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OCA PAD AMENDMENT - PROJECT HEADER INFORMATION

09/06/90

Active

Project #: E-18-520 Cost share #: . Rev #: 1  
Center #: 10/11-6-05044-4A0 Center shr #: OCA file #:  
Contract#: 5 T32 DE07053-14 Mod #: NOA DTD 8/10/90 Document : INST  
Prime #: Contract entity: GRANT

Subprojects ? : N  
Main project #:

Project unit: MAT ENGR Unit code: 02.010.112  
Project director(s):  
HOCHMAN R F MAT ENGR (404)894-2879

Sponsor/division names: DHHS/PHS/NIH / NATL INSTITUTES OF HEALTH  
Sponsor/division codes: 108 / 001

Award period: 900701 to 910650 (performance) 910930 (reports)

Sponsor amount	New this change	Total to date
Contract value	35,964.00	82,700.00
Funded	35,964.00	82,700.00
Cost sharing amount		0.00

Does subcontracting plan apply ? : N

Title: POSTDOCTORAL - PREDOCTORAL TRAINING IN DENTAL MATERIALS SCIENCE

PROJECT ADMINISTRATION DATA

OCA contact: Kathleen R. Ehlinger 894-4820

Sponsor technical contact	Sponsor issuing office
THOMAS M. VALEGA, PH.D. (301)496-6324	MARTIN RUBINSTEIN (301)496-7437

SPECIAL ASST FOR MANPOWER DEVELOPMNT NATL INST OF DENTAL RESEARCH BETHESDA, MD 20892	GRANTS MANAGEMENT OFFICER NIDR, NATIONAL INSTITUTES OF HEALTH BETHSDA, MD 20892
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Security class (U,C,S,TS) : U	CNR resident rep. is ACO (Y/N): N
Defense priority rating : NA	NIH supplemental sheet
Equipment title vests with: Sponsor	GIT X

Administrative comments -  
ISSUED TO ADD \$35,964 TO THIS PROJECT.



GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 06/11/92

Project No. E-18-520\_\_\_\_\_

Center No. 10/11-6-05044-4A0\_

Project Director HOCHMAN R F\_\_\_\_\_

School/Lab MAT ENGR\_\_\_\_\_

Sponsor DHHS/PHS/NIH/NATL INSTITUTES OF HEALTH\_\_\_\_\_

Contract/Grant No. 5 T32 DE07053-14\_\_\_\_\_

Contract Entity GIT\_

Prime Contract No. \_\_\_\_\_

Title POSTDOCTORAL - PREDOCTORAL TRAINING IN DENTAL MATERIALS SCIENCE\_\_\_\_\_

Effective Completion Date 910630 (Performance) 910930 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	910927
Final Report of Inventions and/or Subcontracts	N	_____
Government Property Inventory & Related Certificate	N	_____
Classified Material Certificate	N	_____
Release and Assignment	N	_____
Other _____	N	_____

Comments"INVOICE"=ELECTRONIC SUBMITTAL OF FINANCIAL STATUS REPORT. \_\_\_\_\_  
CONTINUED BY E-18-534\_\_\_\_\_

Subproject Under Main Project No. \_\_\_\_\_

Continues Project No. E-18-529\_\_\_\_\_

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Management	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	N
Project File	Y
Other _____	N
_____	N

SECTION IV PROGRESS REPORT SUMMARY		GRANT NUMBER 5 T32 DE 07053-15	
PRINCIPAL INVESTIGATOR OR PROGRAM DIRECTOR Dr. Robert F. Hochman		PERIOD COVERED BY THIS REPORT	
APPLICANT ORGANIZATION School of Materials Engr., Georgia Inst. of Technology		FROM Feb. 1, 1990	THROUGH Feb. 1, 1991
TITLE OF PROJECT (Repeat title shown in item 1 on first page) Postdoctoral-Predoctoral Training in Dental Materials Science (NIDR Training Grant)			

(SEE INSTRUCTIONS)

1. Program Objectives

The program can be best summarized in the following short statement of training objectives:

- a) A strong academic and laboratory instruction in fundamental state-of-the-art materials research.
- b) An effective supplemental training through seminars, short courses and special laboratory instruction in specialized or advanced materials research areas.
- c) Continuing interaction with the Emory and University of Georgia Dental Schools as well as practicing dentists on their problems and requirements.
- d) Develop a basic research problem or theses study for each trainee to utilize a broad range of knowledge and techniques on a problem that can relate to dental materials.
- e) Arrange special dental orientation programs for nondental trainees to stimulate and challenge their interests in the field.

2. Trainee Related Expenses

A rather minimal amount of trainee related expenses on this program were used to principally support the program by providing services, a small amount of secretarial support, a small amount of travel to defray partial expenses to programs related to new developments in materials which have applicability in the area of dental biomaterials and, finally, a small amount of materials and supplies category were purchased on the program.

A major consideration in reviewing the small amount of overhead as well as the allowable trainee related expenses is that it falls far below the financial requirements necessary for one year's support of a trainee. Calculations of staff time, materials, supplies, equipment, etc. have shown that at the PhD candidate trainee level, support in excess of \$30,000 per year is needed. Therefore, this relatively small level of trainee related expenses falls far short of providing the academic staff time (preceptors time) and support for the student trainee. The combination of the 8% overhead allowance, trainee tuition and fees and travel money fall \$15,000 to \$20,000 short for each trainee per year. Therefore, it is very important that in this type of training that NIDR, and NIH as a whole, consider raising the training related expenses.

3. Trainee List

Melissa Rathburn, D.D.S. - July 1, 1988 to June 30, 1990

Dr. Rathburn initiated a postdoctoral program to learn more about materials for her development of better orthodontic procedures. Her program consisted of materials engineering courses and developing a research program with Dr. Hochman. The fastening of ceramic posts in orthodontic procedures has resulted in difficult removal. The research is centered on a fastening system which will provide a strong bond but will allow for easier removal without harm to the tooth.

Dr. Rathburn devoted her study to developing a measure of the forces necessary to remove ceramic orthodontic posts. In the past decade, ceramic posts have become increasingly desirable because of the aesthetics and because they do provide an excellent, stable orthodontic posts in which either the ceramic post has broken, or because of the strength of the adhesive, part of the tooth structure has been damaged. Therefore, this study was undertaken to determine the forces necessary to remove these orthodontic posts and to consider the possibility of shear forces which will provide easier mechanical movement of the post simply because the shear strength of polymers are much lower than their tensile strength. The results of this study were presented at the National Orthodontic Meeting held in Washington, and was chosen as the "First Place" Table Clinic out of more than 130 national and international table clinic presentations. This paper has been submitted for publication.

Mr. Bruce F. Antolovich - February 1, 1990 to January 31, 1991

Mr. Antolovich has been concerned primarily with the basic fatigue properties of materials used in dental applications. Many problems occur after long-term implantation of alloys, specifically used as prosthodontics and as implants. Thus, the major impact of his work has been directed towards studying basic fatigue characteristics and model systems to provide information on improving the basic cyclic load life of these materials.

Dr. Mark S. Sanchez, BS, DDS - June 1990 to Present

Dr. Sanchez is following on the work in orthodontic attachments initiated with Dr. Melissa Rathburn, DDS. Her work led to a national first place award at the National Association of Orthodontists held in Washington in May 1990. His follow-on work would be of a basic nature, fitting with Dr. Sanchez's background in physics.

Dr. Sanchez has a BS in Physics from Georgia Tech in 1979 and did one year of graduate study here in Physics in 1980. He then received his dental degree at Emory in 1984 and has been in practice. Recently, he has initiated research studies and interest in orthodontics in a cooperative program between Emory and Georgia Tech. The combination of his background in physics and preliminary knowledge of materials, as well as his computer program background is most effective in research of potentially new types of ceramic orthodontic fasteners along with clean and effective methods of removal without breaking the fastener or destruction of surface of tooth structure. Of unique consideration, is the data which shows that indeed the polymeric adhesives have approximately ten times lower shear strength than tensile strength, meaning that loading in shear rather than tensile would be much more effective in their removal. His studies of work will be involved in shear characteristics of the various fastener adhesives, plus work in using surface modified metal fasteners with ceramic coatings formed by physical vapor deposition processes.

Dr. Brian J. Love - January 1, 1991 to Present

Dr. Love received his PhD in Materials Engineering in December of 1991 from Southern Methodist University. He specialized in the properties of polymer and composite materials. Dr. Love previously received a BS degree in chemistry and a MS degree in metallurgy from the University of Illinois. A major interest will be working with Dr. Mark Sanchez in determining the characteristics of the polymeric materials used for orthodontic post adhesion and how to best remove them, both mechanically and, if possible, chemically without any deterioration or toxicity.

Dr. Love had originally made an application to Georgia Tech for a faculty position. Therefore, his primary interest is to obtain a faculty position in a materials department. He will be stressing other programs of interest in biomedical and dental materials. Of secondary concern will be the processing of new types of posts and other dental implants to provide the best combination of biological as well as mechanical properties. In addition to the basic physical metallurgy in these material studies he will look at inducements to bone attachment, soft tissue attachment and proper strength and fatigue life for implants. He will be working with Dr. Forrest Butler, one of our former postdoctoral dental students who has developed a major practice in the area of dental implants.

It is believed that the combination of his work in dental implants, biodental materials, as well as his evident interest in pursuing an academic career will be effective in developing an excellent new academician in the area of dental restorative materials.

Mr. Brent Mills - February 1, 1991 to Present

Mr. Mills is joining our program as a predoctoral candidate, primarily to study the effects of surface modification on mechanical properties of materials. His work will closely align with that of Dr. Hochman and Dr. Love's in producing both dental restorative materials with unique properties through surface modification as well as involving the potential of surface modification and new techniques in producing unique dental implants.

4. Papers

Title: Ceramic Brackets: A Comparative Study, M. Rathburn  
Journal: American Journal of Orthodontics