Alabama Commission on Higher Education
Suite 221, One Court Square
Montgomery, Alabama 36197-0001

Commission Meeting
Joint Briefing Room, Alabama State House
11 South Union St., Montgomery
August 19, 1988
1 p.m.

Chairman: Jane McDonald-Vice Chairman: Cyde Foster-Executive Director: Joseph T. Sutton
Steve Means-Borden Morrow-Frank Nix-Richard A. Pizitz-Philip A. Sellers-Bob Word
AGENDA
ALABAMA COMMISSION ON HIGHER EDUCATION
Joint Briefing Room, Alabama State House
11 South Union Street
Montgomery, Alabama
August 19, 1988
1 p.m.

1. Approval of Agenda ........ ED 1-2
2. Approval of Minutes of May 20, 1988, Commission meeting ...... ED 3-22
3. Chairman's Remarks
4. Report of Nominating Committee
5. Progress Report: Executive Director
6. Continuing Business
   a. Eminent Scholar Administrative Procedures .................. ED 23-31
   b. 1. Formula Study/Reaction: Council of Presidents
       2. Preliminary Guidelines for Unified Budget
          Recommendation Development
   c. Resolution on Out-of-State Tuition....................... ED 32
   d. Approval of Commission Lease Agreement with Aronov Realty
7. Student Assistance
   1. Student Assistance Committee Report on Order of Alabama Student Grant
      Program Payments for 1988-89 .......... SA 1-2
   2. Wachovia Request ......................... SA 3
8. Planning & Coordination
   a. Programs
      1. Auburn University
         Doctor of Philosophy in Family & Child Development .... PC 1-23
      2. The University of Alabama/University of Alabama in
         Huntsville/University of Alabama at Birmingham
         Doctor of Philosophy in Applied Mathematics ............ PC 24-50
      3. Jefferson Davis State Junior College
         Associate in Applied Science in Banking & Finance ...... PC 51-53
      4. Muscle Shoals State Technical College
         Diploma in Horticulture ............................... PC 54-57

ED 1
MINUTES
ALABAMA COMMISSION ON HIGHER EDUCATION
August 19, 1988

Attending:

Members
Jane McDonald, Chairman
Clyde Foster, Vice-Chairman
Katie Espy
Charles Horton
Ken Lott
Steve Means
Borden Morrow
Frank Nix
Richard Pizitz
Philip Sellers
Bob Word

Staff
Joseph T. Sutton, Exec. Dir.
Anna Bass
William O. Blow
Sonny Brasfield
Exir Brennan
Meg Burritt
Susan Cagle
Brenda Carter
Kitty Collier
Richard England
Karen Horn
Kay Ivey
Voncile Love
Tom Roberson
Ed Rutledge
Shirley Speer
Linda Thierfelder
Tim Vick
Bill Wall

The Alabama Commission on Higher Education convened at 1:20 p.m. on August 19, 1988, in the Joint Briefing Room of the Alabama State House in Montgomery. Chairman McDonald called the meeting to order and recognized Dr. Asa Green, president of Livingston University, Dr. Roger Sayers, acting president of the University of Alabama, and Dr. John Johnson, president of Alabama Aviation and Technical College. She also introduced Mr. Bill Roberts, who has been appointed by the Speaker of the House to replace Mr. Ken Lott as a member of the Commission.

Dr. Sutton introduced new Commission staff members: Linda Thierfelder, Karen Horn and Shirley Speer.

Ms. Espy made a motion to approve the agenda with the following additions:

a. Add to section 8-d, Off-Campus, Lawson State Junior College at various locations and the University of South Alabama at various locations.

b. Add to section 8-b, Implementation Report, Alabama State University, Bachelor of Science in Computer Science.

c. Delete item 6, Trenholm State Technical College, Diploma in Dental Laboratory Technology.

Mr. Foster seconded the motion to approve the agenda, as amended. The motion was unanimously approved.
Section 8, Planning & Coordination, Item a. Programs, was presented by Ms. Espy.

1. Auburn University -
   Doctor of Philosophy in Family & Child Development

Ms. Espy made a motion for approval of a Doctor of Philosophy in Family & Child Development at Auburn University. The motion was seconded by Mr. Pizitz, and unanimously approved.

2. The University of Alabama/University of Alabama in Huntsville/University of Alabama at Birmingham -
   Joint Doctor of Philosophy in Applied Mathematics

Ms. Espy made a motion for approval of the joint Doctor of Philosophy in Applied Mathematics at The University of Alabama/The University of Alabama in Huntsville, and The University of Alabama at Birmingham. The motion was seconded by Mr. Word, and unanimously approved.

Mr. Pizitz asked the institution to provide the number of Alabamians enrolled in the program.

Mr. Morrow challenged the staff to prepare suggestions for attracting local Alabama students into scientific programs, even if we have to help pay the way.

3. Jefferson Davis State Junior College
   Associate in Applied Science in Banking & Finance Administration

Ms. Espy made a motion for approval of an Associate in Applied Science in Banking & Finance Administration at Jefferson Davis State Junior College. The motion was seconded by Mr. Foster, and unanimously approved.

4. Muscle Shoals State Technical College
   Diploma in Horticulture

Ms. Espy made a motion for approval of a Diploma in Horticulture at Muscle Shoals State Technical College. The motion was seconded by Mr. Sellers, and approved with two "no" votes and eight "yes" votes.

Mr. Morrow indicated that he is not sure the Commission should approve programs where graduates from the program will not make minimum wage.

A representative from Muscle Shoals stated that the program will provide jobs for people where there are no jobs at the present time.

5. Muscle Shoals State Technical College
   Associate in Applied Technology in Electro-Optics

Ms. Espy made a motion for approval of an Associate in Applied Technology in Electro-Optics at Muscle Shoals State Technical College. The motion was seconded by Mr. Foster, and unanimously approved.
WHEREAS, at this time the members of this Board wish to take official note of Coach Bartow’s most recent honor in a long series of honors and awards, and to state again its great admiration and respect for him as a "statesman of sports";

NOW, THEREFORE, BE IT RESOLVED by The Board of Trustees of The University of Alabama that it herewith extend to Coach B. Gene Bartow its heartfelt congratulations on his selection as a member of the Class of 1988 of the Alabama Sports Hall of Fame, an honor of special importance which indicates the stature and reputation he has achieved after only 11 years as a leader in intercollegiate athletics in Alabama.

BE IT FURTHER RESOLVED that this Board, at this time, convey to Coach B. Gene Bartow its sincere appreciation for the many significant contributions he has made to The University of Alabama at Birmingham, to the entire University of Alabama System, and to his adopted state of Alabama, along with its best wishes as he joins other prominent Alabama sports figures as members of the Alabama Sports Hall of Fame.

BE IT FINALLY RESOLVED that this resolution be spread upon the permanent minutes of this Board, and that copies be sent to Coach B. Gene Bartow and members of his family; to appropriate officials at The University of Alabama at Birmingham; to officials in the Sun Belt Conference; and to the news media in the State of Alabama.

Chairman Blount recognized Trustee Samford for a report from the Planning and Priorities Committee. Trustee Samford presented for consideration a proposed resolution approving a joint Ph.D. in Applied Mathematics. This program reflects extensive planning and collaboration between faculty and administrators on the campuses. The proposal has met all the requirements for joint programs imposed by the Board of Trustees and the Alabama Commission on Higher Education. Trustee Samford said it has received internal System review, statewide higher education review, preliminary Planning and Priorities Committee review, and a recommendation for approval by the Alabama Commission on Higher
education. This program, along with the three-campus program in Materials Science and the two-campus program in Materials Engineering, reflects a Systemwide utility of resources which is unseen throughout the country. Trustee Samford said the Planning and Priorities Committee took special note of this program and wishes to applaud the three campuses for their cooperation in establishing it.

After discussion, and on motion of Trustee Samford, seconded by Trustee Wynn, the Board adopted the following resolution:

RESOLUTION

BE IT RESOLVED by The Board of Trustees of The University of Alabama that it approves a joint Ph.D. program in Applied Mathematics on the campuses of The University of Alabama, Tuscaloosa; The University of Alabama at Birmingham; and The University of Alabama in Huntsville.

Trustee Samford presented for consideration a proposed resolution approving selection of Dr. Chester C. Carroll as the first holder of the E. A. "Larry" Drummond Chair of Computer Engineering in the College of Engineering at UA. Dr. Carroll is a nationally recognized figure in Computer Architecture and is conducting research which is truly of world class stature. Dr. Carroll’s resume reflects his outstanding record of achievement and UA is very fortunate to have him on its faculty, Trustee Samford said. After discussion, and on motion of Trustee Samford, seconded by Trustee Delchamps, the Board adopted the following resolution:

RESOLUTION

BE IT RESOLVED by The Board of Trustees of The University of Alabama that it approves the selection of Dr. Chester C. Carroll as the first holder of the E. A.
August 22, 1988

Dr. V. Lane Rawlins  
Vice Chancellor for Academic Affairs  
The University of Alabama System  
P.O. Box BT  
Tuscaloosa, AL 35487-1998

Dear Dr. Rawlins:

The Commission approved the joint Ph.D. in Applied Mathematics at the meeting Friday, August 19, 1988. The staff will review the program after three years have elapsed.

At the meeting the Commission also accepted as an Information Item the establishment of the Center for Neuroimmunology at UAB.

Please contact us if you have questions or comments regarding these or other matters.

Sincerely,

Joseph Sutton

JTS/dn

cc:  Dr. Joab Thomas  
     Dr. Roger Sayers  
     Dr. William Macmillan  
     Dr. Charles McCallum  
     Dr. James Woodward  
     Dr. Anthony Barnard  
     Dr. Ken Roozen  
     Dr. John Lyons  
     Dr. Robert Wright  
     Dr. Allan Spitz  
     Dr. Ned Audeh
August 19, 1988

ALABAMA COMMISSION ON HIGHER EDUCATION

PRELIMINARY STAFF ANALYSIS

The University of Alabama System

Joint Doctor of Philosophy in Applied Mathematics

INSTITUTIONAL REQUEST: The University of Alabama System seeks approval of a Doctor of Philosophy program in Applied Mathematics to be offered jointly by The University of Alabama, The University of Alabama at Birmingham, and The University of Alabama in Huntsville. The CIP designator for the proposed program is 27.0301.

EXTERNAL REVIEW: Dr. George F. Carrier, Chairman of the Harvard University Division of Applied Sciences, served the Commission as consultant in the review of the proposed program. Dr. Carrier's review included site visits to all three institutions, and a written response which is attached to this analysis. The report endorses the quality of the proposed offering and cites the potential success of the joint arrangement as facilitated by a faculty thoroughly committed to the effort. The report also clarifies concerns related to applied mathematics as opposed to mathematics in the so-called "purer" sense, and reiterates the need for persons doctorally trained in applied mathematics. Other material from Dr. Carrier's report is interspersed throughout this analysis.

The UA System engaged two consultants for site visits and proposal reviews. The proposal contains copies of the reports from Dr. Peter Wolfe, of the University of Maryland and from Dr. Stephen H. Davis, of Northwestern University. The response, a copy of which is attached to this analysis, addresses each of the consultants' recommendations. These recommendations include: 1) reduction of the number of required courses; 2) special arrangements for faculty travel and communication among the three campuses; 3) a telecommunications system to allow inter-campus lectures and examinations; 4) more substantive involvement of support faculty and hiring of more faculty with less traditional mathematics
flavor; 5) giving more focus to the program by designating a few principal areas of thrust. The UA System noted that the telecommunications link was not necessary for program initiation, but the feasibility should be investigated.

GRADUATE COUNCIL REVIEW: The Advisory Council of Graduate Deans approved this proposal by a vote of 13 yes, 1 no and 2 abstentions at its November 11, 1987 meeting.

INSTITUTIONAL ROLE: This portion of the review cannot be addressed fully, pending the formulation of institutional role statements according to the guidelines and procedures to be adopted. It should be noted, however, that the three institutions involved currently offer doctoral programs in Mathematics or other supporting areas of the proposed curriculum, such as Engineering, Business, Chemistry and Physics.

PROGRAM DESCRIPTION

Background: In 1986 The UA System filed a Notification of Intent To Plan (NIP) a Ph.D. program in Applied Mathematics, to be offered jointly by UAH and UAB. The UA System later notified the Commission that the program would be proposed jointly by all three System institutions. The program was designed to provide a pool of resources from which each campus may draw. There is no other Ph.D. program in Applied Mathematics in the state; however, Auburn University and The University of Alabama both offer a Ph.D. in Mathematics, CIP 27.0101. No Ph.D. in Mathematics or Applied Mathematics is available through the Academic Common Market.

The Ph.D. programs at AU and UA currently allow for minors in Applied Mathematics. According to the proposal, neither of these programs provides the focus, depth, and breadth of the proposed program. Further, neither program would be as accessible to UAB and UAH students as the joint program. UA has committed to terminating the Applied Mathematics minor if this program is approved, the rationale being that a much stronger program in Applied Mathematics would result from combined resources.

The ACHE staff and the Council of Graduate Deans questioned the need for a freestanding program as
opposed to the minor and the UA System replied that not only would the focus be better and more depth provided, but the required minor in a field of science or engineering other than Mathematics is a unique feature of the program which would enable students to interact more effectively with Mathematicians and scientists from other disciplines. In this regard, Applied Mathematics would appear to serve as a bridge between "pure" Mathematics and other disciplines. The ACHE consultant, Dr. Carrier, in distinguishing the need for the integration of other disciplines stated that "A broader spectrum (than "pure" Mathematics) is spanned by applied Mathematics. Applied Mathematicians are confronted by questions from outside Mathematics and they invoke Mathematics as needed in their attempts to answer those questions."

To further support the perceived differences, the UA System also cited the existence of well established professional organizations in Applied Mathematics, such as the Society for Industrial and Applied Mathematics (SIAM), which sponsors a Worldwide Conference on industrial and applied mathematics. UA also provided a copy of an excerpt from the 1987 Mathematical Sciences Professional Directory which listed 14 institutions or Systems which offer both the Ph.D. in Mathematics and the Ph.D. in Applied Mathematics.

Program Objectives: The objectives of the program are to enable students to master a significant body of Mathematics including the specialty in Applied Mathematics, to relate this knowledge to a coherent area of science or engineering other than Mathematics; and to carry on fundamental research in Applied Mathematics. According to the proposal there will be an additional "bonus" by increasing faculty opportunity for research collaboration among the three institutions.

Organization and Administration: The administrative structure for the proposed program meets the ACHE definition of a joint program. In response to the Graduate Deans' concerns on this point, the UA System addressed specifically the six points in the ACHE definitions. The UA System also provided a copy of the System guidelines for joint graduate programs which incorporate the requirement to adhere to the ACHE definitions. The ACHE consultant, Dr. Carrier, stated that the "proposed arrangements would seem to be well
designed to optimize the use of resources. Cost savings are almost unavoidable; many of the particular faculty strengths at any one institution need not and probably could not be duplicated at another."

Curriculum: Each Program of Study for the proposed Ph.D. offering will consist of at least 54 semester hours at graduate level, including courses needed for the core portion of the Joint Program Examination; a six course Major area; an outside minor that consists of at least four related graduate courses in an area of science, engineering, operations research or applied statistics.

The Council of Graduate Deans, noting the presence in the proposed curriculum of several courses at Master's level, questioned the rigor of the program for doctoral study. The UA System replied that: 1) All graduate programs allow students to enter with a BA degree, hence, the first graduate courses are often at Master's level; potential doctoral students must enter with a higher GRE combined score than those admitted for Master's programs; students' performance on the Joint Program Examination must be above Master's level; the consultants suggested that the program was too rigorous; the rigor of the program resides in the doctoral dissertation, the results of which must be publishable in a nationally recognized journal.

Supporting Fields: The proposed program requires a minor in a field of science or engineering other than Mathematics. Six sample programs of study given in the proposal include minors in physics, computer sciences, control theory, engineering and operations research. Letters of support included in the appendix comprise departments of Business, Arts and Sciences, Physics, Engineering, Computer Science and a center for applied optics.

Accreditation: There are no accrediting agencies for Ph.D. programs in Applied Mathematics or in any fields of Mathematics.

NEED: The proposal describes a need for this program to address the growth of a technically advanced environment in northern Alabama, centered in the Birmingham and Huntsville metropolitan areas, and states that neither
of the existing traditional Ph.D. programs provides the requisite focus, depth, and breadth of the proposed program. The need for such a program to attract federal funding is also cited, as well as the need for access to the program on the part of place-bound students in Birmingham and Huntsville. Finally, the proposal describes a national shortage of Mathematicians, noted in the so-called David report (Report of the Ad Hoc Committee on Resources for the Mathematical Sciences, by Dr. Edward E. David), which predicts a yearly shortfall of 150 Ph.D.'s in mathematics, based on losses in the decade 1973 to 1983.

The staff noted that the proposal did not give specifics of the needs of the "technically advanced environment," although during the consultant's visit, the UAB and UAH faculty named several business and industrial firms which had indicated they would hire graduates of such a program. The proposal also described a demand for this type of program by 25 or 30 persons employed in Huntsville companies. In regard to the national shortage as described in the David report, the ACHE consultant indicated that the report emphasized a need for support in all of Mathematics, and that the proposed program would be a constructive response.

Although the staff recognizes that it is not always possible to identify the explicit need for such a program at the level proposed, nor to identify actual employment possibilities, the staff did seek to determine what the state need might be for graduates. The Research and Statistics Division of the Alabama Department of Industrial Relations publishes projections of employment by occupation and profession. This information indicated that there will be significant growth in employment opportunity for Mathematical scientists and Mathematicians in Alabama to the extent that there will be 40 new job openings annually by 1995. The staff contacted the Research and Statistics Division concerning what employment these people would be engaged in and what their academic preparation would be. The staff was informed that operations experts, systems personnel, statisticians, professors, and others employed in industry, with the exception of computer scientists, are included in the group. The academic preparations of these people was not specifically known, but their employment was generally described as related to "pretty advanced academic degrees." It could be
inferred that the type of preparation described in the proposal would prepare persons for some of these jobs. However, the staff notes that in view of Alabama's projected needs, the anticipated annual enrollment of 40 to 45 students may represent potential oversupply. On the other hand, the staff acknowledges the documented national shortfall of Mathematicians, and that this program could address a portion of that shortage.

STUDENT DEMAND: The proposal describes a demand by place-bound students in Huntsville and Birmingham. In response, the staff reiterates the consideration that it may be necessary at times for people to travel in order to access programs at doctoral level. It is recognized, however, that UAH has documented a student source pool of at least 30 persons employed in Huntsville business, and out of this UAH anticipates an initial enrollment of 8 to 10 students. Likewise, UAB documents an initial enrollment of 5 to 8, and UA 4 to 5 students. To address the place-bound problem, the structure of the joint proposal is that the faculty will travel to the students, and that there will be some transporting of students among the three campuses for colloquia, seminars, and other group meetings.

Currently, the Mathematics departments of the three institutions enroll about 270 undergraduates and about 70 graduate students. It is anticipated that students from these programs and from engineering or other scientific areas will remain to enroll in the proposed program.

RESOURCES:

Faculty: The primary faculty support for the program will come from the current members of the three universities' Mathematics departments. A number of these faculty have directed Ph.D. dissertations and many serve on Ph.D. committees in various science and engineering areas. The faculty's active research is documented in the proposal's record of their refereed publications and successful competition for research funding. As the program grows there will be a need for new faculty positions in numerical analysis and scientific computing. The incremental budgets for the program reflect the addition of these faculty, beginning in the program's second year.
Facilities and Equipment: With the availability of the Alabama supercomputer at Cray II level, equipment on all the campuses is quite adequate. Facilities for classroom use are somewhat limited on the UA campus but are adequate at UAB and UAH. Secretarial help is a need on two campuses, as is adequate space and equipment for new faculty. These are addressed in the projected budget.

Library: As the review of the proposal progressed, the assessment of library needs evolved to the point that a true joint collection assessment was presented, the first of its nature for the Commission review. The assessment indicates that the combined collections are at the recommended research level. However, the assessment correctly highlighted the problem of accessibility of the collection to students in the program, and indicated that technologies such as teletacsimile production and interlibrary loan offer partial solutions, but the total collections are actually not as accessible to all students as would be desired for doctoral research. It will be the faculties' and students' responsibility to work out some of these problems and to deal with the frustration and expense accompanying the process, according to the assessment.

FINANCIAL SUPPORT: The proposal indicates that the financial support for the program will come from the three universities' normal budgets, supplemented by research contracts and grants obtained by faculty. An example of such support is the recent funding through EPSCOR which awarded research enhancing funds to cover a major part of UAB's joint Ph.D. program needs. UAB has the necessary matching funds for the program. Appendix 5 of the proposal lists faculty contracts and grants in quite substantial amounts, from 1980 to the present.

Program Budget: The anticipated incremental costs of the proposed program are reflected in the following budget. The combined annual costs are estimated eventually to total $540,000.

The potential annual formula funding for the program, calculated at the SREB mean is $234,603.
### UNIVERSITY OF ALABAMA

#### First Year
- Faculty Travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 3,000
- Equipment: 4,000
- Total: $15,000

#### Second Year
- Faculty Travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 4,000
- Faculty Member: 50,000
- Total: $62,000

#### Third Year
- Faculty Travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 5,000
- External Examiners Expenses: 2,000
- Faculty Member: 50,000
- Continuing Faculty & Staff: 50,000
- Total: $115,000

#### Fourth and each subsequent year
- $115,000

### UNIVERSITY OF ALABAMA AT BIRMINGHAM

#### First Year
- Faculty Travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 3,000
- Faculty Member: 50,000
- Two Teaching Assistants: 20,000
- Total: $81,000

#### Second Year
- Faculty travel: $3,000
- Applied mathematics Colloquium: 5,000
- Fellowships: 4,000
- Faculty Member: 50,000
- Two Teaching Assistants: 20,000
- Technical Typist: 15,000
- Continuing Faculty & T.A.'s: 70,000
- Total: $167,000
Third Year

- Faculty travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 5,000
- External Examiners Expenses: 2,000
- Faculty Member: 50,000
- Two Teaching Assistants: 20,000
- Continuing Faculty, Staff & T.A.'s: \(155,000\)
- Total: \(240,000\)

Fourth and Each Subsequent Year: \(240,000\)

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UNIVERSITY OF ALABAMA IN HUNTSVILLE

First Year

- Faculty Travel: $3,000
- Applied Mathematics Colloquium: 5,000
- Fellowships: 3,000
- Two Teaching Assistants: 20,000
- Library: \(15,000\)
- Total: \(46,000\)

Second Year

- Faculty Travel: \(3,000\)
- Applied Mathematics Colloquium: 5,000
- Fellowships: 4,000
- Faculty Member: 50,000
- Two Teaching Assistants: 20,000
- Library: 10,000
- Continuing T.A.'s: 20,000
- Total: \(112,000\)

Third Year

- Faculty Travel: \(3,000\)
- Applied Mathematics Colloquium: 5,000
- Fellowships: 5,000
- External Examiner Expenses: 2,000
- Faculty Member: 50,000
- Two Teaching Assistants: 20,000
- Library: 10,000
- Continuing Faculty & T.A.'s: \(90,000\)
- Total: \(185,000\)

Fourth and Each Subsequent Year: \(185,000\)
6 June 1988

Ms. Exir Brennan
Staff Assistant
Instructional Programs
Alabama Commission on Higher Education
Suite 221
One Court Square
Montgomery, Alabama 36197-0001

Dear Ms. Brennan:

This letter is my report, i.e., my reaction to the proposal for a joint-three-institution Ph.D. program in applied mathematics and my reaction to my visit of May 22-24.

I think my views will come through clearly if I address first, in tabular form, the item "Proposed Concerns for Consultant Assigned to Review the Joint Applied Mathematics Doctor of Philosophy Program", and then, again in tabular form, the "Charge for Consultant in the Review of Proposed Ph.D. in Applied Mathematics". In the latter I will omit a few items that are redundant with some of the "Proposed Concerns ..."

I'll then add some remarks that don't fit naturally in the first two lists.

Response to "Concerns ..."

1. I believe that the proposed joint program can become a much more effective educational vehicle than could individual programs at any or all of the three universities. I doubt that current strengths at any one of those institutions would be denied to the students and/or faculty of the others in the absence of such a joint program but it is only with an explicit cooperative effort in place that truly effective advantage of the composite scope and depth of the three sets of resources would be taken.
2. You should welcome the healthy competition wherein each institution attempts to attract excellent students to activities of high quality and challenge. However, I see no implication that any one must decline as a consequence of that competition provided that each group exercises and builds on its strengths.

3. If administered flexibly the proposed arrangements would seem to be well designed to optimize the use of resources.

4. I know of no close parallel. However, MIT and the Woods Hole Oceanographic Institute offer a very successful degree program in oceanography. Harvard University also participates informally in that effort.

5. I have no expertise regarding administrative strategy. I do sense that the proposed program can work well. What is really required (I think) is that the faculty and administrators be guided more by the educational needs of the students than by rigid adherence to a book of rules.

6. "Other things being equal", the student with the broader exposure will have an advantage over those who don't. However, the more nearly community-bound student who interacts with his peers will also profit from the cooperative aspects of the effort albeit in a more second-hand way. The program can be an integrated program; it will be when the students find it worthwhile to take advantage of the jointness and when the faculty have the will to present the program in ways conducive to the necessary interplay. I have been impressed by the extent to which that will is already in place and the extent of the interaction plans for next year.

7. Programs of inadequate quality could be subsumed under the same words that are used by those who provide excellent programs. I am persuaded that the current faculty of the three institutions fully intend that their program should be of high quality and I am confident that it will.

Responses to "Charge"

1. Cost savings are almost unavoidable; many of the particular faculty strengths at any one institution need not (and probably could not) be duplicated at another. The broader exposure of students to more of their peers and to more faculty members guarantees access to a broader set of prospectives, motivations, skills and attitudes.
4. Many applied math (applied physics) students would find it advantageous to have access to the activities of an Applied Physics (Applied Math) program. Conversely, many applied math students have interests that are largely disjoint from applied physics. I would suggest that the proposed three institution effort should not be delayed further for an exploration of a still broader effort but I would also suggest that, as the program develops, those who have rapport with physics be receptive to informed collaboration when the resource distributions of the two groups suggest that it would be productive. It is the development of rapport across institutional boundaries that is most important.

6. The narrowest interpretation of the label, mathematics, is one that characterizes it as a self-contained intellectual discipline that does not need to make contact with other human activities or concerns. Even in that limited format, mathematics presents enormous challenges and mathematicians devise lines of reasoning of enormous power. A broader spectrum of activities is spanned by Applied Mathematics. To some (I'll greatly oversimplify by calling them applied Mathematicians) the term implies a concern with those aspects of mathematics, those procedures, and the development of those formalisms that are, or may be, recurrently useful to those who quantify things of interest in the real world. Others (the Applied mathematicians) are confronted by questions from outside of mathematics and they invoke mathematics as needed in their attempts to answer those questions. One might regard these definitions as the end points for a very broad category of activities subsumed as Applied Mathematics which, like mathematics itself, also presents enormous challenges and also leads to great accomplishments. By and large, real people pursue careers that sample in various ways from the spectrum of activities implied above. You will easily see that different individuals can distinguish mathematics from applied mathematics by subdividing the foregoing spectrum in different ways. Any effort by me to pick "the right one" would not improve this report.

7. I believe that the David report does emphasize the need for support in all of mathematics. With that interpretation I would assert that this program would be a constructive response.
8. Ph.D.s in Applied Math are in demand and there is strong expectation that the excess of demand over availability will continue to increase.

I have tried in the foregoing lists to respond objectively to individual charges and statements of concern. My more general reaction proceeds from a few perceptions that are based on my own experience and that of colleagues. I would assert that: a Ph.D. student in Applied Mathematics is admitted to serve an apprenticeship during which he is to demonstrate that he, upon graduation, is qualified to conduct independent research in that discipline. For that demonstration the student must acquire, and display thru examinations, a clear understanding of the mathematical foundations needed for his proposed research field, a clear understanding of the manner in which questions that arise outside of mathematics are recast as mathematical questions and a clear understanding of some of the ways in which that mathematics can be invoked in the treatment of those mathematically formulated questions. He must also conduct a supervised but reasonably independent research investigation within which is incorporated some of all of the foregoing foundational understanding.

A Ph.D. student is well served by his university if the faculty who, of necessity, oversee and carry out these activities are, themselves, dedicated to research, dedicated to quality instruction and dedicated to the progress of those students. When a new joint program is at issue it is also necessary that the faculty be dedicated to the success of the inter-campus interactions.

In a nutshell, I am very very impressed with the extent to which the faculty is engaged in Applied Mathematics research, is dedicated to the understanding of mathematical foundations, and I am particularly impressed by the extent to which that faculty has recognized the importance of the inter-campus interactions and has committed itself to activities for next year that are designed to initiate substantive interaction. I am very enthused about the prospects for excellence in this program and thoroughly support its implementation.

Very truly yours,

George P. Carrier

GFC; ljk
RESPONSE TO THE REPORTS BY THE CONSULTANTS

Both consultants encourage us to involve faculty from other departments in the program. We agree that it is desirable to do so; in fact, each graduate supervisory committee must have at least one faculty member from the minor area. (The minor is never in mathematics.) We also agree that it will be a good idea to encourage faculty in other disciplines to act as joint thesis supervisors and we intend to do so. We do not feel that faculty from other departments should have sole supervisory responsibility for a student in the mathematics department. We also do not believe that it is wise for faculty from other disciplines to sit on the Joint Program Committee. Dr. Wolfe mentions the possibility that UAB students could pursue a joint degree program with Biomathematics. This possibility is allowed in the proposed program, since several faculty members who have primary appointments in the Department of Biostatistics and Biomathematics at UAB are included in the mathematics faculty for the program (see page 32 of the proposal).

Both consultants point out that it would be highly desirable to hire additional faculty in numerical analysis and computational mathematics. Our intent to do so is indicated on page 28 of the proposal. It should be noted, however, that these are extremely difficult areas in which to hire and that it may
take several years to accomplish our goals. Professor Davis suggests that we try to focus on a limited number of areas in hiring and build excellence in those areas. This is, indeed, the strategy which we intend to pursue. We recognize that it is impossible to give coverage to all areas of mathematics. The specific areas we target at any given time will depend on the current strengths in the three departments and the availability of suitable faculty.

The consultants recommend establishing a telecommunications link amongst the three campuses and using the link for meetings, seminars, courses, etc. Although such a system is not necessary to begin a joint program, we believe it would be a major benefit to our program, to other joint or cooperative programs, and to the three campuses in general. We encourage the central administrations of the three universities to investigate the feasibility of such a communications network.

The suggestion by both consultants to have periodic joint retreats for all three departments, with both scientific and social events, is an excellent idea. We plan to implement this suggestion.

Dr. Wolfe comments on the administration of the program and the Joint Program Committee in particular. He points out that Graduate Deans should not be involved in the "nuts and bolts" operation of the program. The Graduate Deans are ex officio non-
voting members of the Joint Program Committee. They will not be expected to attend every meeting of the Joint Program Committee or to involve themselves in the educational details of the operation of the program. The Joint Program Committee will, in fact, play two roles, administrative and educational, as described by Dr. Wolfe. These areas are not completely separate and we feel that it would be best to involve the same faculty in both aspects of operating the program. The Joint Program Committee would consult fully with the Department Chairs on the operation of the program.

We agree entirely with Dr. Wolfe's comments concerning the need for active recruitment of graduate students. The mathematics department at UA agrees that graduate stipends are too low and should be raised.

Dr. Wolfe suggests that provision be made for students to earn a Masters Degree on the way to the Ph.D. Each school has at least one Masters Degree program in its mathematics department and students in the joint Ph.D. program will automatically fulfill many (though not all) of the requirements for a Masters degree. By meeting the additional requirements of a Masters program at the university in which the student is enrolled, those students who want a Masters Degree and are qualified can easily obtain one.

In response to suggestions from both consultants that the
proposed program requires too much course work, the minimum number of semester hours required for each program of study has been reduced from 60 to 54.

In response to the suggestion by Dr. Davis that more methods courses be included, a two-course sequence in Numerical Methods in Partial Differential Equations and Finite Element Methods has been added to the original five options for the Joint Program Examination.
June 29, 1988

Dr. Joseph T. Sutton
Executive Director
One Court Square, Suite 221
Montgomery, Alabama 36197-0001

Dear Dr. Sutton:

In Dr. Lane Rawlin's absence, I have been asked to forward two documents which we believe will be useful as the Commission considers our proposal for a Joint Ph.D. Program in Applied Mathematics. The first document describes the modifications which have resulted from the review process.

The second document is a written response to Dr. Bill Blow's letter of October 14, 1987 to Dr. Lane Rawlin. Although, Dr. Rawlin and Dr. Blow have discussed these issues on several occasions, we believe this instrument will be useful in formally addressing those points.

Please contact me if you have any questions or if I may be of further assistance.

Sincerely,

O'Neal Smitherman

H. O'Neal Smitherman, Ph.D.
Director of Institutional Research

HOS: gaf

Attachments

cc: Dr. V. Lane Rawlin
Dr. Roger Sayers
Dr. Allan Spitz
Dr. James Woodward
Dr. William O. Blow

Equal Opportunity in Education and Employment
In a letter dated July 29, 1987, The University of Alabama System submitted a proposal for a Ph.D. in Applied Mathematics to the Alabama Commission on Higher Education. The proposal indicated that the program would be jointly offered by the three campuses of the System and described the program contents, the resources available to support the program, and the administrative procedures to be followed. Since that time we have benefited from the advice of Dr. James Norton regarding the administration of joint programs and we have had the experience of implementing the joint Ph.D. in Materials Science. Most recently, we received the written comments of Dr. George F. Carrier following his three-day visit to Alabama to review the proposed Ph.D. in Applied Mathematics. We would therefore like to make the following comments and modifications relative to the original proposal.

I. Program Faculty

On pages 29 - 32 of the proposal, the program faculty are identified. As noted, all individuals will hold graduate faculty status and be actively involved with research of an applied mathematics nature.

Comment - Although not explicitly stated in the proposal, it is appropriately implied that any new faculty member who joins one of the three institutions and satisfies these criteria will be eligible to join the Applied Mathematics faculty. The nomination for faculty membership will come from the campus and be acted on by the Joint Program Committee.

II. Joint Program Committee

The proposal indicates (pages 8 and 9) that the program will be administered by a Joint Program Committee consisting of six faculty members (2 from each of the three departments) and the three graduate deans from the participating institutions. It further states that the graduate deans will serve as non-voting members of the Committee.

Comment - Because each campus will be principally involved through its math department, we see no reason to have more than three representatives from each campus. One of those three will be the campus program director and the other two will be faculty members selected by their peers. While the graduate deans and the involved school deans have important responsibilities related to the administration of the joint program, those responsibilities can be exercised through normal channels without direct participation on the Joint Program Committee.

The chairman of the Joint Program Committee will be selected by members of that Committee and will be responsible for providing the necessary administrative oversight. Because an administrative structure is already in place on each campus in the form of academic departments, no incremental expense associated with these oversight
responsibilities is anticipated. However, if such expense arises, it will be borne equally by the three campuses.

III. Graduate Study Supervisory Committee

As described on page 10 of the proposal, a Graduate Study Supervisory Committee will be formed for a student after the student has successfully passed the Joint Program Examination common to all students. The student’s committee is then responsible for planning and overseeing the remainder of the student’s program. As noted in the proposal, the Committee will be comprised of five graduate faculty members including at least one faculty member from each of the other two campuses and one faculty member from the minor area of study. Additional faculty could be appointed to this Committee if warranted by the student’s interest and program of study and research.

Comment - There has been some discussion about the possibility of having a single representative from only one of the other two campuses on this Committee. However, we believe it would be useful and not unnecessarily burdensome to maintain the requirement that each Supervisory Committee have a representative from each of the other two campuses.

IV. Degree Designation

Page 20 of the proposal indicates that separate degrees will be awarded by each of the three campuses.

Comment - As was indicated verbally to the Commission staff shortly after the submission of this proposal, any graduate from the Applied Mathematics program will receive a single degree awarded jointly by the three campuses.

V. Faculty and Student Meetings

The proposal does not provide specific information regarding faculty and student meetings.

Comment - The program faculty is the combined Applied Mathematics faculty from the three campuses. The program student body is the total of the students pursuing doctoral work in Applied Mathematics within The University of Alabama System. Although various meetings of faculty and students will naturally occur, the formal sessions are described as follows:

- A one-week, new student orientation program will be held each year after completion of the fall term. The combined group of new students will spend time on each campus learning about activities and capabilities throughout the System.

- An annual conference will be held during which faculty and students from throughout the State will give papers. The students in the joint program will be required to attend.

- The Joint Program Committee will meet quarterly.
The combined Applied Mathematics faculty will meet at least twice a year. One of these meetings might be in connection with the annual conference.
Response to Questions Posed by the
Alabama Commission on Higher Education

In the following, we address questions raised in the October 14, 1987 letter from William O. Blow, Deputy Executive Director of the Alabama Council on Higher Education, to V. Lane Rawlins, Vice Chancellor for Academic Affairs of the University of Alabama System, regarding the proposed joint Ph.D. program in Applied Mathematics.

The format we will follow is to review the question that was raised by the Council, and then offer a response.

1. "The proposal states that students will be encouraged, but will not be required to take courses at other campuses... Implicit in the definition of joint offerings is that students would utilize the resources of each campus involved in a joint program. If all resources, courses, etc. were in place on each campus, then the necessity or desirability of jointness would seem to diminish."

   Response One of the main features of the proposal is that it combines the faculties of three departments under one degree program. Students will be able to take advantage of this extended program through faculty exchanges, which are more efficient and less costly than movements of students throughout the system. UAB and UA have already had some experience with faculty exchanges, in which a faculty member travels from one campus to the other once each week to teach and meet with students.

   The planned faculty exchanges will be necessary for the success of the program, since the departments have agreed to avoid duplication of specialized courses as well as specialties of faculty members. Moreover, incentives to faculty (through reduced teaching loads) and funds for travel (identified in the budget) have been made part of the proposal.

   As a consequence, the participating institutions will be able to offer specialized courses in all areas of expertise at all the institutions, making it unnecessary to require students to take a specific number of courses at other campuses, but without duplication of faculty. This process will also expose students to many more areas of concentration from which to select a research topic, and make available to them potential thesis advisors from all three campuses.

   We expect that students will spend at least the last year of study with their advisor, as is traditional in mathematics and science doctoral programs.

2. "The proposal describes no joint faculty appointments, as is required by the definition of joint programs."

   Response A provision will be explicitly written in the proposal calling for joint appointments of participating faculty on the Graduate Faculties of all three institutions. These faculty will have the same privileges and rights as faculty at those institutions, including teaching of courses, direction of thesis research, and access to the library.

3. "The proposal states on page 20 that 'The degree granted...will be...awarded by the campus where candidacy was obtained and the dissertation written.' The definition of joint programs stipulates that a joint program is, 'A program which is mutually sponsored by two or more institutions leading to a single degree which is conferred by both or all participating institutions."

   Response The requirement that the degree be awarded by the campus where candidacy was obtained and the dissertation written is consistent with the definition of joint programs as defined in the proposal. The definition of joint programs specifically states that joint programs are programs that are mutually sponsored by two or more institutions and lead to a single degree which is conferred by both or all participating institutions.
Response: Under the current proposal students would graduate from one of the participating institutions. To conform to the ACHE requirement, we will amend the proposal so that a single degree is awarded under the seals of all participating institutions.

4. "The library assessments included in the proposal reflect no joint planning for collection development. Rather, they are three separate assessments. This has the potential for considerable and costly unnecessary duplication of materials. A joint offering should involve collaborative library planning and purchasing."

Response: The program contains a core of material which is common to most doctoral programs in mathematics or applied mathematics. The libraries of all participating institutions should (and do) contain materials covering this core subject matter.

However, outside the standard material encompassed by the core, the main focus behind library acquisitions is the need to support the specialized research needs of the faculty. Since faculty research interests in applied mathematics on the three campuses are complementary, not duplicative, the fact that each campus supports its research specializations eliminates needless duplication, and provides for more cost effective and efficient additions to collections.

The three institutions have also agreed to form a joint library committee to coordinate library acquisitions and ensure that duplication of library acquisitions does not develop as research interests broaden and faculty numbers increase.

5. "The proposal comes very close to indicating that one or two of the institutions possibly could offer this program alone. The definition of joint programs states that, 'The joint program is so designed that its viability is dependent upon the shared resources of the participating institutions. In the even one or more of the participating institutions cannot meet its commitments and responsibilities, the program would be terminated.' It is not clear whether this could be the case with the proposed program."

Response: No single institution in Alabama has the resources to mount a doctoral program in mathematics having the breadth and depth of the proposed joint program. Although there is an applied mathematics option in the doctoral program in mathematics at UA, the faculty there have stated that replacing the existing option in applied mathematics with the proposed joint program would result in a much stronger program, including new specializations and additional coverage in existing ones.

A unique feature of the program is the required minor in a field of science or engineering other than mathematics. This is considered an extremely important feature of a program in applied mathematics, one of whose main objectives is the training of students to use mathematics to solve problems in other disciplines. The minor will enable students to effectively interact with both mathematicians and scientists and engineers working in related but different fields.

In a concern which was not numbered separately as a question, the Commission also raised the issue of library expenditures agreed to by UA in 1985, when the Master of Arts in Applied Mathematics was approved. These requirements for library expenditures have not been met.

The evaluation of the University of Alabama Library collection in applied mathematics indicates that the current collection is adequate to support a doctoral program in applied mathematics (see pages 9 and 12 of the library assessment). It must be remembered that recommendations for additions to the library are made with a goal of having an excellent collection, as opposed to one which is adequate or even quite good. The recommendation for additional expenditures calls for a one-time cost of $15,000 and continuing costs of $12,500 annually. The plan is to meet these needs over the next five
years. There are, however, no current deficiencies which must be rectified before the proposed program can be put into place.

It should also be noted that the figures quoted were arrived at through a simulation study, and do not represent specific title needs. Rather, they indicate the maximum resources likely to be necessary to achieve a collection of very high quality. Specific needs will be determined in consultation with the faculty over the next several years, reflecting current interests of the faculty and students in the program at that time. In particular, new journal and monograph acquisitions will depend upon new appointments in the department. It is possible that actual needs will come to less than the proposed amount.

The combined resources of the three proposing institutions also serve to address the deficiencies previously perceived on the UA campus.

In addition, it should be noted that advances in telecommunications and computing have made additional resources available. Interlibrary loan is now more efficient than ever, and the American Mathematical Society and other professional organizations offer computer on-line services for scanning journal and abstract titles, decreasing the need for having in house the same holdings which would have been judged essential ten years ago.

It is the intent of the Mathematics Department and the library at the University of Alabama to develop plans for cooperation with the library systems at the University of Alabama in Huntsville and the University of Alabama at Birmingham, in order to avoid duplication of materials.