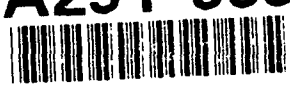


FINAL REPORT
TO
OFFICE OF NAVAL RESEARCH

DOD Science and Engineering Apprenticeship Program for Socially and Economically Disadvantaged High School Students

1991-'92 Activities
Contract No. N00014-91-J-1825

Principal Investigator: Dr. Richard L. Pfeffer
Director, Geophysical Fluid Dynamics Institute
The Florida State University
Tallahassee, FL 32306
(904)-644-5594

Co-Manager: Dr. Robin J. Kung
Geophysical Fluid Dynamics Institute
The Florida State University
Tallahassee, FL 32306
(904)-644-6597

April 1992
The Florida State University
Tallahassee, Florida

1. INTRODUCTION

The year 1991 represented the tenth successful DOD Science and Engineering Summer Apprenticeship Program for Socially and Economically Disadvantaged Students, sponsored by the Office of Naval Research at Florida State University. The program this year was again administered by the Geophysical Fluid Dynamics Institute (GFDI) under the direction of Drs. Richard L. Pfeffer and Robin Kung. Student activities were centered at GFDI and included work experience in GFDI.

Eight students were selected to work in the program starting in the summer of 1991. The guidance counselors of five local high schools were approached to obtain the names of outstanding socially and economically disadvantaged college bound students. Our student group consisted of three seniors, and five exceptional juniors. The departure from our past concentration on seniors was motivated by our desire to influence and expose students to possible scientific and engineering careers at an earlier age. Brief vitae of the selected students appear in the following section, and information pertaining to each apprentice is also attached at the end of the report.

Students spent a total of 30 hours per week with the program for 10 weeks in summer and 10-20 hours during the school year. They participated in research via data handling and data processing with the aid of computer operated equipment, and in enrichment activities including lectures, laboratory demonstrations, scientific films, a formal course and a weekly discussion session on the history of science using the book *Coming of Age in the Milky Way* by Timothy Ferris. A summary of their activities and projects is included in section 3.

2. STUDENTS' VITAE

NAME:	Tamara Akins
RACE:	Black
SEX:	Female
HIGH SCHOOL:	Amos P. Godby High School
COLLEGE:	Tallahassee Community College
ANTICIPATED MAJOR:	Pre-Law
AWARDS/SCHOLARSHIPS:	Outstanding English Student Award (1987-'88), High Honor Roll (1987-'90), Who's Who Among American High School Students.
ACTIVITIES/HOBBIES:	Vice-President, French Club; Member of Anchor Club; Secretary, Senior Board; Varsity Softball Team; Tallahassee Mall Teenboard
NAME:	Rodney Al:
RACE:	Black
SEX:	Male
HIGH SCHOOL:	Leon High School
COLLEGE:	Still in High School, 12^{th} Grade
ANTICIPATED MAJOR:	Pre-Medicine
AWARDS/SCHOLARSHIPS:	Who's Who Among American High School Students, National Honor Society, National Junior Classical League, Junior Scholastic Award.
ACTIVITIES/HOBBIES:	Football, Weightlifting, Track, Fishing, Spanish Club, Latin Club, Interact, F.C.A., Black Tie Board.
NAME:	Kenyetta T. Close
RACE:	Black
SEX:	Female
HIGH SCHOOL:	Lincoln High School
COLLEGE:	Still in High School, 12^{th} Grade
ANTICIPATED MAJOR:	Biology
AWARDS/SCHOLARSHIPS:	National Honor Society, Black History Brain Bowl Team, Spanish Honor Society, Outstanding Spanish Student, McKnight Achievers Organization, Leon County Academic Excellence Award, Selected by the People to People Student Ambassador Program.
ACTIVITIES/HOBBIES:	Girls Chorus, Concert Chorus, Continental Singers, Studied Piano, Gayfers Girl, Miss St. Peter, St. Peter Youth Choir, Students Against Aids, Lincoln Track Team, Varsity Stat Girl.

NAME:	Karen DeSouza
RACE:	Black
SEX:	Female
HIGH SCHOOL:	Amos P. Godby High School
COLLEGE:	Florida State University
ANTICIPATED MAJOR:	Interior Design
AWARDS/SCHOLARSHIPS:	Academic Letter, Outstanding Award in English and DCT Outstanding Student Award from Bethal Missionary.
ACTIVITIES/HOBBIES:	Life-Time member of Thespian Club of Actors, Secretary of Drama Club (1988-'90), Member of Future Educators of America (1989-'90), Homecoming Committee (1989-'90), DCT (1990-'91).

NAME:	James Fuse
RACE:	Black
SEX:	Male
HIGH SCHOOL:	Rickards High School
COLLEGE:	Still in High School, 12^{th} grade
ANTICIPATED MAJOR:	Computer Science
AWARDS/SCHOLARSHIPS:	Awards for Exceptional Reading Skills and Mathematics, March of Dimes Read-a-Thon third place, Awards in French.
ACTIVITIES/HOBBIES:	Football. Basketball and Baseball. French Club, Writing (poetry, short stories), French Congress, Gifted program.

NAME:	Cassandra Gilmore
RACE:	Black
SEX:	Female
HIGH SCHOOL:	Amos P. Godby High School
COLLEGE:	Florida A & M University
ANTICIPATED MAJOR:	Business Administration
AWARDS/SCHOLARSHIPS:	Member of McKnight Achievers Honor Society, received American Business Woman Scholarship, Award for Most Outstanding Business Student, Honor Roll and Good Citizenship.
ACTIVITIES/HOBBIES:	Member of CBE, Alpha Leadership Program, FBLA and FEA. I like reading, collecting posters, shopping and talking on the phone.

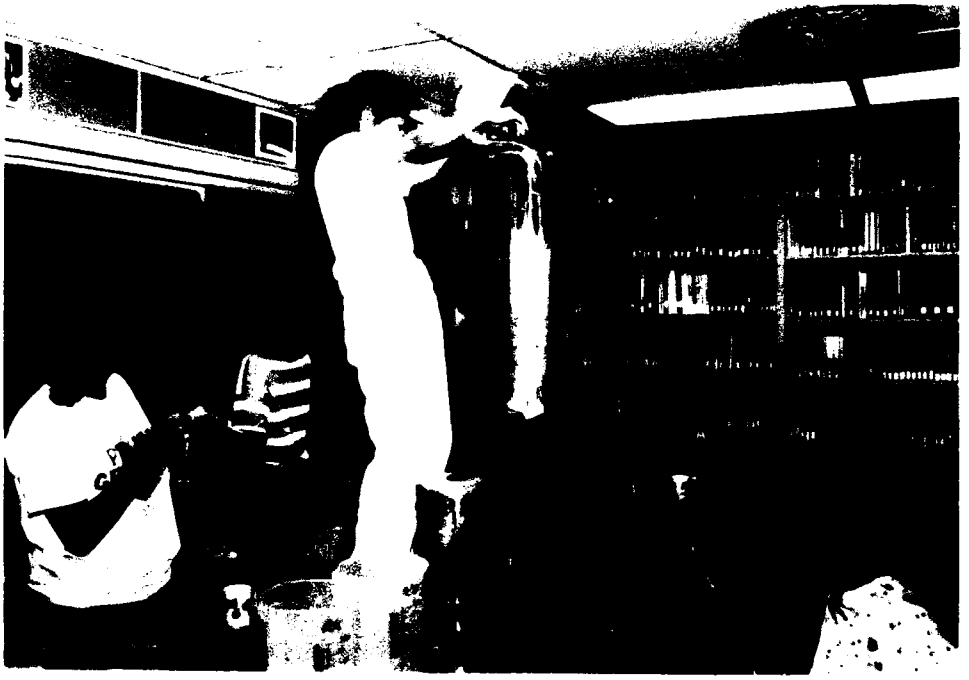
NAME:	Livia Navon
RACE:	White
SEX:	Female
HIGH SCHOOL:	Lincoln High School
COLLEGE:	Still in High School, 12^{th} grade
ANTICIPATED MAJOR:	Undecided
AWARDS/SCHOLARSHIPS:	National Honor Society, J. V. Soccer Academic Award, French II Award (10^{th} grade), English Award (1^{st} place team), Mini Brain Brawls, French Honor Society.
ACTIVITIES/HOBBIES:	Varsity Tennis, Key Club, Writers Exchange, French Club, French Honor Society, Model United Nations.

NAME:	Christine Lin
RACE:	Asian
SEX:	Female
HIGH SCHOOL:	Florida High School
COLLEGE:	Still in High School, 12^{th} grade
ANTICIPATED MAJOR:	Chemistry
AWARDS/SCHOLARSHIPS:	National Latin Exam Gold Medal (8^{th} grade), Silver Medal (10^{th}), Bronze Medal (9^{th}); State Latin Forum Competitions (8^{th}–10^{th} grades); 4^{th} place Grammar I and Advanced Certaman; 3^{rd} place in Derivatives I and Advanced Vocabulary; 2^{nd} place in Advanced Derivatives; 1^{st} place in Derivatives II; Piano Guild; Who's Who Among American High School Students (10^{th}, 11^{th} grades); Top talent Award (9^{th}, 10^{th} grades); Regional Piano Concerto Winner (9^{th} grade), Most Valuable Player for Varsity Tennis Team (10^{th} grade). Outstanding Students of America (11^{th} grade); State Tennis Participant in Florida High School Championships (9^{th} and 11^{th} grades); Winner of 16's doubles in Killearn Country Club and Inn; Junior Championship (9^{th} grade); Thomasville Tennis 16's Doubles (9^{th} grade); Tallahassee Adult Tennis Championships Women's Open Doubles Runner-Up (10^{th} grade)
ACTIVITIES/HOBBIES:	Varsity Tennis Team Member (8^{th}–11^{th} grades), First Seed (10^{th}, 11^{th} grades) and Captain (11^{th} grade). Junior Varsity Volleyball Member (10^{th} grade); USVA Club Participant (10^{th}, 11^{th} grades); Varsity Volleyball Team Member (11^{th} grade) and Captain (12^{th} grade); Latin Club Member (8^{th}–11^{th} grades), Vice President (9^{th} grade), and President (10^{th} grade); Florida Junior classical League Delegate (8^{th}–10^{th} grades); Latin Award (8^{th}, 9^{th} grades); National Council of Teachers of English School Representative (11^{th} grade); Congressional Scholar Representative of Florida (11^{th} grade); National Honor Society Member (10^{th}, 11^{th} grades), Secretary (11^{th} grade) and President (12^{th} grade); Private Lessons for Piano (10 years). Civinettes member (9^{th} and 11^{th} grades), Secretary (10^{th} grade) and Vice President (11^{th} grade).

3. STUDENT WORK PROJECTS

The students participated in digitizing velocity vector data from photographs of flow fields obtained in laboratory experiments that simulate the influence of mountains on the atmospheric jet stream. This activity was a part of a larger project on studies of the interaction of bottom topography with overlying baroclinic waves investigated by Drs. R. L. Pfeffer and R. Kung. The students' work was supervised by Mr. Clayton Lewis and assisted by Messrs. Scott Boyles and Gerald Arnold. Two of these individuals are black and two are undergraduates.

The major project in which the students participated during the summer was the analysis of photographic velocity data from laboratory experiments on the interaction of topography with baroclinic waves, and flows with azimuthally varying lower thermal boundary conditions. The majority of their time was spent in digitizing photographs which were recorded in laboratory experiments designed to study the interaction of topography and different thermal boundary conditions with baroclinic waves. The experiments were conducted in a rotating, differentially heated annulus of fluid.

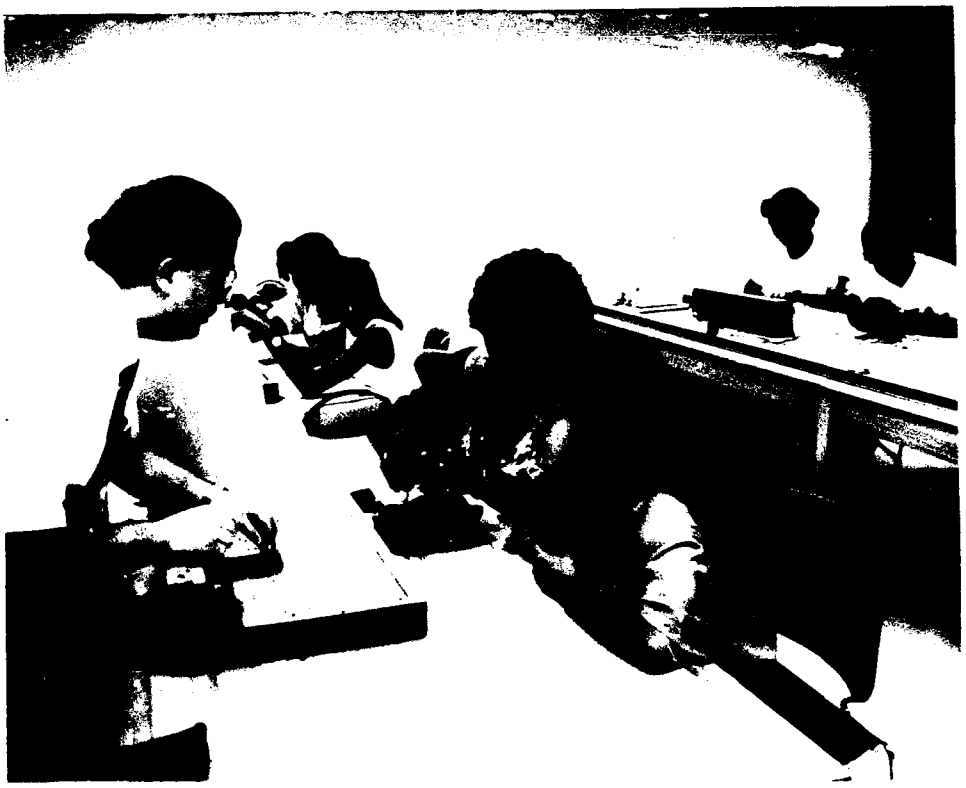


Prof. Ruby Krishnamurti gives a Laboratory Demonstration on "Mixing and Unmixing" with Karen's and James' help. Kenyetta writes the procedure on the blackboard

Prof. J. Magnan gives a lecture on "Deterministic Chaos"

The data from the experiments were obtained by means of a camera, mounted at the top of rotating annulus, which recorded the movements of laser-illuminated particles suspended in the fluid. The camera produced a sequence of still photographs, in each of which the movement of every particle appeared as a string of dots. By digitizing the positions of these dots and calculating the distance between dots and the orientation of each string of dots, one can determine the velocity field as a function of time. Fourier analyses and energetics calculations of such data provide valuable information about the behavior of baroclinic fluids in the presence of bottom topography.

The students had the opportunity to gain experience in the use of digitizing equipment, personal computers, and video monitors which display the work graphically as it is being digitized. They were also able to see and discuss the results of a first-level analysis of the digitized data produced with the DEC VAX computer cluster. During the course of the summer, the students worked with the photographs from several different experiments, which allowed them to see effects



Mr. Tom Harrison (left) explains to Cassandra and Christine how to build a circuit board for data acquisition while other students work in teams on building their own circuit boards.

of variations in experimental parameters such as the difference in temperature between the inner and outer walls of the bath, the speed of rotation, and the presence or absence of topography.

Efforts were made to ensure the students' understanding of the relationships between the theoretical model and observable phenomena, such as the jet stream and ocean currents, which effect the transfer of energy between the earth's equator and poles.

4. INSTRUCTION AND ENRICHMENT ACTIVITIES

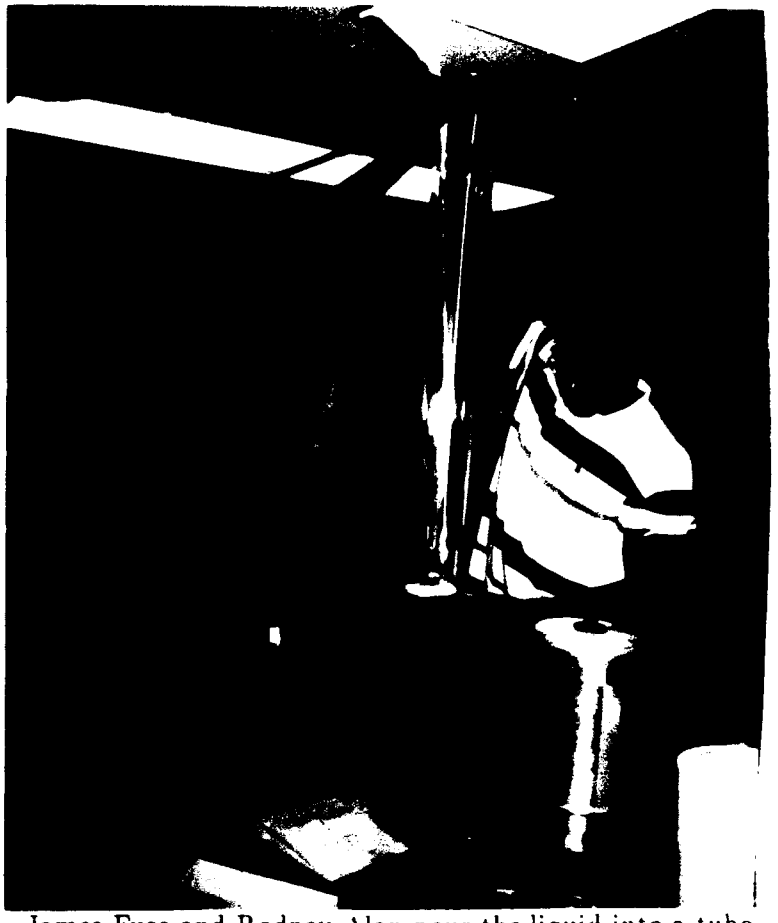
The instruction and training received by the students concerning their work assignments always went beyond that needed to do the job. An attempt was made to make their work experience a learning process and an introduction to scientific research. An explanation of the research project, its implications, and the contribution of the students' work to the overall project was given.

Karen prepares a Laboratory experiment while Kenyetta, Cassandra, Tamara, Rodney, Christine and Livia watch

Aside from the students' activities as apprentices, a variety of other educational activities were scheduled. These included a series of talks on research topics covering a broad spectrum of scientific disciplines. Talks were given by Drs. Buzyna, Pfeffer, Ruby Krishnamurti, Howard, Kung, Blumsack, Gilmer, Gruender, Winchester, Long, Ray and Magnan on topics ranging from the earth's deep interior to mathematics and the sunset In addition to these, the students engaged in discussions with Dr. Pfeffer on the *Coming of Age in the Milky Way*, an exciting book on the history of science by Timothy Ferris. A series of scientific films was also selected and shown by Dr. Kung. These covered topics such as astronomy, evolution, the structure of matter, relativity, space, the oceans and others. Drs. Kung and Krishnamurti also engaged the students in a series of scientific experiments in which different natural phenomena were simulated in the laboratory. A list of these activities is given in Table 1.

Three of the students also took advantage of another opportunity offered by the program — namely a course of their choice, with tuition and books paid for by the program. Two took an Astronomy course given by Prof. Albright and one took a Psychology course. They were given the same homework assignments and exams as the regular college students.

Prof. Loper gives a lecture on "Earth's Deep Interior" to the students



James Fuse and Rodney Alan pour the liquid into a tube during one of the Laboratory Experiments

5. CONCLUSION

The program was very successful this year. The students were bright, attentive, well motivated, and willing to work. Aside from the monetary reward, the students related that they benefited a great deal from their experience. This was especially true of the younger students. They were grateful for the opportunity to work in a scientific environment and acquire new skills and experience. Their contribution to the various projects was also significant. The digitizing work was done carefully and accurately and hence contributed substantially to a much needed data base for further analysis and study. Their work on other projects enabled us to investigate certain aspects we might not have otherwise found time to do or would have had to do at some later time.

In general, the students felt financially rewarded and scientifically enriched by their experience in the program. We feel that the students acquired a certain maturity and confidence which should be a great asset to them during their final years in high school, college and their chosen careers.

Prof. Louis Howard explains "Mathematics and the Sunset"

1991 GFDI Summer Minority Program Enrichment Schedule
Time: 2:00 to 3:00pm
Place: GFDI Reading Room or as indicated

MONDAY (Films)	TUESDAY (Talks)	WEDNESDAY (Discussions)**	THURSDAY (Lab. Demo.)
JUNE 10 F38178 Hidden Structure (Ascent of Man)	11 David Loper The Earth's Deep Interior	12 Richard Pfeffer The Dome of Heaven	13 R. Krishnamurti Rayleigh-Benard Convection
17 F38179 Music of Spheres (Ascent of Man)	18 Louis Howard Mathematics & The Sunset	19 Richard Pfeffer Raising The Roof	20 Robin Kung Rotating Annulus Experiment
24 V70049 Starry Messenger (Ascent of Man)	25 (Discussion) Richard Pfeffer The Discovery of The Earth	26 (Talk) Steve Blumsack Discrete Dyna-mical Systems	27 R. Krishnamurti Double-diffusive Instability
JULY 1 F38180 Majestic Clockwork (Ascent of Man)	2 Jerry Magnan Nonlinear Dynamics	3 Richard Pfeffer The Sun Worshippers	4 Holiday
8 F38183 Ladder of Creation (Ascent of Man)	9 (Discussion) Richard Pfeffer The World in Retrograde	10 (Talk) David Gruender The Trial of Galileo	11 (at EE Lab) Tom Harrison Data Acquisition
15 F38184 World within World (Ascent of Man)	16 George Buzyna Lab. Model of Atmos. Flows	17 Richard Pfeffer Newton's Reach	18 R. Krishnamurti Mixing and Unmixing
22 F38186 Generation Upon Generation (Ascent of Man)	23 Chris Long Nuclear Physics at FSU	24 Richard Pfeffer A Plumb Line to The Sun	25 (at ME Lab) George Buzyna Fluid Mechanics Experiments
29. F38279 Whisper From Space (Nova)	30 Peter Ray Models of Thunderstorms	31 Richard Pfeffer Deep Space	AUGUST 1 Robin Kung Temperature Calibrations
5 F30634 F30782 Dawn of The Solar Age (Nova)	6 John Winchester Global Change Science	7 Richard Pfeffer Island Universes	8 R. Krishnamurti Thermal Oscillators
12 V70031 Oceans (Living Planet)	13 Penny Gilmer Immunology Research	14 Richard Pfeffer Einstein's Sky	15 Robin Kung Temp. Velocity Calibrations

** Chapter by chapter discussion of "Coming of Age in The Milky Way" by Timothy Ferris, Anchor Books, 1988

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Akins (last) Tamara (first)

2 ADDRESS (permanent) 1521 Blountstown Hwy. #803 (street & number) (904) 576-8020 (phone)

Tallahassee (city), FL (state) 32304-1145 (zip code)

2a (school address, '90-91', if applicable) Amos P. Godby High (904) 488-1325 (phone)

1717 W. Tharpe Street, Tallahassee, FL 32302

2b. Expected Major/University Enrolled in Pre-law / T.C.C.

3 LAST GRADE COMPLETED 12th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX ( )Male (X)Female WGPA: 3.24

5 RACE/ETHNICITY:(Voluntary) (X)Black ( )White ( )Hispanic ( )Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State University, Tallahassee,FL

7 MENTOR (name) Dr. R. L. Pfeffer (title) Professor and Director of Institute
Dr. R. J. Kung Research Associate

8 PRINCIPAL DISCIPLINE OF RESEARCH. Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS Outstanding English Student Award, 87-88; High Honor Roll, 87-90; Who's Who Among American High School Students.

11. Activities / Hobbies Vice-Pres - French Club; Member of Anchor Club; Sec-Senior Board; Varsity Softball Team; Tallahassee Mall Teen Board.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Alan (last) Rodney (first)

2 ADDRESS (permanent) 209 China Doll Drive (street & number) (904) 893-0272 (phone)

Tallahassee (city), FL (state) 32312 (zip code)

2a (school address, '90-91', if applicable) Leon High School (904) 488-1971 (phone)

550 W. Tennessee Street, Tallahassee, FL 32308

2b. Expected Major/ Univ. Enrolled in Probably Pre-med / Still a student in High School

3 LAST GRADE COMPLETED 11th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX (X)Male ( )Female WGPA: 4.37

5 RACE/ETHNICITY:(Voluntary) (X)Black ( )White ( )Hispanic ( )Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State University, Tallahassee, FL

7 MENTOR Dr. R. L. Pfeffer (name) Professor & Director of Institute (title)
Dr. R. J. Kung Research Associate

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS Who's Who in American High School Students; National Honor Society; National Junior Classical League; Junior Scholastic Award.

11. Activities / Hobbies Football, Weightlifting, Track, Fishing, Spanish Club, Latin Club, Interact, F.C.A. and Black Tie Board.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Close (last) Kenyetta Tamara (first)

2 ADDRESS (permanent) Route 3, Box 781-C (street & number) (904) 386-4926 (phone)

Tallahassee (city) FL (state) 32308 (zip code)

2a (school address; '90-91', if applicable) Lincoln High School (904) 487-2110 (phone)

3838 Trojan Trail, Tallahassee, FL 32301

2b. Expected Major/ Univ. Enrolled in Dentistry(Biology) / Florida State University

3 LAST GRADE COMPLETED 11th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX ( )Male (X)Female WGPA: 4.29

5 RACE/ETHNICITY:(Voluntary) (X)Black ( )White ( )Hispanic ( )Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State Univ. , Tallahassee, FL

7 MENTOR (name) Dr. R. L. Pfeffer Professor and Director of Institute
Dr. R. J. Kung Research Associate (title)

8 PRINCIPAL DISCIPLINE OF RESEARCH. Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from Photographs of Flow fields obtained in laboratory experiments.

10 HONORS National Honor Society; Black History Brain Bowl Team; Spanish Honor Society; Outstanding Spanish Student; McKnight Achievers Organization; Leon County Academic Excellence Award; Selected by the People to People Student Ambassador Program.

11. Activities / Hobbies Girls Chorus; Concert Chorus; Continental Singers; Studied Piano; Gayfers Girl; Miss St. Peter; St. Peter Youth Choir; Student Against Aids; Lincoln Track Team; Varsity Stat Girl.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME DeSouza (last) Karen (first)

2 ADDRESS (permanent) 2304 Vinkara Drive (street & number) (904) 386-4664 (phone)

Tallahassee, (city) FL (state) 32303 (zip code)

2a (school address; '90-91' , if applicable) Amos P. Godby High (904) 488-1325 (phone)

1717 W. Thape Street, Tallahassee, FL 32302

2b. Expected Major/ Univ. Enrolled in Interior Design / Florida State

3 LAST GRADE COMPLETED 12th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX ( )Male (X)Female WGPA: 3.30

5 RACE/ETHNICITY:(Voluntary) (X)Black__( )White__( )Hispanic__( )Asian__( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State Univ., Tallahassee, FL

7 MENTOR Dr. R. L. Pfeffer, Professor and Director of Institute
Dr. R. J. Kung, Research Associate
(name) (title)

8 PRINCIPAL DISCIPLINE OF RESEARCH. Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS Academcic Letter, Outstanding Award in English and DCT, Outstanding Student Award from Bethel Missionary Baptist Church.

11. Activities / Hobbies Life-time member of Thespian Club of Actors; Sec. of Drama Club, 88-90; Member of Future Educators of America, 89-90; Homecoming Committee, 89-90; DCT, 90-91.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Fuse (last) James (first)

2 ADDRESS (permanent) 4005 Morgan Road (street & number) (904) 877-7805 (phone)

Tallahassee (city) FL (state) 32310 (zip code)

2a (school address; '90-91' , if applicable) Rickards High School (904) 488-178 (phone)

Tallahassee, FL 32310

2b. Expected Major/ Univ. Enrolled in Computer Science / U.C.F / T.C.C.

3 LAST GRADE COMPLETED 11th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX (X)Male ( )Female WGPA: 3.50

5 RACE/ETHNICITY: (Voluntary) (X)Black ( )White ( )Hispanic ( )Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State Univ., Tallahassee, FL

7 MENTOR (name) Dr. R. L. Pfeffer (title) Professor and Director of Institute
Dr. R. J. Kung Research Associate

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS Awards of exceptional reading skills and Math; March of Dimes Read-A-Thon (Third Place); Awards in French.

11. Activities / Hobbies Football, Basketball and Baseball. French Club, Writing (Poetry, short stories), French Congres, Gifted Program.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Gilmore (last) Cassandra (first)

2 ADDRESS (permanent) 1304 Elberta Drive (street & number) (904) 575-2410 (phone)

Tallahassee, (city) FL (state) 32304 (zip code)

2a (school address; '90-91', if applicable) Amos P. Godby High (904) 488-1325 (phone)

1717 W. Tharpe Street, Tallahassee, FL 32302

2b. Expected Major/ Univ. Enrolled in Computer Information Systems / FAMU

3 LAST GRADE COMPLETED 12th TYPE OF SCHOOL: (X) Public ( ) Private

4 SEX ( ) Male (X) Female WGPA: 3.08

5 RACE/ETHNICITY: (Voluntary) (X) Black ( ) White ( ) Hispanic ( ) Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State Univ., Tallahassee, FL

7 MENTOR (name) Dr. R. L. Pfeffer (title) Professor and Director of Institute
Dr. R. J. Kung Research Associate

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Veloctiy Vectors from photographs fo Flow fields obtained in laboratory experiments.

10 HONORS Member of McKnight Achievers Honor Society, Received American Business Woman Scholarship, Award for Most Outstanding Business Student, Honor Roll and Good Citizenship.

11. Activities / Hobbies Member of CBE, Alpha Leadership Program, FBLA, and FEA. I like reading, collecting posters, shopping and talking on the phone.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Lin (last) Christine (first)

2 ADDRESS (permanent) 2108 Skyland Drive (street & number) (904) 386-5913 (phone)

Tallahassee (city) FL (state) 32303 (zip code)

2a (school address; '90-91' , if applicable) Florida High (904) 644-1025 (phone)

100 W. Call St. , Tallahassee, FL 32306

2b. Expected Major/ Univ. Enrolled in Chemistry / Undecided

3 LAST GRADE COMPLETED 11th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX ( )Male (X)Female WGPA: 4.0

5 RACE/ETHNICITY: (Voluntary) ( )Black ( )White ( )Hispanic (X)Asian ( ) Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State Univ., Tallahassee, FL (name)

7 MENTOR Dr. R. L. Pfeffer, Professor & Director of Institute; Dr. R. J. Kung, Research Associate (name / title)

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Veloctiy Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS National Latin Exam Gold Medal (8th grade), Silver Medal (10th), Bronze Medal(9th). State Latin Forum Competition (8-10); 4th Place Grammar I and Advanced Certaman. 3rd Place in derivatives I and Advanced Vocabulary. 2nd Place in Ad-

(continued on back of page)

11. Activities / Hobbies Varsity Tennis Team Member (8-11), First Seed(10-11), and Captain(11). Junior Varsity Volleyball Member (10). USVBA club participant (10,11). Varsity Volleyball Team Member(11) and Captain(12). Latin Club Member (8-11), Vice President (9), and President(10). Florida Junior Classical League Delegate(8-10); Latin Award(8,9). National Council of Teachers of English School Representative (11). National Honor Society Member(10,11), Secretary(11), and President(12). Private Lessions for Piano (10 years). Civinettes Member (9-11), Secretary(10), and Vice President (11).

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Navon (last) Livia (first)

2 ADDRESS (permanent) 3138 Ferns Glen Drive (street & number) (904) 893-7606 (phone)

Tallahassee, FL. (city) (state) 32308 (zip code)

2a (school address; '90-91', if applicable) Lincoln High School (904) 487-2110 (phone)

3838 Trojan Trail, Tallahassee, FL 32301

2b. Expected Major/ Univ. Enrolled in Science, Met., Math, History / Undecided

3 LAST GRADE COMPLETED 11th TYPE OF SCHOOL: (X)Public ( )Private

4 SEX ( )Male (X)Female WGPA: 4.36

5 RACE/ETHNICITY:(Voluntary) ( )Black (X)White ( )Hispanic ( )Asian ( ) Other

6 INSTALLATION (name) Geophysical Fluid Dynamics Institute, Florida State Univ., Tallahassee, FL

7 MENTOR (name) Dr. R. L. Pfeffer (title) Professor and Director of Institute
Dr. R. J. Kung Research Associate

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of Velocity Vectors from photographs of Flow fields obtained in laboratory experiments.

10 HONORS National Honor Society, JV Soccer Academic Award, French II Award(10th), English Award, 1st place team Mini-Brain Brawls and French Honor Society.

11. Activities / Hobbies Varsity Tennis; Key Club; Writers Exchange; French Club; French Honor Society and Model United Nations.

(Suggested Form)

INFORMATION FOR EACH MENTOR

1 NAME: Arnold (Last) Gerald (First)

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

(904) 644-6085
phone

3 DATE OF BIRTH March 2, 1967

4 SEX ( ) FEMALE (X) MALE

5 RACE/ETHNICITY: (Voluntary) (X)Black__( )White__( )Hispanic__( )Asian__( ) Other

6 HIGHEST DEGREE EARNED M.A., Graduate Student, Darkroom Technician

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 6

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1991 8

(Suggested Form)

INFORMATION FOR EACH MENTOR

1 NAME: Boyles (last) Scott (first)

2 INSTALLATION Glorida State University, Geophysical Fluid Dynamics Institute
name

(904) 644-1262
phone

3 DATE OF BIRTH July 1, 1969

4 SEX ( ) FEMALE (X) MALE

5 RACE/ETHNICITY: (Voluntary) ( )Black (X)White ( )Hispanic ( )Asian ( ) Other

6 HIGHEST DEGREE EARNED Undergraduate Student, Laboratory Technician

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 2

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1991 10

(Suggested Form)

INFORMATION FOR EACH MENTOR

1 NAME: Kung (last) Robin (first)

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute (name)

(904) 644-6597 (phone)

3 DATE OF BIRTH May 27, 1939

4 SEX ( ) FEMALE (X) MALE

5 RACE/ETHNICITY: (Voluntary) ( )Black ( )White ( )Hispanic (X)Asian ( ) Other

6 HIGHEST DEGREE EARNED Ph.D.

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 7

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1991 8

(Suggested Form)

INFORMATION FOR EACH MENTOR

1 NAME: Lewis (last) Clayton (first)

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

(904) 644-1262
phone

3 DATE OF BIRTH _____

4 SEX ( ) FEMALE (x) MALE

5 RACE/ETHNICITY: (Voluntary) (X)Black__( )White__( )Hispanic__( )Asian__( ) Other

6 HIGHEST DEGREE EARNED A.A., Research Assistant

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics Institute

8 NUMBER OF YEARS OF MENTORSHIP 3

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1991 8

(Suggested Form)

INFORMATION FOR EACH MENTOR

1 NAME Pfeffer (last) Richard (first)

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

(904) 644-5594
phone

3 DATE OF BIRTH November 26, 1930

4 SEX ( ) FEMALE (xx) MALE

5 RACE/ETHNICITY: (Voluntary) ( )Black (x)White ( )Hispanic ( )Asian ( ) Other

6 HIGHEST DEGREE EARNED Ph.D.

7 PRINCIPAL FIELD OF RESEARCH Meteorology

8 NUMBER OF YEARS OF MENTORSHIP 9

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1991 8