

UNIVERSITY FACULTY SENATE

SUMMARY OF THE AGENDA

March 6, 1989

- I. ADOPTION OF THE AGENDA
- II. APPROVAL OF THE MINUTES: February 13, 1989
- III. REMARKS BY PRESIDENT TRABANT and/or ACTING PROVOST MURRAY
- IV. ANNOUNCEMENTS
 - 1. Senate President Dilley
- V. OLD BUSINESS - none
- VI. NEW BUSINESS
 - A. Recommendation dealing with the new Senate structure
 - B. Recommendation altering the membership of the Committee on Undergraduate Studies
 - C. Recommendation dealing with Faculty Senate committee participation by conference telephone
 - D. Recommendation for provisional approval of a new major leading to the B.S. degree in Biochemistry
 - E. Recommendation on the relocation of the Department of Food Science in the College of Human Resources to the College of Agricultural Sciences
 - F. Recommendation for the establishment of an interdisciplinary Ph.D. program in the Neurosciences
 - G. Introduction of new business

RESOLVED, that the new Senate officers, elected in May 1989 will take office on September 1, 1989, leaving the current Senate Officers in office until September 1, 1989, and be it further

RESOLVED, that the new Senators, elected in spring 1989 will take office on September 1, 1989, leaving the current Senators in office until September 1, 1989, and be it further

RESOLVED, that the Committee on Committees, in staffing the new Senate committees, will try to insure continuity by staggering new committee appointments so that no more than half expire in any given year and, when possible, by filling vacancies with those individuals who were serving on recently disestablished University Faculty Senate committees.

- B. Recommendation from the Committee on Committees (B. Seidel, Chairperson), with the concurrence of the Faculty Senate Executive Committee, altering the membership of the Committee on Undergraduate Studies.

WHEREAS, the current charge of the Committee on Undergraduate Studies is to consider and formulate recommendations on undergraduate curricular changes, and

WHEREAS, the Dean of Counseling wishes to restrict his membership to committees of direct application to his position, be it therefore

RESOLVED, that the charge to the Committee on Undergraduate Studies as it appears in Section I-III, page I-21, paragraphs 2 and 3 of the Faculty Handbook be amended as follows:

This committee shall have the responsibility for setting policies concerning academic deficiency. This committee shall receive and review for policy consideration from the Undergraduate Records and Certification Committee an annual summary report of its activities. This committee shall recommend, for final determination by the Faculty Senate, the undergraduate educational and academic admission policies, and, in consultation with the Committee on Undergraduate Records and Certification, the policies of academic standing of undergraduates. The committee shall advise the Dean of Admissions, the Dean of Counseling and Student Development,¹ and the University Registrar in implementing these policies.

¹Section added.

This committee shall consist of an appointee of the Vice President for Academic Affairs; three faculty members from the College of Arts and Science (if feasible, one from natural sciences and mathematics, one from arts and humanities, and one from social and behavioral sciences) and one faculty member from each other undergraduate college, one of whom shall be chairperson; one representative of the Committee on Graduate Studies, three undergraduate students; the University Registrar; the Dean of Counseling and Career Services,² and the Assistant Registrar for Scheduling and Registration.

- C. Recommendation from the Committee on Committees (B. Seidel, Chairperson), with the concurrence of the Faculty Senate Executive Committee, dealing with Faculty Senate committee participation by conference telephone.

WHEREAS, it shall be the right of a University committee member whose primary assignment is more than 40 miles away from the Newark campus to attend committee meetings by conference telephone or other electronic means, be it therefore

RESOLVED, that it shall be the responsibility of the distant committee member to request electronic arrangements at least five (5) working days prior to a scheduled meeting and provide telephone access at his or her location, and be it further

RESOLVED, that it shall be the responsibility of the committee chairperson to make arrangements for an appropriately equipped room (with a conference telephone) for the committee meeting and insure that copies of the agenda and relevant attachments are received by the distant committee member at least 24 hours prior to the scheduled meeting, and be it further

RESOLVED, that because of the difficulty and confidentiality of the business of the Promotions and Tenure, Academic Appeals and Faculty Welfare and Privileges committees, the meetings of these committees shall be exempted from the requirements of electronic attendance, and be it further

RESOLVED, if the Chairperson feels that, on special occasions, personal attendance is necessary, the Chairperson may appeal to the Faculty Senate Executive Committee. If the request is approved, the Chairperson must see to it that committee members receive notice at least three (3) working days before the meeting.

²Words to be deleted.

- D. Recommendation from the Committee on Undergraduate Studies (J. Morrison, Chairperson), with the concurrence of the Coordinating Committee on Education (L. Palmer, Chairperson), for the establishment of a new major leading to the B.S. degree in Biochemistry. (Attachment 1)

RESOLVED, that the Faculty Senate approves provisionally, for four years, the establishment of a Bachelor of Science degree in Biochemistry, effective immediately.

- E. Recommendation from the Committee on Undergraduate Studies (J. Morrison, Chairperson), with the concurrence of the Coordinating Committee on Education (L. Palmer, Chairperson), to relocate administratively the Department of Food Science from the College of Human Resources to the College of Agricultural Sciences. (Attachment 2)

RESOLVED, that the Faculty Senate approves the administrative relocation of the Department of Food Science from the College of Human Resources to the College of Agricultural Sciences provided:

- (1) Current service functions to all majors, departments, and colleges continue; and
- (2) Any changes in the Food Science program resulting from the move, short-term and long-term, be submitted through appropriate approval channels for review and action by the University Faculty Senate.

- F. Recommendation from the Committee on Graduate Studies (R. Exline, Chairperson), with the concurrence of the Coordinating Committee on Education (L. Palmer, Chairperson), for the establishment of an interdisciplinary Ph.D. program in the Neurosciences. (Attachment 3)

WHEREAS: The field of Neuroscience, an interdisciplinary activity involving biologists, chemists, computer scientists, engineers, mathematicians, pharmacologists, physicists and psychologists, is a rapidly growing field of scientific endeavour which promises a growth in our understanding of the physical basis of the mind and the role it plays in biomedical and biobehavioral phenomena, and

WHEREAS: Training for research in the neurosciences involves inputs from more than a single academic discipline, and

WHEREAS: Faculty in the School of Life and Health Sciences and in the Department of Psychology of the University of Delaware have jointly developed a proposal for an

interdisciplinary Ph.D. program in the neurosciences, which proposal is enthusiastically supported by research scientists in local corporate laboratories, and

WHEREAS: The number of faculty and corporate collaborators is sufficient to staff a relatively low-cost Neuroscience Ph.D. program of the sort which, at Universities comparable to the University of Delaware, has attracted highly-qualified graduate students, be it

RESOLVED: That the University Faculty Senate approves provisionally, for four years, the establishment of an interdisciplinary neurosciences Ph.D. program in which students will satisfy degree requirements in either the School of Life and Health Sciences and in Neurosciences, or degree requirements in the Department of Psychology and in Neurosciences, effective September 1, 1989.

G. Such items as may come before the Senate. (No motion introduced at this time may be acted upon until the next meeting of the Senate.

rg

Attachments: Committee Activities Report

1. B.S. in Biochemistry
2. Relocation of the Department of Food Science
3. Interdisciplinary Neurosciences Ph.D. Proposal



COMMITTEE ACTIVITIES REPORT

ACADEMIC APPEALS, COMMITTEE ON (Susan McGrath-Powell)

No activity.

BUDGET REVIEW, COMMITTEE ON (Allen Morehart)

No new business.

COMMITTEES, COMMITTEE ON (Barry Seidel)

1. Discussing various replacement appointments to Senate committees.
2. Soliciting volunteers/nominees to serve on 1989-90 Senate committees.

COMPUTER COMMITTEE (David Usher)

1. Examining ethics and computer use.
2. Examining the degree of computer literacy on campus.

FACULTY WELFARE AND PRIVILEGES, COMMITTEE ON (Anne McCourt-Lewis)

Discussing development of consistency in the procedures used for hearings at Step 3 of the academic grievance procedure and the possibility of including those in the Faculty Handbook.

FINE ARTS AND EXHIBITIONS, COMMITTEE ON (Leta Aljadir)

No new business.

PHYSICAL PLANNING AND UTILIZATION, COMMITTEE ON (Edward Nickerson)

Planning to meet with appropriate officials, especially Vice President Hollowell, on land use and Project Vision reports.

UNDERGRADUATE STUDIES, COMMITTEE ON (James Morrison)

1. Considering deletion of Physical Therapy as undergraduate major.
2. Reviewing new minor in Religious Studies.
3. Discussing revisions to Physics concentration.
4. Discussing minor in Food Science.
5. Considering revision of major in Coordinated Undergraduate Dietetics.
6. Considering new major in Interior Design.
7. Reviewing deletion of major in Design.
8. Considering RN-BSN/MS option.



University of Delaware


DEPARTMENT OF CHEMISTRY
OFFICE OF THE ASSOCIATE CHAIRMAN
102 BROWN LABORATORY
NEWARK, DELAWARE 19716

(302) 451-1130

February 15, 1988

MEMORANDUM

TO: D. Heyward Brock, Associate Dean
College of Arts and Science

FROM: John L. Burmeister 
Associate Chairman

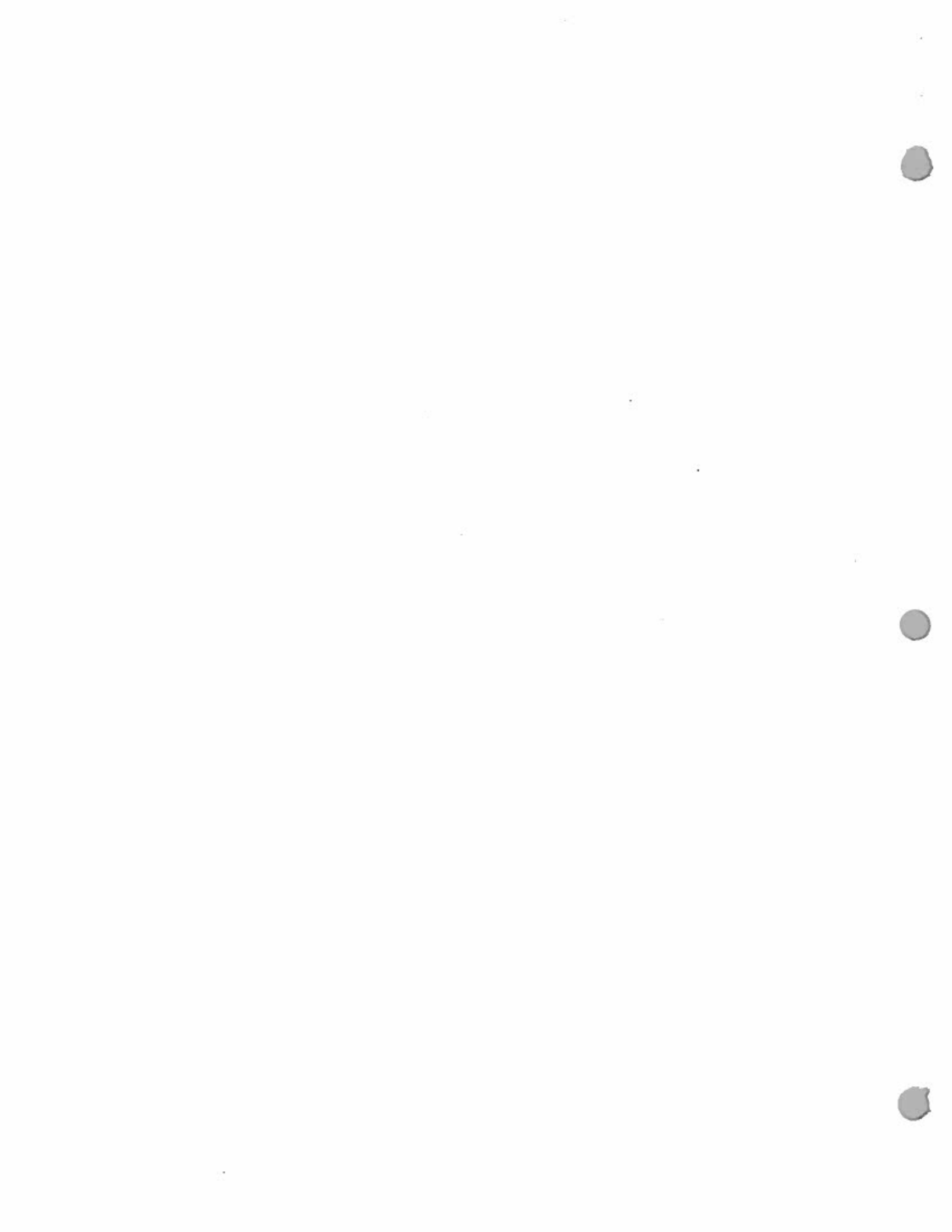
SUBJECT: Request for Approval of C-342, Introduction to Biochemistry
(New Course) and B.S. in Biochemistry (New Program)

Relevant supporting documentation concerning the title course and program are enclosed. Please put the requested approvals on the agenda of the appropriate College committee at your earliest convenience.

b1

Enc.

cc: Ms. Bernice Weinacht
Dr. Jean Futrell



PROPOSED - (Dec. 8/21, 1987) - Biochemistry Division
REVISED - (Jan. 29, 1988) - Undergraduate Curriculum Committee
REVISED AND APPROVED - (Feb. 9, 1988) - Dept. of Chemistry and Biochemistry
B.S. in Biochemistry - Dept. of Chemistry & Biochemistry

Freshman Year

First Semester

Credits

Critical Reading & Writing, E-110 ^a	3
General Chemistry, C-111	3
Quantitative Chemistry, C-119	2
Analytical Geometry and Calculus A, M-241 ^b (or M-221)	4 or 3
Elementary Foreign Language ^c	3
	<u>15</u> or 14

Second Semester

Credits

Introductory Biology I, B-207	4
General Chemistry, C-112	3
Quantitative Chemistry, C-120	3
Analytical Geometry and Calculus B, M-242 ^b (or M-222)	4 or 3
Elementary Foreign Language ^c	3
	<u>17</u> or 16

Sophomore Year

First Semester

Credits

Organic Chemistry, C-331	3
Organic Chemistry Lab I, C-333	2
Introductory Biology II, B-208	4
General Physics, PS-201	4
Intermediate Foreign Language ^c	3
	<u>16</u>

Second Semester

Credits

Organic Chemistry, C-332	3
Organic Chemistry Majors Lab II, C-334	2
Introduction to Biochemistry, C-342	3
General Physics, PS-202	4
Intermediate Foreign Language ^c	3
	<u>15</u>

PROPOSED - (Dec. 8/21, 1987) - Biochemistry Division
 REVISED - (Jan. 29, 1988) - Undergraduate Curriculum Committee
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Junior Year

First Semester

	<u>Credits</u>
Introductory Physical Chemistry, C-418 (or C-443)	3
Instrumental Methods, C-437	3
Instrumental Methods Lab, C-438	1
Biochemistry, C-641	3
Group A/B/C electives ^d	6
	<u>16</u>

Second Semester

	<u>Credits</u>
Introductory Physical Chemistry, C-419 (or C-444)	3
Physical Chemistry Lab, C-445	1
Biochemistry, C-642	3
Group A/B/C electives ^d	9
	<u>16</u>

Senior Year

First Semester

	<u>Credits</u>
Advanced Level Chemistry or Biochemistry course (C-6xx)	3
Advanced Biochemistry (C-6xx) or Biology course (B-xxx) ^e	3 or 4
Senior Seminar, C-465	1
Undergraduate Research, C-468 ^f or substitution of designated lab courses ^g	3 or 4
Group A/B/C electives ^d	6
	<u>16 or 18</u>

Second Semester

	<u>Credits</u>
Electives ^h	9
Advanced Biochemistry (C-6xx) or Biology course (B-xxx) ^e	3 or 4
Senior Seminar, C-465	1
Undergraduate Research, C-468 ^f or substitution of designated lab courses ^g	3 or 4
	<u>16 or 18</u>

Total: 125 credit hours minimum
 Chemistry: 46 credit hours minimum (C-xxx courses)

Effective
 (Class of 88/89)

Candidates for a B.S. in Biochemistry must achieve a cumulative grade point average of at least 2.00 for all chemistry courses (C-xxx) taken.

PROPOSED - (Dec. 8/21, 1987) - Biochemistry Division
REVISED - (Jan. 29, 1988) - Undergraduate Curriculum Committee
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B.S. in Biochemistry - Dept. of Chemistry & Biochemistry

- a A second writing course is required involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content. This requirement can only be filled in the junior or senior year. A minimum grade of C must be earned. The course must be on the approved list of courses for the second writing requirement found in the Arts and Science booklet describing the General Education Curriculum.
- b M-241/242 is strongly recommended.
- c The language requirement is satisfied by proficiency in a modern foreign language. German is the recommended language of choice. Proficiency may be demonstrated by one of the following:
 - (1) Achieving scores on the language placement tests which indicate intermediate level proficiency.
 - (2) Passing the appropriate intermediate language course.If you have demonstrated proficiency in a foreign language you still must make up the 12 credits shown in the program by substituting 12 elective credits.
- d Group A, B, and C electives refer to the Arts and Science B.A. curriculum. A total of 21 credits in Groups A, B, and C are required, with a minimum of six credits in each group. The course used to satisfy the 3 credit multicultural course requirement may also satisfy part of the A/B/C group requirement simultaneously, as long as it is on the approved lists for both the A/B/C group and multicultural course requirements.
- e Acceptable biology courses are as follows:
 - B-301 Molecular Biology of the Cell (4)
 - B-303 Genetic and Evolutionary Biology (4)
 - B-601 Immunochemistry (4)
 - B-604 Recombinant DNA Laboratory (4)
 - B-654 Biochemical Genetics (3)
 - B-679 Virology (3)
 - B-698 Comparative Endocrinology (3)
- f With advisor's consent. Grading for C-468 will be P/F only, unless a thesis is written and defended, whereupon a minimum of 6 credits and a maximum of 12 credits can be converted to a letter grade, the grade being decided by the 3 person faculty committee before whom the thesis was defended.
- g Acceptable laboratory courses are as follows:
 - B-303 Genetic and Evolutionary Biology (4)
 - B-306 General Physiology (4)
 - B-371 Introduction to Microbiology (4)
 - B-601 Immunochemistry (4)
- h C-310, Computers in Chemistry is a highly recommended elective that may be taken during the sophomore year Winter Session.



University of Delaware

Attachment 2

RECEIVED
UNIVERSITY of DELAWARE
JUL 7 1988
FACULTY SENATE

COLLEGE OF AGRICULTURAL SCIENCES
OFFICE OF THE DEAN
TOWNSEND HALL
NEWARK, DELAWARE 19717-1303

(302) 451-2501 or 2502

June 13, 1988

MEMORANDUM

TO: Dr. Frank B. Dilley
President, Faculty Senate

FROM: Dr. A. R. Doberenz *A. R. Doberenz*
Dean, Human Resources

Dr. D. F. Crossan *D. F. Crossan*
Dean, Agricultural Sciences

SUBJECT: Relocation of the Department of Food Science

From time to time over the past two years, we have had discussions on the possibility of relocating the Department of Food Science from the College of Human Resources to the College of Agricultural Sciences. The discussions have included former President Trabant, President Jones, Provost Campbell, the department chairs in both colleges, and faculty in the several departments.

There exists good liaison between the Department of Food Science, the Department of Animal Science and Agricultural Biochemistry, and the Department of Agricultural Engineering. We have cross-listed courses, several joint appointments, and some cooperative planning on research proposals. The research thrust in Food Science would be quite compatible with our Agricultural Experiment Station research mission and could result in significant synergism between faculty in Food Science and Agricultural Sciences not only in the two departments noted above but also in the departments of Food and Resource Economics and Plant Science. Bringing Food Science under the administration of the College of Agricultural Sciences would enhance these relationships and provide a needed mechanism for the seeking, coordinating, and sharing of resources.

This administrative change is addressed in the Project Vision documents of both colleges. Consistent with University procedures, we seek the advice of the Faculty Senate on this proposed administrative move.

/rsg

cc: President R. C. Jones
Provost L. L. Campbell



University of Delaware

COLLEGE OF AGRICULTURAL SCIENCES
OFFICE OF THE DEAN
TOWNSEND HALL
NEWARK, DELAWARE 19717-1303

(302) 451-2501 or 2502

October 13, 1988

MEMORANDUM

TO: Dr. Harrison Hall
Chair, Faculty Senate Coordinating Committee

FROM: Dr. Donald F. Crossan
Dean, College of Agricultural Sciences *D. F. Crossan*

Dr. Alexander R. Doberenz *A. R. Doberenz*
Dean, College of Human Resources

SUBJECT: Administrative Move of the Department of Food Science
to the College of Agricultural Sciences

In response to your memo seeking material for appropriate Senate committees to review and comment on the proposed administrative move of Food Science to the College of Agricultural Sciences, we offer the following thoughts, as well as appended comments from several department chairs.

1. With the Department of Food Science in the College of Agricultural Sciences, the words "food" and "agriculture" can be used together. This could assist in undergraduate student recruitment.
2. Current activities by Food Science faculty compliment ongoing work in four departments, namely, Food and Resource Economics, Plant Science, Animal Science, and Agricultural Engineering.
3. The Department of Food Science does not have to be located in Townsend Hall. However, if they were in the College, they could be located in an addition to Worrilow Hall.
4. At many universities, Food Science and Agricultural Engineering have a strong working relationship. During the last two years, Agricultural Engineering and Food Science have had the opportunity to pursue this relationship. There is a common interest in many post-harvest activities.

5. With Food Science in the College, existing program coordination could be improved to the benefit of both undergraduate and graduate students.
6. There exists ties between Food Science and the College. Dr. Gunasekaran, Agricultural Engineering, has a joint appointment with Food Science. Dr. Hoover, Food Science, has a joint appointment with Animal Science. Dr. Zikakis, Animal Science, has a joint appointment with Food Science.
7. The following courses could be combined, shared, and/or coordinated to the mutual benefit of the departments of Food Science and Agricultural Engineering.
 - a. Fundamentals of Thermodynamics (AGE 311)
 - b. Statistical Quality Control (AGE 317)
 - c. Agricultural Waste Management Systems (AGE 328)
 - d. Engineering Aspects of Agricultural Processes (AGE 441)
 - e. Instrumentation (AGE 443)
 - f. Food Science (FS 305)
 - g. Food Processing I (FS 409)
 - h. Food Processing II (FS 410)
 - i. Food Processing Engineering Technology I (FS 415)
 - j. Food Processing Engineering Technology II (FS 416)
 - k. Food Packaging (FS 467)

The Department of Animal Science and Agricultural Biochemistry and the Department of Food Science also cross-list Food Processing I and II, as well as FS/APS 429 food analysis.

8. Sometime ago, the faculty of the Department of Agricultural Engineering developed and discussed the possibility of a Food Engineering Technology major. The basis for the FET program was existing AET courses and the F.S. minor. The idea has been submitted to the Department of Food Science for further discussion.
9. With joint appointments, the Food Science masters degree program would offer new research opportunities, particularly for the Agricultural Engineering faculty.
10. TAC/ABET (engineering accreditation organization) suggested that the Department of Agricultural Engineering develop stronger ties with the Department of Food Science.
11. An emerging area, packaging technology, is an area of common interest. There is the potential for industrial involvement and external funding.

Dr. Harrison Hale
October 13, 1988
Page 3

12. The chairs of both Agricultural Engineering and Animal Science asked that I work in the suggestion for the addition of Food Science to the College in the Project Vision document. Dean Doberenz added the proposal to his College's document as well.

Comments from the several department chairs are included.

/rsg

cc: Dr. G. L. Cole
Dr. N. E. Collins
Dr. F. B. Dilley
Dr. H. Frick
Dr. A. L. Morehart
Dr. E. R. Pierce
Dr. J. K. Rosenberger
Dr. R. R. Roth
Dr. D. L. Sparks

Memorandum



October 6, 1988

TO: Dean D. F. Crossan
Agricultural Sciences

FROM: Robert W. Keown, Chair
Dept. of Food Science

VIA: Dean A.R. Doberenz
College of Human Resources

RE: Relocation of Dept. of Food Science (8/29 memo from H. Hall)

The proposed transfer of Food Science from the College of Human Resources to the College of Agricultural Sciences could have the following effects with regard to the students of both colleges.

1. Interaction with other students that have similar career goals i.e. food production and food processing. Both these areas are rapidly moving toward "cutting edge" technologies with very similar fundamentals. This type of interaction should not be underestimated.
2. Interaction with faculty that have research and scholarly interests in these new technologies. The merger would certainly broaden the potential opportunities for undergraduate research. This is an important part of the food science "experience".
3. Broadening the potential "net-work" for employment and graduate study opportunities.
4. From a Food Science standpoint, it will be of advantage for our students to be cognizant of the needs of the state in the area of food production - food processing. It is our opinion that this would be facilitated in Agricultural Sciences.

As indicated, the technologies and science are merging and common resources will be utilized for both teaching and research. Therefore, the major advantages for students, both undergraduate and graduate, that will accrue from this proposed merger will be the possibility of improved resources, both those that are now available and new ones that will be more easily justified by the combined program.

RWK/gz



Memorandum



October 12, 1988

MEMORANDUM TO: Dr. D. F. Crossan, Dean
College of Agricultural Sciences

FROM: Norm Collins, Chairman
Department of Agricultural Engineering

SUBJECT: Relocation of Department of Food Science

The proposed transfer of the Department of Food Science to the College of Agricultural Sciences has merit for several reasons.

1. With the Department of Food Science in the College of Agricultural Sciences, the words "food" and "agriculture" come together. This would help break our animal and crop production image. Nationally, most Food Science Departments are located in the College of Agricultural Sciences.
2. Current activities by Food Science faculty compliment on-going work in four departments, Food and Resource Economics, Plant Science, Animal Science and Agricultural Engineering. With Food Science in the College, program coordination could be improved. More joint appointments could strengthen common (overlapping) program areas.
3. At many universities, Food Science and Agricultural Engineering have a strong working relationship. Only during the last two years has agricultural engineering had the opportunity to pursue the relationship. There is a common interest in many post-harvest, packaging and distribution activities.
4. About two years ago, the faculty of the Department of Agricultural Engineering discussed the possibility of a Food Engineering Technology (FET) major. The basis for the FET program was existing AET courses and the proposed F.S. minor. Our concept was shared with the Department of Food Science. Discussions this summer suggest that the revised F.S. minor requirements make the minor a more viable option for AET students with an interest in food processing.



5. The following courses could be combined, shared and/or coordinated to the mutual benefit of the Food Science and Agricultural Engineering Department.
 - a. Fundamentals of Thermodynamics (AGE 311)
 - b. Statistical Quality Control (AGE 317)
 - c. Agricultural Waste Management Systems (AGE 328)
 - d. Engineering Aspects of Agricultural Processes (AGE 441)
 - e. Instrumentation (AGE 443)
 - f. Food Science (FS 305)
 - g. Food Processing I (FS 409)
 - h. Food Processing II (FS 410)
 - i. Food Processing Engineering Technology * (FS 415)
 - j. Food Processing Engineering Technology II (FS 416)
 - k. Food Packaging (FS 467)
6. TAC/ABET suggested the Agricultural Engineering Department develop stronger ties with the Department of Food Science. With both units in the same College, many hurdles would be eliminated.
7. Because of the potential for industrial involvement and external funding, a stronger working relationship with Food Science will provide the Agricultural Engineering faculty new research opportunities. This could be a major boost to our efforts to develop a viable graduate educational experience for our faculty and many of our AET/ETIM majors.

NEC/nhc

Memorandum



January 31, 1989

TO: Dr. Lucia Palmer, Chairperson
Coordinating Committee on Education

FROM: R. V. Exline, Chairperson, University Committee on Graduate Studies *RV*

SUBJECT: Interdisciplinary Neurosciences Ph.D. Proposal

On January 25, 1989 the University Senate Committee on Graduate Studies unanimously approved the enclosed proposal to establish an interdisciplinary Ph.D. program in the Neurosciences.

cc: Dr. Jerome Siegel, Professor, School of Life and Health Sciences
Dr. Carol Hoffeecker, Acting Assistant Provost for Graduate Studies

blp

PROPOSAL FOR AN INTERDISCIPLINARY GRADUATE PROGRAM IN NEUROSCIENCE

I. STATEMENT OF PURPOSE & BACKGROUND

Members of the faculty in the Departments of Chemistry, Physics, Psychology and the School of Life & Health Sciences propose an interdisciplinary graduate program in neuroscience leading to the Ph.D. in a traditional discipline and in neuroscience.

Neuroscience is a multidisciplinary science aimed at understanding the brain from the level of molecular events to behavior and is recognized as an academic discipline in its own right. Important advances have been made in each of the basic science areas from which it evolved and strong ties have been retained to these traditional fields. However, it is now obvious that advances in our understanding of complex brain phenomena are limited by the separation of these disciplines. In recent years, researchers have bridged disciplines by relating their data to that of other brain sciences and employing techniques normally used by neighboring disciplines. For example, a given laboratory may concurrently investigate the anatomical, physiological, and biochemical basis of memory or movement as well as related pathologies such as Alzheimers and Parkinsons diseases. In increasing numbers, students are being formally trained to conduct multidisciplinary research using techniques traditionally associated with two or more disciplines.

There are a number of indications that neuroscience has attained the status of a substantial discipline. The Society for Neuroscience was founded in 1970 with headquarters in Washington, D.C. By 1985 there were 10,129 members. Appendix A (p. 10) graphically represents the growth of the Society. In recent years, more than 8,000 neuroscientists have registered for each annual meeting. At the same time, a number of journals devoted to neuroscience have appeared, including Brain Research, Behavioral Neuroscience, The Journal of Neuroscience, Neuroscience, Neuroscience Letters, The International Journal of Neuroscience, and Trends in Neuroscience. The annual reviews now include an Annual Review of Neuroscience. There is an Association of Neuroscience Departments and Programs which meets twice a year in Washington, D.C. and publishes a handbook that lists the graduate programs and departments of neuroscience in the United States and Canada. Appendix B (p. 11) is an excerpt from the Preface to this handbook that shows the growth in the number of neuroscience programs and courses since 1978. The International Brain Research Organization (IBRO) coordinates activities among national societies and organizes international events. IBRO is organizing the Second World Congress of Neuroscience to be held in Budapest, August 1987.

The University of Delaware has research faculty and laboratories that participated in these developments in neuroscience. In order to remain competitive and viable in a rapidly developing new discipline, the neuroscience faculty propose a formal program that will bring them together into an identifiable neuroscience unit, the focus of which is a graduate training program in neuroscience. This program will also serve a number of other functions as described in the proposal.

As preparation for this proposal, letters were sent to over 40 universities in the United States and Canada requesting information about graduate programs in neuroscience. These letters were directed mainly to universities where programs are not centered in a medical school; we are interested in programs that would be comparable and relevant to the situation at the University of Delaware. Some programs are administered by departments of neuroscience, others are interdisciplinary programs leading to the Ph.D. in neuroscience. A third variant is the Ph.D. in a traditional discipline and in neuroscience. The student satisfies the degree requirements of the traditional department as well as the requirements of the interdisciplinary neuroscience program. The program proposed here is of the latter type and, among the available alternatives, represents the least radical departure from our University's present training structure.

II. A BRIEF HISTORY OF NEUROSCIENCE AT THE UNIVERSITY OF DELAWARE

A detailed history of neuroscience at the University of Delaware is provided in Appendix C (p. 12). Below is a summary of the major points.

In 1974, the Institute for Neuroscience was established as a research unit with no formal role in teaching and graduate training. The Institute has flourished as a research organization in terms of external funding for research of its members, but its exclusion from playing a role in organizing an interdisciplinary training program and being formally involved in graduate functions has been a source of frustration.

In 1983, Provost Campbell appointed a Committee chaired by Professor Arthur B. Metzner to evaluate the Institute for Neuroscience and make recommendations about the development of neuroscience at the University. The Metzner Committee Report commented that "...we look to the future of neuroscience on this campus with substantial enthusiasm: some excellent starts have been made and the paths to be followed are well-defined." The Committee recommended that the Institute be superseded by a unit with more complete academic functions. Members of the Institute met with the Provost a number of times to discuss alternatives to implement that. It was agreed that a proposal be generated by the members of the Institute to establish an interdisciplinary program in neuroscience that would provide a structure to continue and expand the functions of the Institute.

Aside from providing a place for neuroscientists in different departments at the University to meet and interact, the Institute has served as the organizational and physical focus for the activities of the Delaware Area Chapter of the Society for Neuroscience (DACSN). This chapter of the Society is large and active, due mainly to the dense concentration of neuroscientists in the chemical companies in the area and their interest in broadening professional contacts outside their immediate employment. Also, the University offers a stimulating,

congenial and common "neutral territory" for meetings. Chapter members (86) include neuroscientists from the University, the DuPont company, ICI, and the U. S. government laboratories at Aberdeen and Edgewood. Monthly meetings at the University campus have been devoted to workshops, poster sessions, and invited seminars.

Increased contact at Chapter meetings has led to scientific interactions between the University and our surrounding scientific community. Joint projects have been established; students have been placed in industrial and government labs for summer and part-time employment; employees from these labs have enrolled in our academic programs; and scientists from these labs have served on undergraduate honors and graduate degree committees, have provided guest lectures in our neuroscience courses and given seminar talks. With further development of neuroscience at the University, especially in molecular neuroscience, we expect collaborative interactions with local industry to increase.

Neuroscience faculty at the University of Delaware are housed in four basic science departments. The Institute for Neuroscience has served as the organizational unit where faculty in the traditional disciplines and with interests in neuroscience could meet and discuss research, course development, graduate training and other matters of common interest. However, as described above in the brief history of neuroscience at the University of Delaware and in Appendix C (p. 12), the Institute for Neuroscience only administers the research grants of its members and has no role in academic matters. Also, for justifiable reasons detailed in Appendix C (p. 12), the economic basis for the operation of the Institute has been discontinued and the various formal and informal functions of the Institute will no longer be served. This proposal describes a more appropriate organizational focus for neuroscientists at the University of Delaware that is designed to meet the professional needs of these faculty. A neuroscience graduate training program that brings together the neuroscience faculty and their research programs in the various departments and which draws on the considerable neuroscience research strength in the surrounding area of the University, will enhance the visibility of neuroscience at the University of Delaware and facilitate the recruiting of promising graduate students.

The proposed Program in Neuroscience assumes many of the functions served by the Institute for Neuroscience, including its role in the DACSN, and provides an organization for the interdisciplinary training of graduate students in neuroscience. The proposed program is described below.

This proposal was generated by the members of the Institute for Neuroscience who will staff the proposed program. Members of the Institute and their areas of specialization are listed in Appendix D (p. 15).

III. THE PROPOSED PROGRAM IN NEUROSCIENCE

The goals of the Program are stated briefly in IIIA below and elaborated in the detailed description of the Program in the subsequent parts of III.

- A. Goals. An Interdisciplinary Graduate Program in Neuroscience would provide a mechanism for accomplishing a number of the goals of the neuroscience faculty. The goals of the Program are:
 1. Coordinate the neuroscience curricula in the separate departments to provide the multidisciplinary training of neuroscience students.
 2. Provide a degree program in neuroscience.
 3. Organize and facilitate the recruiting of graduate students in neuroscience.
 4. Provide a focus and channel of communication for the neuroscience activities of the faculty and professionals housed in the different departments at the University.
 5. Provide a focus on the University of Delaware campus for the Delaware Area Chapter of the Society for Neuroscience.
- B. Director of the Program. A faculty member in one of the participating departments will be appointed Director of the Program in Neuroscience by the Dean of the College of Arts and Science after consultation with the appropriate department chairs and with the Neuroscience Program Coordinating Committee (see III.D. below). The directorship will be a rotating appointment held for a period of three years. During the tenure of appointment, the Director will also coordinate functions of the DACSN at the University of Delaware. The Director will receive release-time of one course per year and a stipend of 1/9 of his/her academic salary during the summer. The Director will report to the Dean of the College of Arts and Science. The duties of the Program Director are listed in Appendix E (p. 16).
- C. Faculty Participation in the Program. Participation in the Program will be open to all interested faculty and University scientists.
- D. The Neuroscience Program Coordinating Committee. The Coordinating Committee will be comprised of the Director and at least one faculty member from each of the participating academic units in the Program. The Committee members will be appointed for two-year terms by the Dean of the College of Arts and Science after consultation with the Director of the Program. The Committee will function as the Executive Committee of the Program and coordinate neuroscience curricula in the participating departments to ensure systematic offerings of courses and that the teaching needs of the Neuroscience Program are met and coordinated with the teaching programs of the departments.

- E. Recruiting of Graduate Students. It is increasingly difficult to recruit high quality graduate students with neuroscience interests into traditional basic science programs. One comment made by a number of respondents to our letter of inquiry about graduate programs in neuroscience is that prospective graduate students are more sophisticated and seek graduate programs and degrees in neuroscience rather than piecemeal programs in traditional departments [see Appendix F (p. 17) for excerpts from these letters]. Prospective graduate students are aware of the interdisciplinary nature of neuroscience, are attracted by the excitement of a new and burgeoning discipline and prefer to enter a program that is identified as a Neuroscience Program. A program budget would permit us to mount a recruiting campaign in which the degree program in a traditional discipline and in neuroscience is described with emphasis placed on the multidisciplinary training in neuroscience. This should place us in a competitive position even with regard to a dwindling pool of prospective students.
- F. Application to the Program. Prospective graduate students would apply to an academic unit such as the School of Life and Health Sciences or the Department of Chemistry or Psychology and to the Program in Neuroscience. The student must initially be accepted into the graduate program in the department and may, at the same time, be accepted into the Neuroscience Program. Students may, of course, apply solely to the department and at a later date apply to the Neuroscience Program.

Students who apply to the Program will be evaluated for admission by the Neuroscience Program Coordinating Committee, (III-E). Neuroscience students should have some exposure to and some competency in the major disciplines that comprise neuroscience. To fill any gaps, a student may be advised to take specific undergraduate courses. For example, a beginning graduate student with an undergraduate degree in chemistry may be asked to take the Brain and Behavior course (B/PSY 314) and a student with a background in psychology may be asked to take Organic Chemistry (C 321, 322 and associated labs) and Biochemistry (C 527).

- G. Graduate Student Support. We request that the Office of Graduate Studies provide graduate student support funds for this new program. We request two fellowships be assigned to the Program. The allocation of these support positions will be determined by the Neuroscience Program Coordinating Committee. Also requested are funds to partially support two first-year students per summer at the Marine Biological Laboratory at Woods Hole, Massachusetts. The neuroscience-related courses provided at these labs are taught by outstanding faculty from throughout the world and are considered to be excellent. These courses should be an inspiring experience for our first-year students and serve as a strong inducement for highly qualified students to apply to our graduate program. Students would apply to the summer programs and gain admission and scholarship support on their own merits and the University will provide complementary support (e.g. travel and some living expenses).

- H. Courses and Curricula. Within the the School of Life and Health Sciences and the Department of Psychology a number of courses that will form the basis of a multidisciplinary program in neuroscience already exist. Appendix G (p. 18) lists the graduate-level courses offered by the School of Life and Health Sciences and by the Departments of Chemistry and Psychology that are most relevant to the Neuroscience Program. Courses of a supporting nature for the Neuroscience Program, are also offered by the above departments as well as by the Departments of Computer and Information Sciences, Statistics, Mathematical Sciences, Physics and Electrical Engineering.

The Neuroscience Program would contain five graduate level core courses, one for each of the major disciplines that comprise neuroscience. These courses are:

Neuroanatomy (B/PSY626)
 Neurophysiology (B/PSY627)
 Neuropharmacology
 Neurochemistry
 Neurobehavior

Two courses (course numbers listed) already exist. The other courses can all be developed and taught by faculty currently at the University. The Psychology Department recently hired Dr. Steven Grant, a neuropharmacologist, who will offer a course in neuropharmacology. Dr. Mahendra Jain, Department of Chemistry, or one of our neuroscience colleagues at ICI or the DuPont Company, could teach a course in neurochemistry.

The major contents of the first four courses listed are apparent from their titles. The neurobehavior course would cover the neural basis of sensory perception (e.g. vision, audition, touch, pain), movement, sleep and waking, motivation and emotion (e.g. hunger, thirst, sex, aggression, fear), memory, cognition and learning. The material in this course could be developed and taught by neuroscience faculty currently in the Psychology Department and the School of Life and Health Sciences. Some degree of overlap and redundancy would exist between Neurobehavior and the other courses. This is to be expected since neurobehavior is the most integrative of the courses and builds upon the material in the other core courses.

In addition to the five core courses listed above, a number of neuroscience-related courses are available as electives. Some of these courses are listed in Appendix G.

A number of courses in the Interdisciplinary Program in Neuroscience are the same or similar to existing courses in neuroscience in the School of Life and Health Sciences and in the Department of Psychology. This is probably the case in new interdisciplinary programs, i.e., the existing faculty who participate in an interdisciplinary program would already have developed some of the basic interdisciplinary courses, and graduate programs in most

departments are sufficiently flexible to permit students with interdisciplinary interests to take courses in other departments. What the interdisciplinary program should do is provide a structure that will coordinate, encourage, and strengthen interdisciplinary activities by institutionalizing the process and giving it an interdisciplinary title and degree.

- I. Requirements of the Program. The requirements for the doctorate will be those of the department in which the student is enrolled plus those of the Neuroscience Program. The course requirements of the Program will be three of the five core courses listed above. The core and other courses taken will be determined by the student in consultation with his or her faculty advisor and be based on the student's background and research goals. The basic neuroscience courses will be completed by the end of the second year. During the student's second or third year a Qualifying Exam in Neuroscience will be administered by the Neuroscience Program Coordinating Committee and the student's advisor. The exam will contain two parts, A and B. The first part (A) will determine if the student has a reasonable familiarity with the major disciplines that comprise neuroscience; the second part (B) will ascertain if the student has a substantial understanding of the neuroscience areas and techniques of his or her field of specialization. The format of the examination will be determined by the Neuroscience Program Coordinating Committee. If either part is not passed, the student may retake one or both parts within a year. This examination may overlap with or be a part of a comparable exam required by the student's academic department.

Appendix H (p. 19) provides examples of the Program and Departmental requirements for a graduate student in the School of Life and Health Sciences and a student in the Department of Psychology.

- J. Additional Neuroscience Faculty. Graduate programs in neuroscience at the University of Delaware currently offer training in three basic aspects of neuroscience: neuroanatomy, neurophysiology and behavioral neuroscience. However, the area of molecular and cellular neuroscience in which highly dramatic and rapid advances are occurring and in which graduate students in increasing numbers are seeking training, is not represented at the University of Delaware. Molecular neuroscience is also the area that has the greatest potential for major interaction and collaboration between neuroscientists at the University of Delaware and private sector neuroscience research in the area. We feel that it is critical that new faculty be added in this area. Less critical, but also an area in which strength should exist in a modern neuroscience program is neuroplasticity and developmental neuroscience. We request, therefore, that the Administration's support of the Neuroscience Interdisciplinary Program include allocating a new support position for a molecular and cellular neuroscientist when the Program is activated and in a subsequent year allocate a second new position for a faculty person in the area of neuroplasticity/ developmental neuroscience. Since appointments are made to academic units, communication and discussion with the departments should occur to assure that new faculty hiring is coordinated with the department's own priorities for growth.

- K. Budget. The Program will receive an annual operating budget from the administration for the support of a part-time secretary (see III-M below), graduate fellowships (III-G), the Director's summer supplement (III-B), office expenses (III-L), and a seminar series.
- L. Office. Office space and a meeting/commons/reading room will be located in the Wolf/McKinly complex. The office will accommodate the Director, a secretary and office equipment. The meeting/commons/reading room will serve as a gathering and meeting area for faculty and students. Magazine racks will hold the newly-arrived neuroscience journals that currently circulate from the University Library to the Institute for two-week periods.
- M. Secretary. The secretary of the Program will be employed part-time to perform the secretarial duties associated with the Program as well as serve as the secretary for the DACSN.
- N. Implications for Undergraduate Students. Even though the proposed Program is directed toward graduate training, a formal interdisciplinary program in neuroscience at the University of Delaware should have an impact on undergraduate students. The graduate program should indicate to undergraduate students that neuroscience is a multidisciplinary approach that is exploring some of the most challenging problems in life science and is a viable area of specialization. Neuroscience faculty would be available to direct undergraduate students into courses and labs appropriate for developing a foundation for graduate work and it is hoped that our better undergraduates would consider entering the field and apply to graduate programs in neuroscience.

IV. SUPPORTING INFORMATION

- A. Grant Support. The faculty and professionals in Neuroscience at the University of Delaware have a very strong record of grant support. Every one of them has received external funding continuously or near continuously since coming to the University of Delaware. Invariably, in the past when funding lapsed, support was forthcoming again within a year.
- B. Support from the Neuroscience Community. Members of the neuroscience community in the area who belong to the Delaware Area chapter of the Society for Neuroscience have expressed strong support for a graduate program in neuroscience at the University. Neuroscientists at ICI, the DuPont Company, and the U. S. Government laboratories at Aberdeen and Edgewood have indicated their willingness to assist by contributing guest lectures and even teaching complete courses. Letters to this effect are in Appendix I (p. 20).

- APPENDIX A: Growth of the Society for Neuroscience (from Neuroscience Newsletter, Jan./Feb. 1986).
- APPENDIX B: Excerpt from the Preface to the Society for Neuroscience Handbook, "Neuroscience Training Programs in North America," 1986 Edition.
- APPENDIX C: A history of neuroscience at the University of Delaware.
- APPENDIX D: Members of the Institute for Neuroscience.
- APPENDIX E: Duties of the Program Director.
- APPENDIX F: Excerpts from letters describing interdisciplinary programs in neuroscience at other Universities.
- APPENDIX G: Neuroscience-related graduate courses in the School of Life and Health Sciences and the Departments of Chemistry and Psychology.
- APPENDIX H: Examples of typical programs for students in the School of Life and Health Sciences and in the Department of Psychology.
- APPENDIX I: Letters of support from members of the neuroscience community in the area.

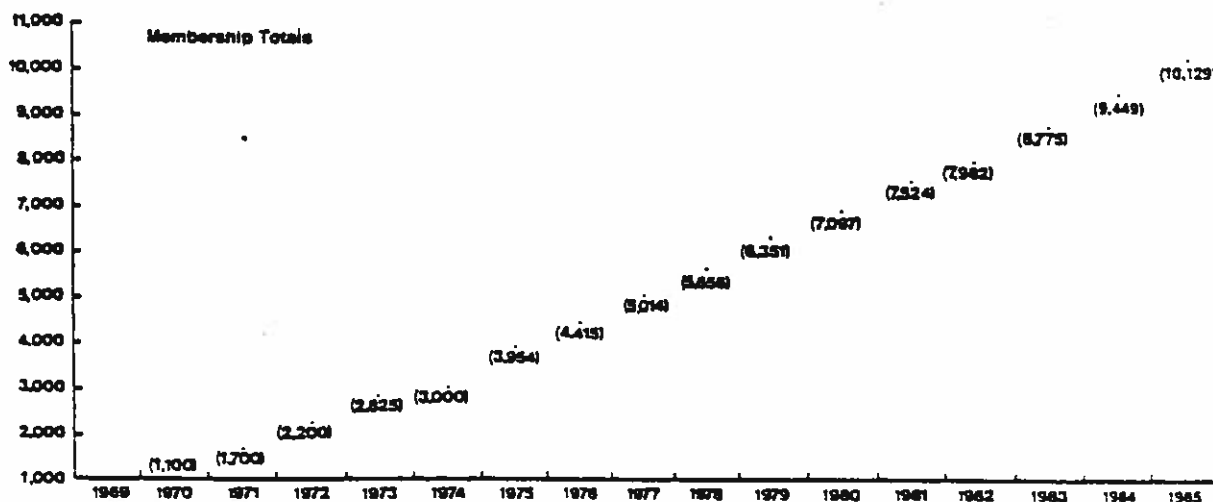
January 19, 1988

APPENDIX A

Growth of the Society for Neuroscience
(from Neuroscience Newsletter, Jan./Feb. 1986)



Strong Growth in Society's Membership



The above graph illustrates the dynamic growth of the Society's membership since 1969 and reflects the excitement about the unparalleled scientific advances taking place in the neurosciences. It also illustrates the importance of the field as a major scientific discipline and exemplifies the attractiveness of the neurosciences to young scientists as they make career decisions. For the purpose of comparison, other scientific societies' membership figures are listed: American Society of Biological Chemists—6,601; American Physiological Society—6,500; American Society for Cell Biology—5,600; Endocrine Society—4,992; American Association of Immunologists—4,659 (includes 732 trainee members); American Society for Pharmacology and Experimental Therapeutics—3,700; American Association of Pathologists—2,500; and American Institute of Nutrition—2,270.

Society activities have increased in diversity, and as opportunities and programs expand, greater expectations are fostered. Concomitant is the need and justification for additional resources, financial and otherwise. In addition to planning, organizing, and sessioning the Annual Meeting and organizing its related publications, the Society handles a growing number of important projects and programs, including *The Journal of Neuroscience*, the Science Writers' Seminar and Annual Meeting press room, CME accreditation, annual Short Courses, and an increasing number of committees and annual prizes.

Nancy Beang
Executive Director

APPENDIX B

Excerpt from the Preface to the Society for Neuroscience Handbook, "Neuroscience Training Programs in North America," 1986 Edition.

PREFACE

This is the sixth edition of the *Neuroscience Training Programs* handbook, published under the direction of the Education Committee of the Society for Neuroscience.

The twelve years since publication of the first edition have seen a continual, almost exponential, growth in the then infant field of neuroscience. Scientific endeavors in the field have been recognized by the award of a number of Nobel Prizes, and contributions of enormous clinical significance continue to be made. The field can now be said to be firmly established as an independent discipline, and it would be difficult to find any institution of higher learning in North America that is without a neuroscience course or program of some kind. In many instances, these extend down to the undergraduate level, and in an increasing number of cases whole new departments have been created.

The Society for Neuroscience handbook is, so far as we know, the only comprehensive guide to the available programs, and it seems clear that it is widely used by prospective students, at all levels, when applying to institutions for graduate or other study. From approximately 150 listings in 1974, the handbook has now grown to 297 institute listings. The accompanying table indicates the changes that have occurred since publication of the 1978 and 1986 editions.

	1978*	1980	1982	1984	1986	Increase 1978-86
Undergraduate programs/courses	20	53	93	95	97	385%
Masters programs/courses	52	109	149	157	163	215%
Doctoral program /courses	98	196	299	325	323	235%
(including M.D., M.D./Ph.D.)						
Ph.D. in Neuroscience	29	38	39	39	47	65%
Postdoctoral programs/courses	97	144	200	218	230	138%

APPENDIX C

A History of Neuroscience at the University of Delaware

The Departments of Biological Sciences and Psychology have shared Wolf Hall for many years. This proximity facilitated interactions between faculty interested in the biological basis of behavior. During the 1960's, Drs. Boord and Nystrom in Biology and Drs. Granda, Gulick, and Siegel in Psychology interacted closely with each other and there was a substantial sharing of techniques and equipment as well as discussions of research.

A number of events in the late 1960's and 1970's were important for the development of neuroscience at the University. In 1967, the dedication of a new research wing of Wolf Hall was marked by a two-day symposium on the biological foundations of behavior. A distinguished panel of guest speakers sparked considerable interest and activity in neuroscience. In 1972, Dr. Granda (Psychology) and Dr. Nystrom (Biology) organized a seminar series on the neural basis of behavior. This series of lectures by the early leaders of the emerging discipline of neuroscience was very exciting to the faculty and students in both departments and stimulated discussions about establishing an interdisciplinary neuroscience program at the University.

In 1974, the Institute for Neuroscience and Behavior was established by action of the University Senate and seed monies were provided by the Dean of the College of Graduate Studies. The Institute was established as a research unit having no functions related to the teaching and training of students. A small building on Academy Street provided office space for the Institute's Director (Dr. A. M. Granda) and secretary and a place for meetings of the Institute members. Most importantly, the building provided a place for faculty, research associates, and graduate students to congregate and meet informally for discussions.

In 1975, the School of Life and Health Sciences was established and Drs. Granda and Siegel moved from the Psychology Department to the School. At the time, it was felt that a School of Life and Health Sciences would be sufficiently broad to encompass the multidisciplinary aspects of neuroscience. In 1984, a Program in Neuroscience was added to the existing five programs in the School. However, due to the arrangement of the overhead distribution (described below) and other factors, growth of neuroscience has not occurred within the School.

Aside from the initial seed money provided by the University administration, the sole financial support of the Institute has been the return, from the Office of the Provost, of a portion of the grant overhead monies generated by the members of the Institute. The arrangement was that 75% of the overhead return to the Institute was retained by the Institute and 25% was sent to the members' academic departments. Adoption of this policy at the time of the formation of the Institute led to problems that were not anticipated. Thus, when new faculty with interests in neuroscience were considered for hiring in the Psychology Department or in the School, non-neuroscience faculty argued that the prospective faculty person's grant overhead returns would be of minimal value to the home department. Their position was that in contrast to hiring a neuroscientist,

bringing in a faculty person in an area other than neuroscience would increase the overhead return to the department and, therefore, the hiring of neuroscience faculty was not in the best financial interests of the home department. Consequently, even though research funding for members of the Institute flourished, the growth of neuroscience at the University of Delaware was stymied at a time when neuroscience was expanding at neighboring institutions. Compromises were made, such as splitting overhead income 50-50 or by the Institute accepting no overhead. This resulted in receiving the academic departments' support for the hiring of neuroscience faculty, but the operating funds of the Institute were progressively eroded. Since these overhead returns were the Institute's sole source of support, the financing of the Institute's activities became a variable and tenuous arrangement. But even more serious was the inhibitory influence on neuroscience hiring and growth engendered by the overhead return policy.

In 1983, Provost Campbell appointed a committee chaired by Professor Arthur B. Metzner, Department of Chemical Engineering, to evaluate the Institute for Neuroscience and make recommendations about the development of neuroscience at the University. A thorough investigation was undertaken in which University administrators, department heads, and members of the relevant academic units were interviewed. Problems associated with the Institute were explored and the aspirations of the neuroscientists on campus were solicited. In addition, Dr. David H. Cohen, Chairman of the Department of Neurobiology and Behavior at SUNY, Stony Brook, and past-president of the Society for Neuroscience, was retained by the University as a consultant to assist in the evaluation of neuroscience at the University. The Metzner Committee's report (June, 1983) concluded with the following statements.

In overall summary, we look to the future of neurosciences on this campus with substantial enthusiasm: some excellent starts have been made and the paths to be followed are well-defined. Either of the two scenarios seem as reasonable to us:

1. To take advantage of the current interest in this science, both nationally and locally, and to develop the strengths necessary for really first-rate education in this discipline, a separate department may be formed. This implies identification of a vigorous scholar who is also a vigorous leader, a substantial number of new faculty lines and office and laboratory space to house all of this. This thrust would imply a major commitment of new resources but it is entirely timely and appropriate to do this.

OR:

2. A Center for Neurosciences within the School of Life and Health Sciences may be formed. Prerogatives and responsibilities of this Center (as contrasted to the prerogatives of the graduate groups within the School) should be defined explicitly to avoid later misunderstandings. Such a Center may evolve into a separate department in due course, but the rate of development would be much slower than under the first option.

After consultation with the Provost, a proposal for a Center for Neuroscience to be housed with the School of Life and Health Sciences was developed and submitted on November 1, 1985 to Prof. M. R. Tripp, Director of the School. At an Executive Committee meeting of the School on December 3, 1985, the proposal was rejected.

Members of the Institute for Neuroscience met shortly after to discuss alternative plans for the future of neuroscience at the University. It was agreed that the current arrangement of the Institute was unsatisfactory and specifically that the policy of research overhead return was, in practice, counterproductive. Members of the Institute suggested that 100% of overhead monies should be returned to the academic departments, and in the Spring of 1986, the Provost agreed to this arrangement. The members of the Institute discussed ways that the positive functions of the Institute could be retained. It was suggested that an interdisciplinary program in neuroscience be established that would formally organize the interdisciplinary training of graduate students and provide a structure to continue and expand those aspects of the Institute that are valuable. The current proposal was thus generated.

APPENDIX D

Members of the Institute for Neuroscience

Dr. Robert L. Boord, Professor, SLHS: Neuroanatomy - Lateral line system

Dr. Barbara K. Giza, Research Associate, Psychology: Neurophysiology - Taste and feeding

Dr. Allen M. Granda, Professor, SLHS: Neurophysiology - Vision

Dr. Steven Grant, Assistant Professor, Psychology: Neuropharmacology - Attention

Dr. Mahendra K. Jain, Professor, Chemistry: Biochemistry - Biological membranes

Dr. David P. M. Northmore, Scientist, Psychology: Neurophysiology Vision, plasticity

Dr. Thomas R. Scott, Professor, Psychology: Neurophysiology - Taste and feeding

Dr. Mark Sharnoff, Professor, Physics: Biophysics - Voltage sensitive dyes

Dr. Jerome Siegel, Professor, SLHS: Neurophysiology - Sleep and inhibition

Dr. David F. Sisson, Research Associate, SLHS: Neurophysiology - Vision and inhibition

Dr. L. Carlisle Skeen, Associate Professor, Psychology: Neuroanatomy - Olfaction, plasticity

Dr. David G. Sperry, Assistant Professor, SLHS: Developmental Neurobiology - Plasticity

Dr. Simon Yaxley, Research Associate, Psychology: Neurophysiology Taste and feeding

APPENDIX E

Duties of the Program Director

1. Coordinate the activity of the Neuroscience Program Coordinating Committee to ensure that the teaching of neuroscience courses will accommodate the needs of the Neuroscience Program and will be coordinated with the teaching programs of the participating departments.
2. Coordinate the recruiting of graduate students for the Program and the neuroscience components of the academic departments. The Director will be responsible for advertising the Program and responding to inquiries about graduate training in neuroscience.
3. Organize and coordinate a regular in-house seminar-journal club series to be attended by neuroscience faculty and students.
4. Organize an invited seminar series in coordination with the seminar series of the academic departments and the DACSN.
5. Convene regular meetings of the Neuroscience Program Coordinating Committee and neuroscience faculty to deal with issues that arise relevant to the Program.
6. Coordinate the DACSN functions at the University of Delaware.
7. Supervise the activities of the part-time secretary who will assist the Director in the above duties.

APPENDIX F

Excerpts from letters describing Interdisciplinary Programs in Neuroscience at other Universities.

"...you will attract more qualified students in neuroscience than the older, more (traditional) disciplines do at present."

Ronald Kalil (Molec. Biol.),
Chairman, Neuroscience Training
Program, University of
Wisconsin (Madison).

"Strong backing by the faculty is important, ...this did not arise immediately and spontaneously here. Based on our experience, it should come if the program brings in better students than faculty tend to get through their own departments, which is to some extent true here."

William T. Greenough (Psychology and Anatomical Sciences), Program
Chairman, Neural and Behavioral Biology Program, University of
Illinois, Urbana-Champaign.

"Our Neuroscience Program students must meet both the entrance and degree requirements of their home departments and those of the Program. In many cases, there is a good deal of overlap between the two, but there is little question that for most students, the neuroscience degree adds to the work and the time-to-Ph.D. We might have more (but perhaps not more motivated) graduate students if this was not the case. On the other hand, I believe that this inherent bias has had a clear, positive long range effect on the quality of our trainees and their subsequent performance as functioning neuroscientists."

Glenn T. Hatton (Psych.), Director, Neuroscience Program, Michigan
State University

"Our program has been in existence for approximately three years and the current graduate students are now receiving a much broader training in neuroscience. They come in contact with a large number of faculty, especially at our monthly neuroscience seminars."

John D. Steeves (Zoology), Chairman, Graduate Program in Neuroscience,
University of British Columbia.

"Our (interdisciplinary) program consists of four collaborating academic units in three colleges (and) the degrees are granted within each unit... Out of about 800 inquiries last year, we had only 27 applications. I suspect the reason is that the (interdisciplinary) program does not grant the degree in neuroscience, which is the degree students want."

Ronald T. Verrillo (Physiol.), Director, Institute for Sensory
Research, Syracuse University.

APPENDIX G

Neuroscience-related Graduate Courses in the
School of Life and Health Sciences and the
Departments of Chemistry and Psychology

Course		Credits
B605	Advanced Mammalian Physiology	4
606	Advanced Mammalian Physiology	4
610	General Endocrinology	3
613	Vertebrate Nervous Systems	4
617	Lab Techniques in Electron Microscopy	3
626	Neuroscience I: Neuroanatomy	5
627	Neuroscience II: Neurophysiology	5
661	Neuromuscular Physiology	2
685	Sensory Systems	3
698	Comparative Endocrinology	3
806	Advances in Physiology	2
C641	Biochemistry	3
642	Biochemistry	3
648	Membrane Biochemistry	3
PSY606	Animal Behavior	3
608	Advanced Learning & Motivation	3
626	Neuroscience I: Neuroanatomy	5
627	Neuroscience II: Neurophysiology	5
6XX	Neuroscience III: Neuropharmacology	3
654	Human Psychophysiology	3
806	Psychobiology	3
808	Clinical Neuropsychology	3
810	Information Processing	3
811	Sensory Processes	3
826	Organic Brain Syndromes	3
829	Advanced Psychopathology	3
833	Seminar in Emotions	3
850	Seminar in Memory	3
860	Psychological Statistics	3
861	Psychological Statistics	3
867	Emotional Development	3

APPENDIX H

Examples of Typical Programs for Students in the
School of Life and Health Sciences
and in the Department of Psychology

Example 1: A student in Life and Health Sciences

	<u>Fall</u>	<u>Spring</u>
Year 1	Neuroanatomy (B626) (4) Elective (3) Research (B868) (2)	Neurophysiology (B627) (4) Neuropharmacology (PSY6--) (3) Research (B868) (2) SLHS Preliminary Examination
Year 2	Neurochemistry (C6--) (3) Elective (3) Research (B868) (3) SLHS Defense of Dissertation Proposal	Neurobehavior (PSY6--) (3) Elective (3) Research (B868) (3) Neuroscience Qualifying Exam, Part A
Year 3	Elective (3) Research (B868) (6)	Elective (3) Research (B868) (6) SLHS Qualifying Exam (same exam as Neuroscience Qualifying Exam, Part B)
Year 4	Elective (3) Dissertation Research (B969) (6)	Elective (3) Dissertation Research (B969) (9)
Year 5	Dissertation Defense	

Example 2: A student in the Department of Psychology

Year 1	Neuroanatomy (Psy626) (4) Develop. Psychol. (PSY804) (3) Statistics (PSY860) (3) Research (PSY868) (2)	Neurophysiology (PSY627) (4) Neuropharmacology (PSY6--) (3) Information Processing (PSY810) (3) Master's Thesis (PSY869) (2)
Year 2	Neurochemistry (C6--) (3) Elective (3) Master's Thesis (PSY869) (3)	Advanced Learning & Motivation (PSY608) (3) Neurobehavior (PSY6--) (3) Master's Thesis (PSY869) (32) Neuroscience Qualifying Exam, Part A
Year 3	Elective (3) Research (PSY868) (6) Master's Thesis Defense	Elective (3) Research (PSY868) (6) Neuroscience Qualifying Exam, Part B
Year 4	Elective (3) Dissertation Research (PSY969) (6)	Elective (3) Dissertation Research (PSY969) (6) Dissertation Defense
Year 5	Dissertation Defense	

APPENDIX I

Letters of Support from Members of the Neuroscience
Community in the Area

February 10, 1987

Dr. L. Leon Campbell, Provost
104A HULLIHEN HALL
University of Delaware
Newark, DE 19716

Dear Dr. Campbell:

I am writing this letter in support of the Proposal for an Interdisciplinary Graduate Program in Neuroscience that is presently up for consideration.

As an active member of the neuroscience community in the area, I have foreseen the need to strengthen the Neuroscience program at the University of Delaware for many years. Although the Institute for Neuroscience has been doing an excellent job of trying to foster the development of an interdisciplinary neuroscience program at the University for many years, it is now time for a very serious commitment to be made on a formal basis. The proposal before you appears to be a major step in the right direction.

Several of the local pharmaceutical concerns (i.e., Stuart, DuPont) have very heavy commitments in the area of central nervous system research and a great deal of basic neuroscience research is currently being performed. Accordingly, we hire a great many technicians and research support personnel from programs like the one you are proposing; this has two immediate implications in that there would be a job market for your graduates and also many of our employees would welcome the opportunity of extending their education by entering your program in neuroscience. Thus, I believe the establishment of this Interdisciplinary Graduate Program in Neuroscience is extremely critical and that it would be mutually beneficial to both the academic and industrial community in Delaware and surrounding states and to the University. This concept, although in a somewhat different format, has been on the table for a number of years now; I feel that it is urgent that this proposal be approved without further delay to fill a critical void in the educational facilities available in our community.

Therefore, I would appreciate it very much if you would consider the comments I have made when you make your decision concerning this very important proposal.

Sincerely,

Jeffrey B. Malick

Jeffrey B. Malick, Ph.D.
Manager, CNS Pharmacology

cc: ✓ Dr. Jerome Siegel
Professor and Director of the
Institute for Neuroscience



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

EXPERIMENTAL STATION
WILMINGTON, DELAWARE 19898

Copy To:
Dr. Steven Grant

PHARMACEUTICALS R & D DIVISION
MEDICAL PRODUCTS DEPARTMENT

February 3, 1987

Dr. Leon Campbell
Provost of the University
University of Delaware
Newark, DE 19716

Dear Dr. Campbell:

Dr. Steven Grant of the Department of Psychology at the University of Delaware recently sent me a copy of a proposal to establish a Graduate Program in Neuroscience at Delaware. He asked for my comments about the proposal from my perspective as a Group Leader of Neurobiology Research in the Du Pont Company. I am delighted to have the opportunity to do so. The proposal lists a variety of excellent reasons for implementing a formal Program in Neuroscience, and I endorse all those points. My comments here elaborate a few additional thoughts that could be factored into your decision to implement the proposal.

Neuroscience as a field is still in its growth phase, but the opportunities for the future are clear. Companies around the world are initiating new programs in Neuroscience or expanding existing ones in order to capitalize on opportunities expected to have significant impact on the needs of the health care community. The emerging technologies in cellular and molecular Neuroscience are one of the important elements driving this growth, and academic programs which stimulate further development in this area (section III J of the proposal) are highly welcome.

A positive consequence of establishing a vigorous Program in Neuroscience at the University would be to enhance the capabilities of both University and corporate neuroscientists in the region. The relationship between neuroscientists at Du Pont and those at the University have always been cordial. Du Pont is an active contributor to the Delaware Area Chapter of the Society for Neuroscience which uses the good offices of the University for the Chapter's administrative and monthly meeting functions. Du Pont scientists have been officers and regular members of the Chapter since its inception. Contacts generated through Chapter meetings have resulted in scientific collaborations between Delaware faculty and Du Pont scientists, but frankly, more can be done so that each party can take advantage of the different kinds of resources that each has available. One very useful scenario to consider would be a situation in which advanced graduate students and postdoctoral fellows from Delaware could conduct research in

our Wilmington laboratories on projects that serve the mutual interests of Du Pont and the faculty and students of the University. Such a plan would have to be carefully worked out so as to protect the rights, interests, and obligations of all parties, but the idea has merit because the strengths of each party complement each other -- although companies have ample capital and hardware resources, augmenting our human resources is very expensive, whereas the the reverse is often true at universities. The main reason that this kind of Du Pont-Delaware-Neuroscience connection has not materialized is that there has not been sufficient common ground between the research interests of the faculty and the neurobiology research mission of Du Pont. The addition of Dr. Grant to the faculty, whose expertise is in neuropharmacology, is helping to close the gap. I think that the proposed faculty appointments in cellular/molecular neuroscience, neuronal plasticity, and neurochemistry represent a very worthwhile direction in this regard.

Additional Neuroscience faculty as noted in the proposal would undoubtedly strengthen the existing scientific ties between the University and its corporate neighbors. But there is another mutual benefit to be derived from a strong Program in Neuroscience at the University. The University has an interest in placing its graduates in good jobs, and corporations are interested in recruiting highly-qualified people. A firm commitment to the Program in Neuroscience will create breadth and depth in the training of excellent undergraduates, graduate students, and post-doctoral fellows. A Program in Neuroscience can therefore help the University take advantage of Delaware's strategic location in the New York-Washington corridor, which contains the vast bulk of employment opportunities in the U.S. pharmaceutical industry.

The proposal mentions the possibility of some courses at the University to be taught by appropriate staff at Du Pont and ICI. This is an excellent idea which needs a champion or two at the University to make it work. Several scientists in my organization find teaching very rewarding and have responsibility for courses or parts of courses at universities in Philadelphia. An enthusiastic Program Director at Delaware could, easily I think, tap into this reservoir of talent in a way that is highly cost-effective from the University's perspective.

In conclusion, I think that implementing a Program in Neuroscience at Delaware is a strategically wise move. Neuroscience is a growth area, not only in terms of funding from various governmental and private sources, but also in terms of the scientific achievements that are changing the way we treat serious diseases and, indeed, the way we think about ourselves as a species. A formal Program in Neuroscience is really the first step the University must take to achieve the goal of establishing Delaware

Dr. Leon Campbell

3

February 3, 1987

as a leader in this exciting and promising field of science. Realizing that goal will take bold vision and a long-term commitment to excellence. I urge you not to miss the opportunities for productive scientific interaction between the faculty and their corporate colleagues, opportunities for students to learn from experienced company scientists, and opportunities of employment for the people the University trains. I think that a strong Program in Neuroscience will enhance the national reputation of the University and is in the best interests of the regional and national community it serves. I strongly urge that the Program be implemented with a sense of urgency in order to take maximal advantage of the growth climate that Neuroscience is so fortunate to have.

Sincerely,

A handwritten signature in cursive script that reads "Greg R. Christoph". The signature is fluid and extends to the right.

Greg R. Christoph, Ph.D.

smv

Division of ICI Americas Inc.

Wilmington, Delaware 19897
(302) 575-8001

DAVID C. U'PRICHARD, PH. D.
Vice President
Biomedical Research

February 25, 1987

Dr. L. Leon Campbell
Provost and Vice President
for Academic Affairs
University of Delaware
Newark, DE 19716

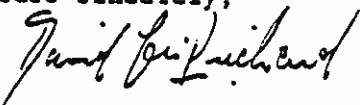
Dear Leon:

I am writing to lend my support to the proposal initiated by some of your faculty to establish an interdisciplinary Ph.D. program in neuroscience at the University of Delaware. This proposal was brought to my attention by Dr. Steven Grant, a good personal friend and an outstanding recent recruitment to your institution.

I would like to say that I am fully in support of the concept of forming an interdisciplinary degree-granting program at the graduate level in neuroscience at the University of Delaware. From my present perspective, I cannot think of a better approach towards integrating further the intellectual connections and collaborative possibilities between the University of Delaware and local chemical and pharmaceutical companies such as ICI Americas. I know that I can speak for all of my colleagues at ICI working in the field of neuroscience research who would be only too glad to participate in such a program.

I do hope you give this proposal serious consideration. I certainly know that in the case of Steve Grant and his colleagues, you have a cadre of first-rate, bright and enthusiastic faculty who would be well capable of carrying through such a program with distinction, including being able to recruit very high calibre graduate students.

Yours sincerely,



David C. U'Prichard, Ph.D.

DCU'P:1bt

BCC: ☒ Dr. S. Grant, U of D



DEPARTMENT OF THE ARMY
U.S. ARMY LABORATORY COMMAND
HUMAN ENGINEERING LABORATORY
ABERDEEN PROVING GROUND, MARYLAND 21005-5001

REPLY TO
ATTENTION OF

Behavioral Research Directorate

29 January 1987

Dr. L. Leon Campbell, Provost and
Vice President for Academic Affairs
104A HULLIHEN HALL
University of Delaware
Newark, DE 19716

Dear Dr. Campbell:

I have just learned that the University of Delaware is considering a proposal for an Interdisciplinary Graduate program in Neuroscience. There has been a growing need for this type of integrated academic instruction in our area. Since our laboratory has a requirement for researchers with expertise in the neurosciences, I am excited about the idea of having such a program in close proximity to our laboratory. An interdisciplinary program in neuroscience could provide us with students for summer and part-time employment. In addition, members of our laboratory could take advantage of the educational opportunities a graduate program in neurosciences would provide.

I look forward to the establishment of an Interdisciplinary Graduate Program in Neurosciences at the University of Delaware.

Sincerely,

A handwritten signature in cursive script, reading "Lynn C. Oatman", is written over a horizontal line.

Lynn C. Oatman, Ph.D.
Research Psychologist

Copy Furnished:
Dr. Jerome Siegel



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

EXPERIMENTAL STATION
WILMINGTON, DELAWARE 19898

PHARMACEUTICALS R & D DIVISION
MEDICAL PRODUCTS DEPARTMENT

Copy To:
Dr. Jerome Siegel

February 5, 1987

Dr. L. Leon Campbell
Provost of the University
University of Delaware
Newark, DE 19716

Dear Dr. Campbell:

I am writing to express my support for the proposed Inter-disciplinary Graduate Program in Neuroscience at the University of Delaware. I believe the proposed program would be of value to the University in attracting high-quality students at the graduate and undergraduate level and to the neuroscience community in and around Delaware by providing a focus for the Delaware Area Chapter of the Society for Neuroscience.

As a member of the DACSN, I have enjoyed interactions with neuroscientists of the University and from industrial and government laboratories which would not have been possible without the local chapter. We have had the privilege of entertaining notable outside speakers that otherwise may have visited only one of the institutions in the area. As a past president of the local chapter, I can attest to the strong catalytic and supportive role of the University of Delaware faculty, which could not be assumed by any other local organization.

I believe that most of the neuroscientists in the area share my enthusiasm for the program. I would certainly be eager to participate in any phase of the program, from planning through implementation, and do all I can to contribute to its success.

Sincerely,

William F. Herblin



DEPARTMENT OF THE ARMY

UNITED STATES ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE

APPROPRIATE PROVING GROUND, MARYLAND 21010-5425

FORM 10
1-75

3ERD-UW-YC

January 22, 1987

Dr. L. Leon Cambell
Provost
University of Delaware
Newark, Delaware 19716

Dear Dr. Cambell:

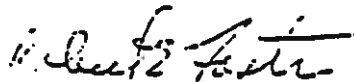
As President of the Delaware Area Chapter - Society for Neuroscience and as a U.S. Army Neuroscientist, I am writing this letter in support of the proposed "Interdisciplinary Program in Neuroscience" at the University of Delaware. Today's Neuroscientist is a broadly trained professional who may carry out research on the nervous system at any level from the molecular to the behavioral. I am lucky that the Psychology Department at Duke University allowed its graduate students to participate in a neuroscience program which encompassed coursework in the Psychology, Biology, Physiology, Anatomy, Biomedical Engineering, and Medical Psychology Departments. While my degree is in Psychology, the same program now has a Neuroscience Degree. It is not the designation 'Neuroscience' that is important, it is my broad academic training that has served me well. We benefitted from the atmosphere of a research oriented medical school. In the absence of such an atmosphere, a career in Neuroscience hinges on the academic flexibility of the graduate program.

University of Delaware students have been a critical asset for my research activities with the Army as well as for other scientists in this Institute. Both graduate and undergraduate students have come into my lab from the Psychology Department. They work here both for the income and for the research experience. In some cases they have had to play catch-up when compared to students from other Universities with Undergraduate and Graduate Neuroscience Programs. To assure that your students are completely competitive with those from other Universities, I wholeheartedly recommend the establishment of a Program in Neuroscience for both Undergraduates (e.g., Concentration) and Graduates (Neuroscience degree). I was a Post-Doctoral Fellow at Brown University when an undergraduate concentration in Neuroscience was established. It became the most popular concentration under Biology and helped raise the graduate program to national prominence.

The Delaware Area Chapter - Society for Neuroscience has a membership category for students. We do not have many student members due in large part to the lack of a well-defined University program in Neuroscience. The regular members of the Chapter, numbering about 90, come from industry and government labs as well as from the University of Delaware. Regular members usually have

Ph.D. or M.D. degree although that is not a prerequisite. Many regular members not affiliated with the University would be fully qualified to be on the University staff. Indeed, members have offered to teach Neuroscience courses at your University in such diverse topics as neuropharmacology, neurotoxicology, behavioral toxicology, membrane biophysics while asking for no compensation other than the student interaction. I believe that the Director of your Interdisciplinary Program can be assured of continuing support from Chapter members in terms of teaching, lectures at Chapter meetings, and, in some cases, on-the-job laboratory experiences for students. The Chapter will continue to serve as the regional hub for discourse among Neuroscientists. The Delaware Area Chapter's Council has endorsed the concept of this Program and encourages you to give the Program its license to practice.

Sincerely,



Robert E. Foster, Ph.D.
Research Physiologist



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

EXPERIMENTAL STATION
WILMINGTON, DELAWARE 19898

cc: Steve Grant
Dept of Psychology
220 Wolf Hall
University of Delaware
Newark, DE 19716

February 6, 1987

PHARMACEUTICALS R & D DIVISION
MEDICAL PRODUCTS DEPARTMENT

Dr. Leon Campbell
Provost of the University
University of Delaware
Newark, Delaware 19716

Dear Dr. Campbell:

My colleague Greg Christoph forwarded a proposal he received from Steve Grant in regards to the Univ. of Delaware establishing a program in Neuroscience. I find this to be very exciting and strongly urge you to impliment the plan. My support is primarily based on the fact that Neuroscience in the last 5 years has come of age and is considered to be one of the last frontiers in research. The Univ. of Delaware should not be left out. Moreover, with the presence of many local Neuroscientists (at DuPont, ICI and the Army), the Univ. of Delaware has a unique opportunity in that it can draw upon the community to facilitate in the development of a first-rate, world class program.

As you can see in the proposal, the University already has a number of respected, successful Neuroscientists in the various Depts. and the program would formalize their scientific relationships. This is important to the outsider, whether it be an industrial scientist like myself, a potential student, or a granting agency. The program will facilitate your ability to obtain grants, program project funds, and a traineeship program as well as being the focal point for the Del. Area Chapter of the Society for Neuroscience. I mention the importance of IASCN since this has afforded me the ability interact with the local Neuroscience community; a very important aspect of science is communication. Also, with Carl Skeen, I was one of the founders and a past president of the Chapter which led me to provide a variety of lectures in Univ. of Delaware courses. Thus, the benefit is both ways. The University has already served an important role for Neuroscientists and the official program is the next logical step in the progression. You and the Univ. of Delaware should not miss this opportunity.

Please feel free to call me at 772-7129 if you have any further questions. I'm looking forward to the initiation of this Neuroscience Program.

Best Regards,

Leonard G. Davis

Leonard G. Davis
Group Leader
Cellular and Molecular
Neuroscience

Memorandum

DATE: January 18, 1989



TO: Ralph Exline, Chair
Graduate Studies Committee

FROM: Jerome Siegel, Professor, SLHS

RE: Interdisciplinary Graduate Program in Neuroscience

For your meeting of January 25, when the Neuroscience Program will be discussed, I have itemized the costs of the Program. If the Program is approved by the Senate during the Spring semester, we plan to advertise the Program as soon as possible and start it in the Fall of 1989.

Therefore, a budget for the expenses below should be available for the Fall of 1989. The Dean informs us, however, that funds for the faculty position could not be available until the Fall of 1990.

Seminar Series	\$ 6,000
Secretary, Half-time	\$ 7,000
Director's Salary, One-ninth	\$ 6,000
Brochures, Advertisements	\$ 5,000
Misc. expenses: office, telephone, etc.	\$ 2,000
Graduate fellowships, two	\$30,000
Faculty position, one, Fall 1990 (Rank open)	
Faculty position, one, Fall 1992	

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Rec'd 10-28-88

EVALUATION OF THE PROPOSAL FOR AN INTERDISCIPLINARY
GRADUATE PROGRAM IN NEUROSCIENCE AT THE UNIVERSITY OF DELAWARE

Professor Alan N. Epstein
Director, Interdisciplinary Training Program in Neuroscience
Department of Biology
University of Pennsylvania

Professor Barry L. Jacobs
Director, Program in Neuroscience
Princeton University

Professor James L. McGaugh
Chair, Department of Psychobiology
University of California, Irvine

Prepared for Richard B. Murray
Associate Provost for Graduate Studies

October, 1988

INTRODUCTION

A three person external committee was brought to the University of Delaware on September 22 and 23, 1988, by Richard B. Murray, Associate Provost for Graduate Studies. Its purpose was to evaluate The Proposal for an Interdisciplinary Graduate Program in Neuroscience at the University of Delaware. The evaluation committee members were Professor Alan N. Epstein, Director, Interdisciplinary Training Program in Neuroscience at the University of Pennsylvania, Professor Barry L. Jacobs, Director, Program in Neuroscience at Princeton University, and Professor James L. McGaugh, Chair, Department of Psychobiology at the University of California at Irvine. This report was written during the month following the committee's visit to the campus.

ACADEMIC MERIT

Understanding the brain clearly ranks as one of our greatest scientific challenges. In the last several decades enormous progress has been made in understanding the chemical, anatomical, and physiological systems underlying physiology and behavior. Such findings will ultimately lead to the development of treatments for diseases and disorders of the nervous system. And, they will no doubt lead to the development of new information systems based on the mechanisms used by the brain in the processing of information. Most important, perhaps, is the intellectual challenge posed by attempting to understand the physical basis of the mind. Academic programs in neuroscience (graduate and undergraduate) are already in place at most major research universities. The University of Delaware has had informal neuroscience programs in biology and psychology, and the faculty of the two units are cooperating in research and training in neuroscience. However,

the development to date has been modest in comparison with many comparable institutions. And, the rate of development at the University of Delaware is, in our view, considerably less than optimal given the importance and complexity of the problems addressed by neuroscience research.

The members of the evaluation committee strongly and unanimously support the proposed program. We believe that it is well thought-out, timely and feasible. We urge its immediate approval and implementation. However, we also believe that it is excessively modest and that changes in the proposed structure of the program as well as provision of additional resources would greatly increase the quality of neuroscience at the University of Delaware as well as promote its long-term success. However, this latter consideration should not, in our view, compromise the presently proposed program or lead to any delay in its initiation. It is a small first step, but a necessary and important one, both symbolically and strategically.

The proposed formal establishment of two programs (biology/neuroscience and psychology/neuroscience) is the first step toward significantly increasing the viability of neuroscience at the University of Delaware. The program can be implemented with modest changes in administrative structure and at a minimal cost. But the consequences could be considerable. The program will serve to increase the interaction among existing neuroscience faculty and students as well as the visibility of the programs. At the present time the programs in the areas of neuroscience at the University of Delaware are not well coordinated and they lack visibility both within and outside of the University. Establishment of the two programs in the manner proposed will increase the coordination of the course offerings and clearly indicate to undergraduate students throughout the U.S. that neuroscience

programs are offered at the University of Delaware. The programs can be announced in brochures and can be listed in the booklet describing neuroscience training programs that is published by the Society for Neuroscience. In addition implementation of the proposed program will encourage planning by the faculty within the programs and will aid in the recruitment of new neuroscience faculty. Finally, the University of Delaware is in a unique setting. It is located near industries that have extensive and well-developed neuroscience research programs. Thus, the development of neuroscience at the University of Delaware will provide an opportunity for extensive university-industry cooperation in research and teaching, and lay the groundwork for future corporate financial support.

ADMINISTRATION

We believe that the hybrid nature of the proposed program creates several problems. It was not clear how the Director of the Program would interact with the Provost's Office, the various Deans or the two Department Chairs. It was also not clear what courses would be offered and when, nor how graduate fellowships would be assigned. The Provost, Associate Provost for Graduate Studies, and Deans must give the Director of the new program and his faculty clear and exclusive authority to employ the resources of the program, and they must give the Director and his faculty the encouragement to plan its future. The Director must also be supported in his dealings with the chairs of Biology and Psychology. This can best be done by providing benefits for all. Examples are: 1) if one of the departments provides the space for the new program, compensatory improvements in existing space should be offered to the departments providing the neuroscience space; 2) the fellows in the new program could be assigned to

do some of their teaching in departmental courses or in courses that are cross-listed between neuroscience and one of the cooperating departments.

The Program Coordinating Committee will have to be large enough to represent the interests of Neuroscience, of Biology, and of Psychology; to represent the several levels of faculty seniority (tenured and untenured) and their breadth of research interests; and to meet its assigned responsibility for the conduct of the program. At least 2, perhaps 3, representatives from each academic unit will be necessary, in addition to the Director.

FACULTY

Ten current faculty would form the nucleus of the proposed Program. Five come from Biology and five from Psychology, with eight in tenured or tenure-track positions. All of the faculty members that the Evaluation Committee met were enthusiastic about establishing the proposed Program, although several were pessimistic because of lack of change and initiative in the past. All of the faculty members appeared to be deeply involved in and heavily committed to interesting and often exciting research programs. It was heartening to see that virtually all of the faculty members have garnered financial support for their research programs.

The Evaluation Committee felt that the faculty in the Neuroscience Program should not be left open and fluid. The members should be clearly specified so that the Program is seen as a tangible and stable entity. However, a mechanism should be established whereby other faculty at the University of Delaware, such as those in Artificial Intelligence, Chemistry, and Physics, could formally join the Program.

While the ten Neuroscience faculty members were impressive, the Evaluation Committee felt that a minimum of an additional three faculty positions would be required to provide the University of Delaware Neuroscience Program with national visibility and stature. One effective scenario might be to hire a senior person who would have a major voice in the other two appointments. It is also important that these additional positions be integrated into the existing program, rather than brought in to fill some existing teaching need or research expertise. These positions should be seen as a linchpin for the Neuroscience Program.

STUDENTS

The Evaluation Committee met with 5 students (3 from Psychology, 2 from Biology) and 2 postdoctoral fellows (1 each from Psychology and Biology) at lunch. They were unanimously enthusiastic about the proposal. All of them identify themselves as neuroscientists and are looking forward to careers in academics or industry. The creation of an educational program in neuroscience would institutionalize and strengthen what they are trying to achieve informally. In addition, several of them expected that the new program would remove restrictions among departments that make it difficult for them to take courses outside their resident departments.

All of them were engaged in satisfying laboratory work. They were articulate and seemed well-qualified (although we did not examine their academic records). But, several of them were "home-grown", having been undergraduate or graduate students at the University of Delaware. All of the graduate students expressed a healthy interest in postdoctoral work, but several of them had limited career goals (small college teaching, industrial research). As a group, they did not seem to have the broad preparation and

the high aspirations typical of the best of the neuroscience students and postdoctoral fellows at other institutions.

Creation of the new program, especially if it is adequately supported and well advertised, should improve the caliber of graduate students by enlarging the applicant pool to include the large reservoir of top-ranked undergraduate students that are now interested in graduate work in neuroscience. Faculty in the program should be encouraged to increase their efforts in recruiting a larger number of postdocs. This gives a training program the extra dimension of "journeyman" scientists who interact with both faculty and graduate students, and are the closest colleagues and the ideal role-models for the graduate students.

CURRICULUM

Within the constraints of a "hyphenated" neuroscience program, the proposed curriculum appeared adequate to the Evaluation Committee. It was free of major problems, except for the requirement of preliminary exams both in neuroscience and in the student's parent department. An effort should be made to consolidate them. The prospect of two preliminary exams (for one PhD) is intimidating, and will discourage applicants to the new program. Computational neuroscience and molecular neuroscience are not among the listed course offerings. They are both active and important areas of neuroscience and should be included. The omission could be repaired either by the new hirings or by enlisting the help of interested colleagues in other departments (computer science, engineering, physics, chemistry, molecular biology).

RESOURCES

Most of the resources required by the proposed program already exist in the two academic units that are involved. The proposal requests two new faculty positions, two graduate fellowships and two rooms for the administrative and teaching needs of the program. We believe that, if the program is to begin to compete with other strong programs in neuroscience, the needs are significantly understated. We believe that at least four fellowships (each providing 12 months of support) are required to launch the program. There must be guaranteed support of some form for all entering graduate students. This could be provided for a limited number of years, say 3-5, at which time the program would be expected to pick up some, or all, of the burden. This could be done through competing for federal training grants or with industry fellowships.

We believe that the program should have additional faculty. The two proposed in addition to an existing position in psychology are the minimum necessary for an initial stage development. In addition, a serious administrative commitment to the program will allow for continued development of the spectrum of areas encompassed by neuroscience. The program should initiate a colloquium series. It seems likely that support for this as well as other needs of the program might be provided at least in part by local industry. A major long-term need of the program is additional research space as well as funds for equipment. It was not at all clear to the members of the evaluation committee where laboratory space will be found for additional neuroscience faculty.

The library collection in neuroscience appears to be quite adequate for the proposed program. However, our judgment assumes that current library resources will not be reduced. Further it is essential that future support

allow for increased costs of library materials as well as the addition of resources required by the development of areas not yet fully in place at the University of Delaware.

SUMMARY AND GENERAL OBSERVATIONS

The students, faculty, and administration at the University of Delaware are poised to establish this new interdisciplinary program in neuroscience. The evaluation committee unanimously supports this proposal and does so strongly and with enthusiasm. However, we feel that it is inevitable that a larger step be taken, that of establishing a free-standing program in neuroscience, with the commitment of additional faculty positions and the additional requisite resources. Since this field is developing and evolving so rapidly, especially with the emergent influences of molecular biology and computer science, we feel that it is crucial that the University act boldly and take these crucial steps now. This will enable the University of Delaware to remain nationally competitive in attracting students, faculty, and resources, including external grant support. An integral part of this expanded program would be a University-Industrial cooperative effort, where students, faculty, scientists and resources are shared, to the mutual benefit of all concerned parties. The University of Delaware, with its proximity to and strong ties with its corporate neighbors, such as DuPont and ICI, is in a strategic position to take full advantage of this opportunity.

