objects [41]. Previous systems have tended to support either synchronous or asynchronous collaboration modes, but based on our current experience we will unify them for this proposal. Initial synchronous deliveries have has some success using systems like Microsoft NetMeeting, NCSA's Habanero [23] and Syracuse's TangoInteractive [47]. However the new requirements imply we will not use these, but rather build collaboration on the event service of our base (Ninja or equivalent) framework. We will allow this to support either synchronous delivery or event archiving and later delivery of a session. Session control will be implemented in XML using the generalized portalML described above [20]. We have found that developing

shared animations (for education) is too difficult in current systems like TangoInteractive, which only easily support complex collaboration-aware applications. We will use VNC [51] or equivalent technology to allow both shared display and collaboration-unaware applications, which are less flexible but much easier to author. One important research issue will be the techniques needed to provide this unified approach to collaboration.

One continual area of difficulty is the variable quality in digital audio video conferencing, and here higher speed networking and quality of service will address some of the difficulties. We will track the ANL/NCSA Access Grid project [1] at the high end, but for many educational uses commercial systems like RealAudio/Video can be used. In our multi-paradigm framework, we will allow use of the more reliable (as larger buffers) technologies when interactive audio-video interactions are not essential.

5: Management Plan and Budget

The principal investigator has substantial experience with running large multi-institutional projects funded by NSF and DARPA as both project PI and co-PI. For a project of this size, we intend a steering committee containing leaders of technical activities and site representatives. This will discuss and approve major decisions. There will be an established oversight group, which will review general approach and supply vision and connectivity to national scene. This will help in the qualitative assessment plan of Sec. 3. The proposed budget is approximately $700K per year for five years. We see that the need to iteratively develop and assess new curriculum requires the relatively long five-year duration. The budget is split into activities as follows: Technology $175K, Assessment $125K, and the remainder apart from management and meeting costs to courseware development and network building.

6: Participating Institutions

The principal investigator Geoffrey Fox has moved from Syracuse University (CSIT) to the Department of Computer Science and new School of Computational Science and Information Technology at Florida State and brings substantial experience in both collaboration technology and novel computer science (Internetics) curriculum [16,17]. This was developed and delivered with Nancy McCracken at Syracuse, Jackson State and other participants. This work was sponsored by the Programming Environment & Training (PET) effort of the DoD Major Shared Resource Centers program - led by the NSF ERC at Mississippi State. It involved regular semester undergraduate and graduate CS courses, which were later, delivered by JSU to other HBCU's – the prototype of our proposed HBCU college network. Initially funded by NSF in 1990 as an NSF Engineering Research Center (ERC), the Computational Field Simulation activity at Mississippi State is a multi-disciplinary academic research center - now funded at approximately $15M annually by NSF, DoD, NASA,

Jackson State University (JSU), is the urban university of Mississippi and enrolls approximately 6,500 students. The primary goal of the School of Science and Technology, and the new School of Engineering, is to develop top quality scientists and engineers who can advance knowledge and address the technical problems facing the nation and the world. Particularly relevant to this proposal, JSU has graduated more African Americans in Computer Science than any other university in the United States. Among African Americans in Mississippi Institutions of Higher Learning, JSU has enrolled 53% of all Chemistry majors, 54% of all Biology majors, 66% of all Computer Science majors, 69% of all Mathematics majors, and 80% of all Physics and Atmospheric Sciences majors. Thus, JSU will continue to provide significant numbers of technical graduates for the current and future workforce.

Florida Agricultural & Mechanical University, founded in 1887, is an HBCU land-grant institution, which educates approximately 12,000 minority students each year. The Computer and Information Science department has a 94% minority population of approximately 600 undergraduates and 25 graduate students. It brings expertise in assessment and the use and evaluation of Internet courses.

FSU is also represented by the ODDL, which supports distance learning with the principle that the same education should be available to all FSU students, whether residential or distance. Their current model includes strong materials-based support for teacher and learner; optimal use of Internet bandwidth for communication, interactivity, and delivery; and a mentor system that provides low-ratio student support and scalability at the faculty level. This project will leverage ODDL's existing assessment unit. ODDL and CSIT combined with a rapid expansion of the FSU computer science department reflect the commitment of FSU to the teaching of Information Technology and its use in all aspects of research and education. Note that in 1999, there were 55 courses offered on-line at FSU to a total of 1800 students; this statistic is increasing rapidly and excludes "web-enhanced" courses.

References

1) Argonne National Laboratory NCSA Alliance Access Grid Digital Conferencing System, http://www-fp.mcs.anl.gov/fl/accessgrid/default.htm
2) Barry, M. and Runyan, G., A Review of Distance-Learning Studies in the U.S. Military, *The American Journal of Distance Education.* Vol. 9, No. 3, pp. 37-47. 1995
3) Bernholdt D.E., Fox G.C., Malluhi Q., Markowski R., McCracken N., Mitra D., Podgorny M., Scavo T., *Synchronous Learning at a Distance: Experiences with Tango*, Proceeedings of SC98 Orlando, IEEE. http://www.npac.syr.edu/projects/training/Papers/sc98/
4) Bernholdt D.E., Fox G.C., McCracken N., Podgorny M., *Network-Based Remote Collaboration and Training: Progress and Plans*, Internal technical report http://www.npac.syr.edu/Projects/DoD/white-paper-collab-train-990510.html
5) Blackboard Inc is a major provider of education technologies. http://www.blackboard.com/
6) Chacon-Duque, Fabio J., *Building Academic Quality in Distance Higher Education.* University Park, PA: The Center for the Study of Higher Education, The Pennsylvania State University, Fall. 1985
7) CILT. The NSF Center for Innovative Learning Technologies, http://www.cilt.org
8) Cheng, H-C, Lehman, J., and Armstrong, P., Comparison of Performance and Attitude in Traditional and Computer Conference Classes, *The American Journal of Distance Education.* Vol. 5, No. 3, pp. 51-64. 1991.
9) Clark, B., *Comparison of Achievement of Students in On-campus Classroom Instruction versus Satellite Teleconference Instruction.* Paper presented at the National Conference on Teaching Public Administration, Charlottesville, VA, March, 1989.
10) Commission on Professionals in Science and Technology*: Professional Women and Minorities -- A Total Human Resource Data Compendium, May '97*, published by CPST http://www.cpst.org/
11) DETC, *Accredited Distance Study Degrees: Graduates and Employers Evaluate Their Worth*, Distance Education & Training Council, 1994.
12) Digitalthink.com is a typical commercial computer science training site: http://www.digitalthink.com
13) Dodd, J., *The Credibility of Distance Education.* Walton, England: Distance Education Group, The Open University. 1981.
14) E-Speak project at Hewlett-Packard, http://www.e-speak.hp.com/
15) Figueroa, L., Understanding Students' Approaches to Learning in University Traditional and Distance Education Courses. Ann Yakimovicz, ed. *Distance Learning Research Conference Proceedings, San Antonio, TX* . College Station, TX: Texas A&M University. April ,1994.
16) Fox G.C., *Internetics: Technologies, Applications and Academic Fields* Invited Chapter in Book :Feynman and Computation", edited by A.J.G. Hey, Perseus Books (1999), http://www.npac.syr.edu/users/gcf/internetics/)
17) Fox G.C., *From Computational Science to Internetics: Integration of Science with Computer Science*, Chapter in a book dedicated to John Rice of Purdue (to be published). http://www.npac.syr.edu/users/gcf/internetics2/
18) Fox G.C., Internal memo on Collaborative Educational Objects, http://www.npac.syr.edu/users/gcf/webwisdomrefs/npacwwdocs.html
19) Fox G.C., Initial discussion of use of XML for Universal Access, *Shared Places on the Web: XML for Web-based collaboration and Distance Education*, XML Developers Conference http://www.gca.org/conf/xmldev99/ Montreal August 19-20 1999, http://www.npac.syr.edu/users/gcf/montrealxmlaug99
20) Fox G.C., Initial Description of CPW (Collaborative Portal on the Web) - http://www.npac.syr.edu/users/gcf/offbeatxmloct99/
21) FSU ODDL Workshop on *Symbolic Notations on the Web*, October 8, 1999, Tallahassee, http://cologne.oddl.fsu.edu/~pdragovitsch/WS/
22) Gehlauf, D.A., Shatz, T. and Frye, T. Faculty Perceptions of Interactive Instructional Strategies: Implications for Training. *The American Journal of Distance Education.* Vol. 5, No. 3, pp. 20-28. 1991.
23) Habanero Home Page at NCSA - http://havefun.ncsa.uiuc.edu/habanero/
24) Hall, B., Ward, A.W. and Comer, C.B. Published Educational Research: an Empirical Study of Its Quality. *Journal of Educational Research.* Vol. 81, No. 3, pp. 182-189, 1988.
25) IEEE Learning Technology Standards Committee (LTSC), http://ltsc.ieee.org/

26) IMS Project from Educause, http://www.imsproject.org/
27) iPlanet e-commerce software from Sun Microsystems, http://www.sun.com/software/iplanet/
28) Java Academy for Middle and High School Students offered Spring 1999 by NPAC. http://www.npac.syr.edu/projects/k12javaspring99/
29) Jewett, F. *The Human Computer Interaction Certificate Program at Renssalaer Polytechnic Institute: a Case Study in the Benefits and Costs of a Joint Industry/University Designed Program Featuring Integrated Delivery Systems.* Seal Beach, CA: The Chancellor's Office, California State University. 1997.
30) Lee M., *Information Architecture of Interactive and Customizable Learning Environments*, Syracuse Ph.D. 2000, advisor G. Fox.
31) Lewis, L., Alexander, D. and Farris, E., *Distance Education in Higher Education Institutions.* NCES-98062. Washington, D.C.: U.S. Government Printing House. 1997.
32) Massy, W.F. Life on the Wired Campus: How Information Technology Will Shape Institutional Futures. In Diana G. Oblinger and Sean C. Gold, eds. *The Learning Revolution: The Challenges of Information Technology in the Academy.* Bolton, NY: Anker Publishing Co., 1997.
33) McClelland, J., *Adult and Vocational Education: Implications on Research for Distance Delivery.* St. Paul, MN: Minnesota Research and Development Center for Vocational Education, Univeristy of Minnesota. 1986.
34) Moore, M.G., Thompson, M.M., Quigley, B.A., Clark, C. and Goff, G.G., *The Effects of Distance Learning: A Summary of Literature.* University Park, PA: American Center for the Study of Distance Learning, 1990.
35) National Center for Education Statistics, http://nces.ed.gov/
36) Ninja project at University of Berkeley, http://ninja.cs.berkeley.edu/
37) NPAC Distance Education Technology and Classes at Graduate and Undergraduate level, http://www.npac.syr.edu/Education/Distance/
38) NSF Science Resource Studies, National Science Foundation Washington D.C. December, 1998
39) Phipps, R.A., Wellman, J.V. and Merisotis, J.P., *Assuring Quality in Distance Learning: A Preliminary Review.* Washington, D.C.: Council for Higher Education Accreditation. April, 1998.
40) Powell, R., Conway, C. and Ross, L., Effects of Student Predisposing Characteristics on Student Success. *Journal of Distance Education.* Vol. 5, No. 1, pp. 20-37. 1990.
41) Roussev V., *A Reference Architecture for Distributed Collaborative Applications*, technical report from Univ. North Carolina Collaboration Bus Project, 1999 http://www.cs.unc.edu/~dewan/cb.html
42) Russell, T.L., *The No Significant Difference Phenomenon.* Chapel Hill, NC: Office of Instructional Telecommunications, North Carolina State University. 1999.
43) Sen M., *Support of Assessment in a Web-based Database Environment*, Syracuse Ph.D. 2000, advisor G. Fox.
44) Smith, P, Dillon, C.L. and Boyce, M., A Critical Analysis of Comparative Research on Distance Learning Technologies. In Ann Yakimovicz, ed. *Distance Learning Research Conference Proceedings, San Antonio, TX*, College Station, TX: Texas A&M University. April 1994
45) Souder, W.E., The effectiveness of traditional versus satellite delivery in three management of technology masters degree programs, *Amer. J. Dist. Educ.* **7**(1), 1993, 37--53.
46) Thomas, R. and Hooper, E., Simulations: An Opportunity We Are Missing. *Journal of Research on Computing in Education.* Vol. 13, No. 4, pp. 497-513. 1991.
47) Tango Interactive Collaboration System home page http://www.npac.syr.edu/tango
48) Threkeld, R. and Brzoska, K. Research in Distance Education. In Barry Willis, ed. *Distance education: Strategies and Tools.* Englewood Cliffs, NJ: Educational Technology Publications. 1994.
49) U.S. Bureau of Labor Statistics, Employment and Earnings, U.S. Bureau of Labor Statistics, Jan 1993
50) Valore, L., and Diehl, G.E., *The Effectiveness and Acceptance of Home Study*. Washington, DC: National Home Study Council. 1987.
51) VNC or Virtual Network Computing at http://www.uk.research.att.com/vnc/
52) W3C Document Object Model http://www.w3.org/DOM/

WebCT: Major commercial web-based course authoring system: http://www.webct.com/

Geoffrey Charles Fox:
Florida State University (Principal Investigator)

gcf@npac.syr.edu , http://www.npac.syr.edu,
Phone: (315) 443-2163, Fax: (315) 443-4741
NPAC Syracuse University
111 College Place
Syracuse NY 13244-4100

Education:

B.A. in Mathematics from Cambridge Univ., Cambridge, England (1961-1964)
Ph.D. in Theoretical Physics from Cambridge University (1964-1967)
M.A. from Cambridge University (1968)

Professional Experience:

2000-	Professor of Computer Science, Florida State University
1990-	Professor of Computer Science, Syracuse University
1990-	Professor of Physics, Syracuse University
1990-2000	Director of Northeast Parallel Architectures Center
1979-1990	Professor of Physics, California Inst. of Tech.
1986-1988	Associate Provost for Computing, California Inst. of Tech.
1983-1985	Dean for Educational Computing, California Inst. of Tech.
1981-1983	Executive Officer of Physics, California Inst. of Tech.
1974-1979	Associate Professor of Physics, California Inst. of Tech.
1971-1974	Assistant Professor of Physics, California Inst. of Tech.
1970-1971	Millikan Research Fellow in Theoretical Physics, Caltech
1970	Visiting Scientist (April-May), Brookhaven National Laboratory
1969-1970	Research Fellow at Peterhouse College, Cavendish Lab.,Cambridge
1968-1969	Research Scientist, Lawrence Berkeley Lab., Berkeley, Calif.
1967-1968	Member of School of Natural Science, Inst. for Advanced Study, Princeton, New Jersey

Five Selected Publications

1) Fox G.C., *Internetics: Technologies, Applications and Academic Fields* Invited Chapter in Book :Feynman and Computation", edited by A.J.G. Hey, Perseus Books (1999), http://www.npac.syr.edu/users/gcf/internetics/)
2) Fox G.C., *From Computational Science to Internetics: Integration of Science with Computer Science*, Chapter in a book dedicated to John Rice of Purdue (to be published). http://www.npac.syr.edu/users/gcf/internetics2/
3) Bernholdt D.E., Fox G.C., Malluhi Q., Markowski R., McCracken N., Mitra D., Podgorny M., Scavo T., *Synchronous Learning at a Distance: Experiences with Tango*, Proceeedings of SC98 Orlando, IEEE. http://www.npac.syr.edu/projects/training/Papers/sc98/
4) Fox G.C., and Podgorny M, *Real Time Training and Integration of Simulation and Planning using the TangoInteractive Collaborative System*, in Proceedings of International Test and Evaluation Workshop on High Performance Computing, July

1998, Aberdeen Maryland.
http://www.npac.syr.edu/users/gcf/iteatango/iteatangopaper.html
5) Fox, G. C. *Parallel Computing and Education*, Daedalus Journal of the American Academy of Arts and Sciences, 121(1):111-118, 1992.

Willie G. Brown: Jackson State University

Assistant Vice President for Information Technology
Jackson State University
P. O. Box 17750
Jackson, MS 39217

Institution and Location	Degree	Years	Field of Study
Wayne State University Detroit, MI	B.A.	1984 – 1987	Computer Science
Wayne State University	M.S.	1987 – 1988	Computer Science
Wayne State University	Ph.D.	1988 – 1994	Computer Science

EXPERIENCE

1987 - 1990 Research Assistant, Wayne State University, Detroit, MI.
1990 - 1991 Analyst, Mount Clemens General Hospital, Mount Clemens, MI.
1991 - 1993 Graduate Teaching Assistant, Wayne State University, Detroit, MI.
1992 - 1993 Consultant, Ford Motor Company, Allen Park, MI.
1993 - 1994 Assistant Professor of Computer Science, Jackson State University, Jackson, MS.
1994 - Present Chair, Department of Computer Science, Jackson State University, Jackson, MS.
1997 - Present Assistant Vice President for Information Technology, Jackson State University, Jackson, MS.

PUBLICATIONS

Kaminsky, E. J., Barad, H., Brown, W. G., "Textural Neural Network and Version Space Classifiers for Remote Sensing"; *International Journal of Remote Sensing*, Vol. 18, No. 4, 1997, pp. 741-762.

Mitra, D., Brown, W. G., "Two Orthogonal Sub-Algebras of the Interval Algebra"; *Proceedings of the Tenth International IEA/AIE Conference*, Atlanta, GA, June 10-13, 1997.

Malluhi, Q., Jung, G. S., Brown, W. G., "A Scheme for High Performance Data Delivery Service in the Web Environment"; accepted by the International Conference on Parallel and Distributed Systems, National Cheng-Kung University, Tainan, Taiwan, ROC, December 14-16, 1998.

COLLABORATORS WITHIN LAST 48 MONTHS

Name	Affiliation
Barad, Herb	Intel Corp.
Jung, G. S.	Jackson State University
Kaminsky, Edit J.	Tulane University
Malluhi, Q.	Jackson State University
Mitra, D.	Jackson State University

DOCTORAL THESIS ADVISEES

Frederick Wilson	NASA Goddard Space Flight Center

DOCTORAL THESIS ADVISOR
Robert Reynolds Wayne State University

Robert Christopher Lacher: Florida State University

Personal: Born October 14, 1940, in Atlanta, Georgia; parents Sarah R. and the late Hermann J. Lacher of Athens, Georgia; married to the former Kathleen Teagle of North Palm Beach, Florida; three children (none living at home).

Education: B.S., University of Georgia, 1962; M.A., University of Georgia, 1964; Ph.D. (Mathematics), University of Georgia, 1966; Major Professor: James C. Cantrell; Dissertation: Some Conditions for Manifolds to be Tame. NDEA Fellow, 1962-65; NSF Graduate Fellow, 1965-66; Institute for Advanced Study Fellow, 1967-68; Alfred P. Sloan Fellow, 1970-72.

Memberships: Phi Beta Kappa, Phi Kappa Phi, Sigma Xi, American Mathematical Society, Association of Members of the Institute for Advanced Study, Association for Computing Machinery, Institute of Electrical and Electronic Engineers, IEEE Computer Society, American Chemical Society (inactive), International Neural Networks Society, Florida State University President's Club.

R.C. Lacher (Chris Lacher) is Professor of Computer Science at Florida State University. His research interests include geometric topology, macromolecular modeling, neural computation, advanced technology engineering, and trustworthy systems engineering. He has authored over 100 refereed articles and 3 books, given over 70 invited talks, and is a principal holder of two patents. He served as Chair the Department of Computer Science for the seven year period ending in August, 1998. Dr. Lacher has served on the Editorial Boards of IEEE Transactions on Neural Networks (1992-96), Neurocomputing - An International Journal (1994-97), and International Journal of Computational Intelligence and Organizations (1995-97). He is a founding member of the Board of Directors of Tallahassee Freenet, the first public Internet service provider in Florida, and still free.

Dr. Lacher has taught virtually every undergraduate mathematics and computer science course at FSU and specialty graduate courses in both departments. He has directed 8 Dissertations in both Computer Science (7) and Mathematics (1), along with numerous Masters theses and projects. He has judged science fairs and been a Partner in Excellence with local schools. He has served on numerous departmental, university, and extramural committees.

Dr. Lacher regularly serves as a reviewer for national funding agencies, most recently on the NIH Human Brain Project Review Panel (April 1996) and on the NSF Review Panel for Instrumentation Grants for Research in Computer and Information Science and Engineering and Office of Cross-Disciplinary Activities (CISE/CDA) (October 1996).

Dr. Lacher has been a Principal Investigator on 24 research grants the National Science Foundation, US Office of Naval Research, Alfred P. Sloan Foundation, Florida High Technology and Industry Council, US Department of Energy, and Florida Department of Education.

Dr. Lacher has been a principal in the production of several major software packages under extramural support, including CROSSWALK (ONR, 1987), PolyStruct (ONR, 1990), and ENBP (FHTIC, copyright 1992).

Dr. Lacher holds US Patent 5,524,176 [issued June 1996] for the invention FEN Learning Architecture (co-holder K. Narita) and US Patent 5,649,066 [issued July 1997] for the invention ExNet Machine Learning process (co-holders S.I. Hruska and D.C. Kuncicky).

Dr. Lacher is currently the Director of the FSU Office for Distributed and Distance Learning.

Publications

R.C. Lacher, Loop entanglement in a constrained liquid region: simulation data, simplified models, and general measurement heuristics, *Macromolecules* **20** (1987) 3054-3059.

R.C. Lacher, S.I. Hruska, and D.C. Kuncicky, Backpropagation learning in expert networks, *IEEE Transactions on Neural Networks* **3** (1) (1992) 62-71.

R.C. Lacher, Expert networks: Paradigmatic conflict, technological rapprochement, *Minds and Machines* **3** (1993) 53-71.

K.D. McCroan and R.C. Lacher, Region coloring, edge coloring, and scan-conversion of maps, *Journal of Computational Geometry and Applications* **4** (4) (1994) 423-455.

Allan Egbert, Jr, and R.C. Lacher, Building EMYCIN expert systems from raw data sources, *Proceedings International Conference on Artificial Intelligence*, CREA Press, Las Vegas, 1999, pp 571-573.

Dr. Sara Stoecklin: Florida A and M University

Demographics:

Dr. Sara Stoecklin, Associate Professor, MSES Director
Department of Computer and Information Science
Florida A & M University Tallahassee, Florida 32307
CIS Office Phone 850-425-3022 Office Phone 850-599-8899
Fax 850-599-3221

Education:

B.S. : Major- Mathematics Minor- Business : Troy State University : 1965
M.S. : Computer Information Science : East Tennessee State University : 1987: GPA 4.0
Thesis Topic; Object Oriented Detailed Methodology to Develop Computer Systems
Computer Science : Southern Illinois University (Edwardsville) : GPA 4.0
Ph.D. : Computer Information Systems : Florida State University - 1991 - GPA 3.8
Dissertation Topic: Object Oriented Requirements Analysis and Design of Computer Integrated Manufacturing Systems

Professional Experience:

Pres - 1993 Florida A & M Univ. Tallahassee, Fl; Assoc. Prof.- Computer and Information Sciences
1993 - 1994 Florida Health and Rehabilitation Services; Tallahassee, Fl; Director of Software Engineering
1987 - 1993 Florida A & M University; Tallahassee, Fl.; Assoc. Prof.r- Computer Information Systems
1983 - 1987 East Tennessee State University; Johnson City, Tenn.; Inst.- Computer Information Sciences
1982 - 1983 St. Louis Comm. College; St. Louis, Missouri; Assistant Professor- Information Systems
1978 - 1981 State of Illinois; Springfield, Illinois; Project Coordinator- Project Leader- Dept. of Revenue
1972 - 1978 Independent Consultant; Customer List on Request
1968 - 1969 Gardner Denver Corporation; Quincy, Ill.; Project Analyst- Computer Manufacturing Systems
1965 - 1968 International Business Machines; Montgomery, Al, Systems Engineer- D P Division

Selected Publications:

[All99d] Allen, C., Stoecklin, S., et al, "A Software Engineering An Architecture for Creating Distributed Spoken Language Systems", Proceedings of the 3rd IASTED International Conference on Software Engineering and Applications, Scottsdale, A.Z., October, 1999.
[Cha98d] Chandra, U, Stoecklin, S., etal, Introducing Research in an Undergraduate Program, Journal of College Science Teaching, Vol XXVIII Number 2, November 1998.
[Har97] Harmon, M., Stoecklin, S., Chandra, U., Ehlmann, B., "Software Engineering Research and Education Laboratory Software Engineering Research and Education Laboratory Workshop for NSF/CISE, Lexington, Kentucky, May 1997
[Sto96] Stoecklin, S., " Objects, Objects Everywhere But Not a One to Teach",The Journal of Computing in Small Colleges, Volume 12, Number 2, November 1996.
[Sto95] Stoecklin, S./etal, "Teaching Object-Oriented Design and Programming in Computer Science Curriculums", SIGCSE Bullitan, Volume 27, Number 1,March 1995

Joe F. Thompson: Mississippi State University
William L. Giles Distinguished Professor of Aerospace Engineering

Personal
Office Address: P. O. Box 9627, NSF Engineering Research Center
Office Phone: (662) 325-7299 Fax Number: (662) 325-7692
Email Address: joe@erc.msstate.edu

Education
PhD, Aerospace Engineering, Georgia Institute of Technology, 1971
MS, Aerospace Engineering, Mississippi State University, 1963
BS, Physics, Mississippi State University, 1961, "Highest Honors"

Employment
Department of Aerospace Engineering, Mississippi State University, 1964-Present
Marshall Space Flight Center, NASA, 1963-1964

Selected Publications
1. Handbook for Grid Generation, Joe F. Thompson, Bharat K. Soni, Nigel Weatherill (Eds), CRC Press, 1999.
2. Handbook for Computer Science and Engineering (Editorial Board, Editor for Computational Science Section), Allen Tucker (Ed.), CRC Press, 1997.
3. Numerical Grid Generation: Foundations and Applications, Joe F. Thompson, Z. U. A. Warsi, and C. W. Mastin, North-Holland, 1985. (Available on the Web at www.erc.msstate.edu)
4. Chrisochoides, N., Fox, G., and Thompson, J.F., "Menus-PGG: A Mapping Environment for Unstructured and Structured Numerical Parallel Grid Generation," Contemporary Mathematics, Volume 180, pp. 381-386, 1994.
5. "A Survey of Grid Generation Techniques and Systems with Emphasis on Recent Development," J.F. Thompson and B. Hamann, Surveys on Mathematics for Industry," Chp. 6, p. 289, Springer-Verlag, 1997.

Other Significant Publications
1. Luong, P.V., Thompson, J.F., and Gatlin, B., "Solution-Adaptive and Quality-Enhancing Grid Generation," Journal Of Aircraft, Vol. 3, Page 2, 1993.
2. Thompson, J.F., "The National Grid Project," Computing Systems in Engineering, Volume 3, Nos. 1-4, pp. 393-399, 1992.
3. Tu, Y., and Thompson, J.F., "Three-Dimensional Solution-Adaptive Grid Generation on Composite Configurations," AIAA Journal, Vol. 29, No. 12, pp. 2025-2026, 1991.
4. Warsi, Z.U.A., and Thompson, J.F., "Application of Variational Methods in The Fixed and Adaptive Grid Generation," Computers & Mathematical Applications, Vol. 19, No. 8-9, p. 31, 1990.
5. Thompson, J.F., "A General Three-Dimensional Elliptic Grid Generation System on a Composite Block Structure," Computer Methods in Applied Mechanics

and Engineering, Vol. 64, p. 377, 1987.

Synergistic Activities

1. Founding Director, NSF Engineering Research Center (ERC) for Computational Field Simulation at Mississippi State University
2. Led the formation of the multi-university team that teamed with Nichols Research and Raytheon/E-Systems to win the support contracts for Programming Environment & Training (PET) at three of the four DoD HPC Major Shared Resource Centers (MSRCs) as part of the DoD HPC Modernization Program, and now leads this team for the MSRC at the Army Engineer Research & Development Center in Vicksburg, Mississippi.
3. Editorial board, Journal of Computational Physics
4. Appointed by President Clinton to the President's Information Technology Advisory Committee (PITAC).

Peter Dragovitsch: Florida State University

Address:
Dr. Peter Dragovitsch
Office for Distributed and Distance Learning
The Florida State University
C3524 University Center
Tallahassee, FL 32306-2540
Phone: 850.645.0392
Fax: 850.644.5803
Email: pdragovitsch@oddl.fsu.edu

Personal Information:
Born February 13, 1959. Married. Resident alien.

a. Professional Preparation:

University of Köln, Köln (Cologne), Germany	Physics	Vordiplom (Bachelors)	1980
University of Köln, Köln (Cologne), Germany	Physics	Diplom (Masters)	1984
University of Köln, Köln (Cologne), Germany	Physics	Dr. rer. Nat. (Ph.D)	1987
IKP, Forschungszentrum Jülich, Jülich, Germany	Computational Physics		1987-1990

b. Appointments:
1999 now Florida State University, Office for Distributed and Distance Learning, Tallahassee, USA (Special Projects Coordinator)

1995 now Florida State University, Departments of Physics and Mathematics Tallahassee, USA (Instructor)

1990 1999 Florida State University, Supercomputer Computations Research. Institute, Tallahassee, USA (Research Scientist in Nuclear Physics)

1987-1990 Forschungszentrum Jülich (KFA), Institute for Nuclear Physics (IKP), Jülich, Germany (Postdoctoral Researcher)

1983-1987 University of Köln, Institut for Nuclear Chemistry, Köln (Cologne), Germany (Research Assistant)

c) Publications: None of the more than 50 printed publications are closely related to the proposed project (besides stating a record in multidisciplinary computational research).

Web-related tools to teach mathematics in real and virtual classrooms , Workshop on Mathematics on the Web, FSU, Tallahassee, FL, April 20, 1998.

Involving the Web in On-Campus and Distance Education at FSU , SCRI Seminar Talk, SCRI, Tallahassee, February 2, 1999

Web4M distributed toolkit for collaboration and learning , Presentation to the FSU Web Template Team, , February 3, 1999

Web-based Delivery of Mathematics , Invited talk at the 24th Annual Meeting of the Mathematical Association of America at TCC, Tallahassee, November 4th, 1999

Nancy Jean McCracken: Syracuse University

Northeast Parallel Architecture Center (NPAC)
at Syracuse University
Syracuse NY 13244
(315) 443 4687 njm@npac.syr.edu

Education

Earlham College, Richmond, Indiana 1967-1971 B.A. Mathematics
Syracuse University, Syracuse, New York 1971-1979
Ph.D. Computer and Information Science

Employment

Associate Professor, Syracuse University, School of Computer and Information Science (CIS), September 1982 - September 1984.
Senior Research Associate, CIS, September 1984 - July 1987.
Research in programming language semantics and the typechecking of polymorphic languages. Taught courses in programming languages, semantics and compilers.

Research Consultant, Northeast Parallel Architectures Center (NPAC) at Syracuse University, July 1987 - September 1989.
Research on parallel languages and algorithms. Taught programming workshops on the CM2, the Alliant FX80 and the Encore Multimax. Consulted with scientific researchers on parallel computing.

Manager of Research Consulting, NPAC, September 1989 - March 1992.
Managed a group of seven Ph.D. level consultants working with business programmers and academic researchers in parallel computing.

Senior Research Scientist, NPAC, March 1992 - present.
Director of Education Programs. Develop certificate programs in computational science. Develop course materials and teach courses in parallel computing and information technologies. Develop distance education infrastructure. (1997-present)
Co-Director and Training Coordinator for the NSF REU site program (1990-95).

Affiliated Faculty, CIS, June 1987 - present.
Chairman of Computational Science Curriculum Committee.
Designed new courses, minors, and a master's degree in computational science.

Selected Papers

Synchronous Learning at a Distance: Experiences with Tango, David E. Bernholdt, Geoffrey C. Fox, Roman Markowski, Nancy J. McCracken, Marek Podgorny, Thomas R. Scavo, Qutaibah Malluhi, Debasis Mitra, Supercomputing '98, December 1998. http://www.npac.syr.edu/projects/training/Papers/sc98/

Recent Training Workshops

Web/Database Course at ARL, Maryland, February 10-12,1998, a 3-day workshop taught by Dr. Nancy McCracken and assisted by Dr. Chao-wei Ou. http://www.npac.syr.edu/projects/training/ARLdb/

Java for Scientific Computing, a 3-day workshop at CEWES, Vicksburg, MS, May 19-21,1998. http://www.npac.syr.edu/projects/training/CEWESjava98/

Integration of Web Database and Object Technologies, a 1-day tutorial at the ITEA Workshop, July 13, 1998, taught by Dr. Geoffrey Fox and assisted by Dr. Nancy McCracken. http://www.npac.syr.edu/projects/training/ITEA98/

Java for Scientific Computing, a 3-day workshop at NAVO, John Stennis Space Center, MS, September 23-25,1998. http://www.npac.syr.edu/projects/training/NAVOjava98/

Recent Academic Courses

CPS406/606 Computational Methods for Distributed Information Systems, aka Programming for the Web, at Syracuse University, Fall 1998-99. Topics include using Java for distributed web-based applications. http://www.npac.syr.edu/projects/cps606fall98/

CPS615 Computational Science for Simulation Applications, with Dr. Geoffrey Fox, a distance education course at Jackson State University, Fall 1998. http://www.npac.syr.edu/projects/jsufall98/

CPS616 Computational Science for Information Applications, aka Web Software Technologies, at Syracuse University and as a distance education course at Jackson State University, Mississippi State University and Clark-Atlanta University. Topics include web/database interfaces, CORBA, 3D modelling, and XML.
http://www.npac.syr.edu/projects/cps616spring99 and
http://www.npac.syr.edu/projects/jsuspring99.

SUMMARY PROPOSAL BUDGET

YEAR 1

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

ORGANIZATION: **Florida State University**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Geoffrey C Fox**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Geoffrey C Fox - Prof.**	**0.00**	**0.00**	**5.00**	$ **75,000**	$
2. **Willie G Brown - Prof.(JSU)**	**0.00**	**0.00**	**0.00**	**0**	
3. **Peter Dragovitsch - Dr.**	**7.50**	**0.00**	**0.00**	**40,000**	
4. **Robert C Lacher - Prof.**	**0.00**	**0.00**	**5.00**	**55,000**	
5. **Sara F Stoecklin - Prof.(FAMU)**	**0.00**	**0.00**	**0.00**	**0**	
6. (**1**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**6**) TOTAL SENIOR PERSONNEL (1 - 6)	**7.50**	**0.00**	**10.00**	**170,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL ASSOCIATES	**0.00**	**0.00**	**0.00**	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	**20.00**	**0.00**	**0.00**	**80,000**	
3. (**4**) GRADUATE STUDENTS				**320,000**	
4. (**2**) UNDERGRADUATE STUDENTS				**40,000**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**610,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**48,160**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**658,160**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)				**30,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
(**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**50,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**20,000**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**2,250,000**	
6. OTHER				**40,000**	
TOTAL OTHER DIRECT COSTS				**2,360,000**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**3,048,160**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE) **See Justif. (Rate: 46.5000, Base: 858160)**					
TOTAL INDIRECT COSTS (F&A)				**399,044**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**3,447,204**	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **3,447,204**	$

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

PI / PD TYPED NAME & SIGNATURE*: **Geoffrey C Fox** DATE

ORG. REP. TYPED NAME & SIGNATURE* DATE

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

SUMMARY PROPOSAL BUDGET COMMENTS - Year 1

Other Senior Personnel

Name - Title	Cal	Acad	Sumr	Funds Requested
Thompson, Joe F - Prof.(MSU)	**0.00**	**0.00**	**0.00**	**0**

SUMMARY PROPOSAL BUDGET

Cumulative

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

ORGANIZATION: **Florida State University**

PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR: **Geoffrey C Fox**

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)	NSF Funded Person-mos. CAL	ACAD	SUMR	Funds Requested By proposer	Funds granted by NSF (if different)
1. **Geoffrey C Fox - Prof.**	**0.00**	**0.00**	**5.00**	$ **75,000**	$
2. **Willie G Brown - Prof.(JSU)**	**0.00**	**0.00**	**0.00**	**0**	
3. **Peter Dragovitsch - Dr.**	**7.50**	**0.00**	**0.00**	**40,000**	
4. **Robert C Lacher - Prof.**	**0.00**	**0.00**	**5.00**	**55,000**	
5. **Sara F Stoecklin - Prof.(FAMU)**	**0.00**	**0.00**	**0.00**	**0**	
6. (**1**) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	**0.00**	**0.00**	**0.00**	**0**	
7. (**6**) TOTAL SENIOR PERSONNEL (1 - 6)	**7.50**	**0.00**	**10.00**	**170,000**	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. (**0**) POST DOCTORAL ASSOCIATES	**0.00**	**0.00**	**0.00**	**0**	
2. (**1**) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	**20.00**	**0.00**	**0.00**	**80,000**	
3. (**4**) GRADUATE STUDENTS				**320,000**	
4. (**2**) UNDERGRADUATE STUDENTS				**40,000**	
5. (**0**) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)				**0**	
6. (**0**) OTHER				**0**	
TOTAL SALARIES AND WAGES (A + B)				**610,000**	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				**48,160**	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)				**658,160**	
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.)					
TOTAL EQUIPMENT				**0**	
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)				**30,000**	
2. FOREIGN				**0**	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $ **0**					
2. TRAVEL **0**					
3. SUBSISTENCE **0**					
4. OTHER **0**					
(**0**) TOTAL PARTICIPANT COSTS				**0**	
G. OTHER DIRECT COSTS					
1. MATERIALS AND SUPPLIES				**50,000**	
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION				**20,000**	
3. CONSULTANT SERVICES				**0**	
4. COMPUTER SERVICES				**0**	
5. SUBAWARDS				**2,250,000**	
6. OTHER				**40,000**	
TOTAL OTHER DIRECT COSTS				**2,360,000**	
H. TOTAL DIRECT COSTS (A THROUGH G)				**3,048,160**	
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)					
TOTAL INDIRECT COSTS (F&A)				**399,044**	
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				**3,447,204**	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS SEE GPG II.D.7.j.)				**0**	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ **3,447,204**	$

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

PI / PD TYPED NAME & SIGNATURE*: **Geoffrey C Fox** DATE

ORG. REP. TYPED NAME & SIGNATURE* DATE

FOR NSF USE ONLY

INDIRECT COST RATE VERIFICATION

Date Checked	Date Of Rate Sheet	Initials - ORG

NSF Form 1030 (10/98) Supersedes all previous editions

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