08:06:03 OCA PAD INITIATION - PROJECT HEADER INFORMATION 03/27/92

Active

Project #: E-25-X08 Cost share #: Rev #: 0
Center # : 10/24-6-R7439-0A0 Center shr #: OCA file #:
Work type : RES
Contract#: DDM-9213092 Mod #: INITIATION Document : GRANT
Prime #: Contract entity: GTRC

Subprojects ? : N CFDA: 47.041
Main project #: PE #:

Project unit: MECH ENGR Unit code: 02.010.126
Project director(s):
COLTON J S MECH ENGR (404)894-7407

Sponsor/division names: NATL SCIENCE FOUNDATION / GENERAL
Sponsor/division codes: 107 / 000

Award period: 920315 to 930831 (performance) (reports)

Sponsor amount	New this change	Total to date
Contract value	5,000.00	5,000.00
Funded	5,000.00	5,000.00
Cost sharing amount		0.00

Does subcontracting plan apply ?: N

Title: WORKSHOP ON TEACHING DESIGN SKILLS

PROJECT ADMINISTRATION DATA

OCA contact: Mildred S. Heyser 894-4820

Sponsor technical contact

BRUCE M. KRAMER
(202)357-7676

NATIONAL SCIENCE FOUNDATION
1800 G STREET, NW
WASHINGTON, DC 20550

Sponsor issuing office

ANDREA R. KLINE
(202)357-9626

NATIONAL SCIENCE FOUNDATION
1800 G STREET, NW
WASHINGTON, DC 20550

Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): N
Defense priority rating : supplemental sheet
Equipment title vests with: Sponsor GIT

Administrative comments -
PROJECT INITIATION

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CA                              Maintain Closeout                  05-DEC-1997
CA0140                                                             WS12      [AQ]
+--  Document Header  ------------------------------------------------------+
| Project Number E-25-X08                          Doc Header Id 30581       |
| Project Title WORKSHOP ON TEACHING DESIGN SKILLS                Status T   |
| Award Period: From 15-MAR-1992  To 31-AUG-1993                             |
| PDPI COLTON                JONATHAN      Sponsor NATL SCIENCE FOUNDATION/GENE |
| Contract No DDM-9213092                                                    |
| Prime Contract No                                                          |
| Source Document Header                                                     |
| OCA File No 02.107.000.92.167                    BOA No                    |
| Security Class U           Unclassified                                    |
|                                                                            |
+-+-  Closeout  ---------------------------------------------------------+-+
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Title of the project.
Count: *1                                                      <Replace>
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E 25-108

Georgia Tech

THE GEORGE W. WOODRUFF SCHOOL OF
MECHANICAL ENGINEERING

Georgia Institute of Technology
Atlanta, Georgia 30332-0405

September 17, 1992

Dr. Bruce Kramer
National Science Foundation
ENG/DDM/1128
1800 G Street, NW
Washington, DC 20550

Dear Dr. Kramer:

Enclosed please find the final report for NSF grant DDM-9213092, Workshop on Teaching Design Skills. I wish to thank you and the NSF for your support for this workshop.

Sincerely,

Jonathan Colton
Associate Professor
Woodruff Faculty Fellow

Enc.

OMB Number 3145-0058

NATIONAL SCIENCE FOUNDATION
1800 G STREET, NW
WASHINGTON, DC 20550

PI/PD Name and Address

NATIONAL SCIENCE FOUNDATION
FINAL PROJECT REPORT

PART I - PROJECT IDENTIFICATION INFORMATION

1. Program Official/Org. Dr. Bruce Kramer

2. Program Name ENG/DDM/1128

3. Award Dates (MM/YY) From: 3/92 To: 8/93

4. Institution and Address

Georgia Tech Research Corp.
Georgia Institute of Technology
School of Mechanical Engineering
Atlanta, GA 30332-0405

5. Award Number DDM-9213092

6. Project Title

Workshop on Teaching Design Skills, Atlanta, Georgia;
March 16-17, 1992

This Packet Contains
NSF Form 98A
And 1 Return Envelope

NSF Grant Conditions (Article 17, GC-1, and Article 9, FDP-II) require submission of a Final Project Report (NSF Form 98A) to the NSF program officer no later than 90 days after the expiration of the award. Final Project Reports for expired awards must be received before new awards can be made (NSF Grants Policy Manual Section 677).

Below, or on a separate page, provide a summary of the completed projects and technical information and attach it to this form. Be sure to include your name and award number on each separate page. See below for more instructions.

PART II - SUMMARY OF COMPLETED PROJECT (for public use)

The summary (about 200 words) must be self-contained and intelligible to a scientifically literate reader. Without restating the project title, it should begin with a topic sentence starting the project's major thesis. The summary should include, if pertinent to the project being described, the following items:

- **The primary objectives and scope of the project**
- **The techniques or approaches used only to the degree necessary for comprehension**
- **The findings and implications stated as concisely and informatively as possible**

See attached sheets

PART III - TECHNICAL INFORMATION (for program management use)

List references to publications resulting from this award and briefly describe primary data, samples, physical collections, inventions, software, etc. created or gathered in the course of the research and, if appropriate, how they are being made available to the research community.

See attached sheets

	9/17/92
Principal/Investigator/Project Director Signature	**Date**

IMPORTANT:
MAILING INSTRUCTIONS
Return this *entire* packet plus all attachments in the envelope attached to the back of this form. Please copy the information from Part I, Block I to the *Attention line* on the envelope.

PART IV — FINAL PROJECT REPORT — SUMMARY DATA ON PROJECT PERSONNEL

(To be submitted to cognizant Program Officer upon completion of project)

The data requested below are important for the development of a statistical profile on the personnel supported by Federal grants. The information on this part is solicited in response to Public Law 99-383 and 42 USC 1885C. All information provided will be treated as confidential and will be safeguarded in accordance with the provisions of the Privacy Act of 1974. You should submit a single copy of this part with each final project report. However, submission of the requested information is not mandatory and is not a precondition of future award(s). Check the "Decline to Provide Information" box below if you do not wish to provide the information.

Please enter the numbers of individuals supported under this grant.
Do not enter information for individuals working less than 40 hours in any calendar year.

	Senior Staff		Post-Doctorals		Graduate Students		Under-Graduates		Other Participants[1]	
	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.	Male	Fem.
A. Total, U.S. Citizens	5									
B. Total, Permanent Residents										
U.S. Citizens or Permanent Residents[2]:										
American Indian or Alaskan Native ...										
Asian										
Black, Not of Hispanic Origin										
Hispanic										
Pacific Islander										
White, Not of Hispanic Origin										
C. Total, Other Non-U.S. Citizens		1								
Specify Country 1. Israel										
2.										
3.										
D. Total, All participants (A + B + C)	5	1								
Disabled[3]										

☐ Decline to Provide Information: Check box if you do not wish to provide this information (you are still required to return this page along with Parts I-III).

[1]Category includes, for example, college and precollege teachers, conference and workshop participants.

[2]Use the category that best describes the ethnic/racial status for all U.S. Citizens and Non-citizens with Permanent Residency. *(If more than one category applies, use the one category that most closely reflects the person's recognition in the community.)*

[3]A person having a physical or mental impairment that substantially limits one or more major life activities; who has a record of such impairment; or who is regarded as having such impairment. *(Disabled individuals also should be counted under the appropriate ethnic/racial group unless they are classified as "Other Non-U.S. Citizens.")*

AMERICAN INDIAN OR ALASKAN NATIVE: A person having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

ASIAN: A person having origins in any of the original peoples of East Asia, Southeast Asia and the Indian subcontinent. This area includes, for example, China, India, Indonesia, Japan, Korea and Vietnam.

BLACK, NOT OF HISPANIC ORIGIN: A person having origins in any of the black racial groups of Africa.

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

PACIFIC ISLANDER: A person having origins in any of the original peoples of Hawaii; the U.S. Pacific Territories of Guam, American Samoa, or the Northern Marianas; the U.S. Trust Territory of Palau; the Islands of Micronesia or Melanesia; or the Philippines.

WHITE, NOT OF HISPANIC ORIGIN: A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

THIS PART WILL BE PHYSICALLY SEPARATED FROM THE FINAL PROJECT REPORT AND USED AS A COMPUTER SOURCE DOCUMENT. DO NOT DUPLICATE IT ON THE REVERSE OF ANY OTHER PART OF THE FINAL REPORT.

Workshop on Teaching Design Skills; Atlanta, Georgia; March 16-17, 1992

NSF Grant # DDM-9213092

Final Report to

National Science Foundation
Engineering Directorate
Division of Design and Manufacturing
Room 1128
1800 G Street, NW
Washington, DC 20550

Program Official: Bruce Kramer
202-357-7676

Grants Official: Andrea Kline
202-357-9626

Introduction

The workshop focused on teaching design skills. It brought together a small group of experienced design teachers, practitioners, and researchers to examine design teaching in a range of disciplines, such as engineering, architecture, and computer science. The goals were to clarify how specific aspects of design teaching are cross-disciplinary or domain-specific and to gather techniques, tools, and materials that can be used in a multidisciplinary undergraduate course in design skills. This course could be a requirement for all sophomores in engineering, architecture, computer science and allied disciplines, somewhat akin to the current calculus, physics, and chemistry requirements.

1. Selection Process

The selection process used was to fund academic faculty who had no other means of attending the conference. Preference was given to junior (untenured) faculty. All faculty who requested funding received it.

2,3,4. Funding

Name:	Address:	Amount:
Vinod Goel	Institute of Cognitive Science, University of California, Berkeley, CA 94720	567.78
Stephen Kendall	Cal Poly Department of Architecture, Washington Alexandria Architectural Consortium, Alexandria, 1001 Prince St., VA 22314	395.26
David Littman	Computer Science Dept., George Mason University, Fairfax, VA 22630	674.60
Farrokh Mistree	Department of Mechanical Engineering, University of Houston, Houston, TX	546.17
Rivka Oxam	Faculty of Architecture, Technion-Israel Institute of Technology, Haifa, Israel	530.46
David Steier	Engineering Design Research Center, Carnegie Mellon University, Pittsburgh, PA 15213	765.90
	Total	$3,480.05

5. Attendance

Total number of attendees = 38
US Attendees = 37
Other country represented = Israel

Highlights of the conference:

The conference was held in the newly completed Manufacturing Research Center of the Georgia Institute of Technology. It is a facility built to facilitate researchers from different departments working together in a multidisciplinary environment. The architect of the building (Terry Sargent) discussed how the building was designed. A tour of the building highlighted his talk. These two events provided the framework around which the discussions of teaching design proceeded.

Various break out groups were asked to discuss three aspects of teaching design: 1) Content: what should be taught?; 2) Teaching Methods: how should it be taught?; and 3) What's needed: facilities, tools, resources. After each break-out sessions, everyone met as a whole and the groups reported their findings. These were then discussed by the entire group.

An evening program allowed the demonstration and discussion of software developed by the faculty for teaching design. A bound volume of design course material (course outlines and reading lists) provided by the participants was given to each participant.

General Reaction of U.S participants supported:

The general reaction of the U.S. participants supported, as well as of the group as a whole, was very favorable. The participants were glad that someone brought together a group of faculty and industry (albeit a small number of the latter) to discuss teaching. People were pleased that the group was truly cross-disciplinary. It included engineering, architecture, computer science, cognitive science, and education faculty. Some participants were disappointed that there was no consensus on a single course outline for teaching an introductory design course. The lack of this "magic" outline is understandable, given the wide variety of curricula represented. It was felt that it was more important the dialogs between different universities and different departments were started than specific recommendations. Many expressed the hope that a meeting like this would be held yearly.

A letter from one participant sums up the comments of all:

> *"...It was a real pleasure to meet you and to share questions with you and all the other participants at the Workshop. It was a valuable thing to, even if the answers do not come quickly. It was pretty clear that even within each design domain, the question of what designing is about, and what are central principles, are not always agreed upon, so it is no surprise that drawing out common threads is slow in coming.*
>
> *Thanks for making it all possible.*

I think such workshops are good and should somehow continue..."

Overall, the Workshop made everyone think about design from other perspectives and built bridges that will help develop the teaching of design.