



UNIVERSITY
OF CALIFORNIA
SANTA CRUZ
Twenty-Year Plan
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FINAL CAMPUS VERSION

PREFATORY NOTE TO THE TWENTY YEAR PLAN

by

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CHANCELLOR

The growth contemplated over the next two decades provides UCSC with a renewed opportunity to fulfill its original dream: to become the jewel of the UC system, academically, culturally, and physically. To do so, however, will demand wisdom, selectivity, the highest standards, and a clear sense of mission. The following attempts to provide some broad guidelines to enable us to realize this opportunity.

I begin with three postulates:

- 1) That UCSC, as a part of the University of California, is a State University, and it is our obligation to undertake education, research, and service, broadly conceived, to benefit the citizens of California.
- 2) That we wish UCSC to play a special role in the University of California. That we wish this role to be recognized, and University policies modified where necessary to take account of that role. In order to facilitate such modifications, the special qualities of that role must be clearly defined, and a clear rationale presented for all changes proposed.
- 3) That our students will live most of their lives in the 21st century, and it is our obligation to prepare them as best we can for life in that era. While the shape of the future is always vague, I suggest there are two near certainties: 1) The State of California will become increasingly multi-cultural; 2) The State of California, and our society in general, will become increasingly technological (i.e., it will become increasingly dependent upon the use of science-based technology in all of its social processes - manufacture, agriculture, service, transportation, recreation, finance, administration, education, et al).

These three general postulates then lead to a series of policies affecting every area of campus life.

Curriculum:

We should reaffirm our belief in the virtues of a liberal education, based upon the concept that students who have had the benefit of a liberal education will 1) contribute to a more tolerant, humane, and compassionate society, 2) be better informed citizens participating in our democracy, 3) lead fuller, richer, more satisfying lives.

At the same time, we should recognize that the educational program which will achieve these goals cannot be static; it surely must be shaped by the changing context of the society in which the students will live their lives.

The circumstances cited above must then be considered in the design of a liberal education. An awareness of the perspectives and contributions of other cultures and traditions must be incorporated into our core courses within the several disciplines. More generally, we should seek to understand the extent to which the education and the educational milieu at UCSC have been implicitly adapted to the preparation and values of students with a particular cultural background, and thereby to envision those changes necessary to facilitate the successful performance of students from different social environments.

We should also seek to ensure that the liberal education we provide for our students will prepare them for the looming technological age. Our society confronts at least three major technological revolutions - the advent of nuclear energy, the emergence of genetic engineering, and the invention of computers and artificial intelligence. Each of these is leading us to wholly novel issues unprecedented in human history. In a democratic society, the successful resolution of these issues must depend upon an informed citizenry.

This will require that our scientists and engineers be educated so as to appreciate the social consequences of their discoveries and inventions, and that our non-scientists be educated so as to comprehend the scientific bases of the new technologies that so affect their lives.

Still other vital issues, such as those posed by the expansion of world population (largely in the Third World), by the gradual exhaustion of conventional natural resources (accompanied by rising levels of pollution), and by the confrontation of disparate cultures (produced by modern communications and transport), will confront those living in the 21st century. Our education should seek to prepare students to cope with such problems.

In this regard, we ought to rethink the traditional reluctance at UCSC to impose academic requirements. To quote from a recent speech by President Gardner, "If we [in higher education] are unwilling to make decisions about what is essential to undergraduate education, can we blame our students for responding to the pressures of the job market or personal whim in choosing what to study?"

It has become increasingly true throughout the UC system, and not just at UCSC, that relatively few students complete their educational program in four years. A portion, or all, of a fifth year is becoming the norm. UCSC might well seek deliberately to propose an extension of the length of the undergraduate program in

the interests of breadth of education, as by devising a wide range of coherent "3-2" programs. I believe such an extension will be common by the end of the next two decades.

Colleges:

The role of the colleges is, currently, largely social and cultural and only modestly instructional. I suggest that the colleges can serve valuable academic roles if such roles are carefully defined and if adequate resources can be found to support such roles independently (and not at the expense of the academic majors - e.g., the independently endowed colleges of Oxbridge). A systematic and continuing effort should be made to obtain the resources that would permit the College system to achieve its potential.

Future Colleges - If the student body is to double, several options, not mutually exclusive, might be considered: a) add more colleges, b) enlarge some existing colleges and add fewer new colleges, or c) add specialized colleges; specialized as to 1) a freshman complex of colleges, 2) a college for older students, 3) colleges specialized by academic interest, 4) others, such as foreign language and area study.

Community Relations:

I believe we must evolve a more coherent and sustained pattern of community relations, and this must involve the faculty as well as the campus administration. The "normal" town-gown disagreements are exacerbated in our case by the conflict inherent between a community currently swayed by a "no growth" philosophy, and a campus that must grow, and that, as any modern university, requires a dynamic milieu of artistic, technological, cultural, and social innovation if it is to thrive.

Such immediate issues, as the provision of housing for the students to be added, and of the utilities and roads needed for a growing campus, must be addressed, as well as the longer-term social needs of the University.

With its contemplated growth, the campus will be able to serve the Santa Cruz community culturally, economically, politically with increasing effectiveness. Santa Cruz then has the opportunity to become a "university town" in the best sense of the phrase - a community inspired by and giving support to a vibrant, intellectual, and cultural institution.

Other modes of University-community cooperation, as in artistic and cultural ventures, in University-public school interactions, in student internships in governmental and service organizations, in the provision of University expertise to aid in the analysis of local problems, and so on, should be expanded whenever feasible within the limits of resources and faculty interest.

Graduate and Professional Education:

I believe an expansion of the graduate program is necessary to sustain its long term viability. While UCSC should remain predominantly an undergraduate campus, we should aim at a student population that is 15 percent graduate. The disciplinary distribution of these students should not be uniform, but should be carefully contoured to the needs and opportunities of the particular disciplines.

In order to develop a more balanced and diversified educational program, I believe we should develop, as the opportunity arises, professional programs of a character which can derive support from our basic disciplines. Examples of such programs could include mechanical and electrical engineering, biotechnology, agroecology, ocean engineering, environmental studies, and resource management.

While such programs will, of course, require new faculty and resources, the bulk of the faculty and resources that would come with a larger student body must be used to provide greater depth in the disciplines that we already cover much too thinly.

Research:

I would suggest that UCSC, in its next growth phase, should deliberately seek out faculty with research interests in a small number of fields, disciplinary and interdisciplinary, which may not currently be fashionable but which have great future promise - fields in which a small cadre of first-rate people could make a decisive contribution. Such a strategy of concentration seems well adapted to a campus of our scale.

Faculty:

An increase of enrollment of some 7,200-7,500 students will bring to UCSC an increment of some 400 faculty. While the specific allocation of these FTE's must depend upon the outcome of numerous future decisions, it may be useful to suggest a few broad guidelines.

Fifteen percent (60 FTE) of these new positions might specifically be reserved for Target of Opportunity Program (TOP) appointments to diversify the faculty. (It is to be hoped that by the end of the 20-year period, TOP appointments will no longer be needed.)

Ten percent (40 FTE) of these new positions should be allocated in clusters of four (average size), to permit the rapid development of strong new foci.

Five percent (20 FTE) of these new positions should be allocated to a single new initiative (Institute), to permit UCSC to become

a world leader in the area chosen.

Unless some guidelines such as these are developed and sustained, all FTE will be allotted one by one, foregoing the opportunity to develop centers of academic strength.

In keeping with its distinctive mission, UCSC should seek to locate and employ faculty who truly combine a passion for research or creative work with a deep motivation to teach. Only such faculty can preserve our special qualities.

Campus Development:

A thorough revision of the campus long-range development plan that accepts the prospect of growth and attempts earnestly to envision the UCSC campus of the future - and its environs and means of access - as a whole, is urgently needed.

UC Policies:

The United States has always recognized implicitly that an effective democracy requires an educated citizenry. As U.S. society has become increasingly complex and interactive, the need for correspondingly increased education has been met quantitatively by lengthening the median period of schooling, until now nearly half of American youth have some college education.

The need for education may be expected to continue to increase. It is still possible to raise the median length of schooling. However, much more might be accomplished by qualitative changes in the educational programs. The inertia of educational institutions is well known. The definition of "liberal arts" appropriate to Cardinal Newman's day is surely in need of extensive revision in the 21st century. A major function of UCSC could be to lead the way to such a revision.

Such a revision must be based upon strong programs in the several disciplines that as professions serve as the repositories of knowledge and the determinants of standards. But such a revision must seek to define a broader vision than that of the separate disciplines, a longer perspective, a more holistic conception of education.

The relatively anomalous position of UCSC within the UC system needs a legitimation it has never had. Present UC policies, from those governing the distribution of resources to those defining the criteria for academic advancement, derive from the use of UC Berkeley as a model. To the extent that we wish to emphasize the importance of individually adapted undergraduate education and the value of dedicated and imaginative teaching, and to the extent that we seek to involve undergraduates in field and internship and research activities, we must seek the resources and recognitions to make such objectives feasible.

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UNIVERSITY OF CALIFORNIA, SANTA CRUZ

TWENTY-YEAR PLAN

Over the next twenty years, UC Santa Cruz will strive to become a comprehensive university of national distinction. As we set this goal we rededicate ourselves to the founding vision of the campus, that of a full range of undergraduate, graduate, and professional programs.

We will continue to be committed to the ideal that undergraduate liberal studies of the highest quality can coexist with fine graduate programs and research. Teaching and scholarship must be major and complementary activities for any university. Research without teaching leads to overspecialization and atrophied communication skills. Teaching without scholarship denies students an essential element in education: contact with teachers who not only know, but also question, discover, and evolve.

The campus must change, and to change it must grow. Only growth will allow us to overcome the effects of truncation that occurred early in our history and to achieve the diversity and depth essential for long-term stability and flexibility.

Santa Cruz must overcome shortcomings as it responds to the opportunities expansion will bring. At present we have only a few graduate programs and no professional offerings. We remain today a small campus, with the vulnerability and lack of flexibility that condition brings. Santa Cruz must also overcome the effects of a distorted public image of our educational program and students. Student retention, too, must be improved; enrollment remains a source of concern.

Despite these difficulties, UC Santa Cruz is poised to prosper. Student applications have increased dramatically; a new professional program in computer engineering is under way; our undergraduates compete successfully with the best in the nation; and some of our programs boast national and even international reputations for excellence.

MISSION

The Santa Cruz campus shares in the University of California's responsibility to serve the public as a center of higher learning and repository of organized knowledge through its programs of teaching, research, and service. We understand our mission as a set of specific obligations and responsibilities. Over the next two decades, we intend to make the following our most important concerns:

- continuing to promote a distinguished undergraduate education;
- developing new graduate and professional programs in areas of established strength and true promise;
- strengthening programs that demonstrate the existence of or potential for distinction;
- intensifying the campus commitment to scholarly research and creative activity, both individual and organized;
- increasing underrepresented minority student enrollment;
- continuing systematic pursuit of faculty affirmative action; and
- maintaining and enhancing the residential collegiate structure, adding new colleges as the student population grows.

We must now shift our emphasis from a small, predominantly liberal arts undergraduate campus to one characterized by a full complement of undergraduate, graduate, and professional programs. We seek the breadth, balance, and depth appropriate to a major university.

Our first decade was largely devoted to college building, and to founding and evolving undergraduate programs and curricula on a scale appropriate to a campus of an anticipated enrollment of about 27,000. Development of graduate and professional schools and of research institutes, though begun with notable success in several disciplines, was largely deferred.

In our second decade, campus growth stopped abruptly. Near-stationary enrollment and declining budgets prevented the achievement of the range of opportunities envisioned in the original conception of the campus.

The effect was far more profound than a mere failure to mount new programs. Faculty were hired with a much larger campus in prospect, with the result that many boards of studies are now seriously out of balance, with uneven coverage in some important sub-disciplinary areas and broad gaps in others. Moreover, the age distribution of faculty is narrow, with a high proportion tenured. This circumstance has reduced the turnover of faculty and limited the intellectual renewal brought by new colleagues.

We now reassert the original vision of the campus as a full-fledged member of the University of California system. The body of this plan lays out the foundation for that endeavor, describing new graduate and professional programs, enhanced undergraduate liberal education, new applied and undergraduate pathways, and strengthened research, scholarship, and creative activity.

Over the next two decades, we must introduce vital and worthy programs and strengthen the best and most promising of our existing ones. This challenge must be met with leadership, patience, and the judicious application of talent and resources. We cannot reach all our goals in the next five or even ten years; the sweep and range of our aspirations are indeed worthy of a twenty-year plan.

In addition to realizing the academic elements of our mission, UCSC will pursue the following operational goals:

- housing all additional freshmen in existing or new colleges;
- enhancing college life by continuing to develop collegiate activities and facilities;
- developing cross-campus student activities and support facilities; and
- cooperating with the local community to provide housing for upper-division and graduate students and to minimize the negative impacts of growth on the community.

THE SIZE OF THE CAMPUS

The rate of growth and projected size of the campus will be influenced by the following factors: UCSC's ability to recruit and retain students, unanticipated enrollment pressures on the University as a whole, and the appropriate size of the campus.

Student Recruitment and Retention. Even the finest academic programs will go begging if students cannot be recruited and, once enrolled, retained. Until very recently, we had difficulties in both areas. We will continue to make every effort to tell our story in a way that makes compelling our unique blend of commitment to a distinctive liberal education and to opportunities for professional and applied training. We intend, for example, to offer attractive new programs, such as business economics, communications, and language studies, within the context of a liberal arts degree. Recruitment and retention of minority students are major components of our retention strategy, and we will continue to develop programs tailored to minority students' needs and aspirations.

We will create a campus environment that maintains and enhances the special contribution colleges make to the intellectual and social life of a university. This means continuing to develop collegiate activities and facilities. We will also strengthen cross-campus activities and facilities that serve to broaden opportunities for social activities and recreation.

UC Enrollment Increases. Unexpectedly, the University of California system is facing increased enrollment pressure, despite declining numbers of high school graduates. The Office of the President now predicts growth for the University over the next ten years.

The University is obligated to provide the opportunities for higher education promised in the State Master Plan for Higher Education, and UC Santa Cruz intends to carry its share of the total enrollment increase. We are one of the few campuses with untapped potential to accommodate increases in enrollment. (See Enrollment Plan, below).

Appropriate Size of the Campus. A strong case can be made for a campus of 12,000 to 15,000 students. Universities in that range possess the flexibility to respond to changing programmatic and research needs by internal shifts of resources. At its present size, Santa Cruz has too few faculty to increase more than a small number of boards of studies to a size necessary to sustain an appropriate array of subdisciplinary endeavors and research programs. UCSC currently consists of about 30 boards of studies. Given a budgeted faculty FTE numbering 370, the average size of a board is approximately 11 ladder faculty (actually fewer, because 10 percent of all FTE are held in a temporary pool). Some boards approach 30 members, whereas other boards are quite small; boards at the low end of the range find it difficult to mount viable programs. Even with the average of 11 faculty, several boards find it hard to mount competitive Ph.D. programs.

A university of 15,000 students, however, will provide opportunities to introduce new programs and at the same time expand the average board of studies to a size that provides stability and breadth. A campus of 15,000 students would have approximately 800 faculty FTE. Even if the number of boards increased to 40, an average board would comprise 20 faculty, a number much closer to the size necessary to support strong graduate and undergraduate programs.

For these reasons we are convinced that the achievement of a campus enrollment of 12,000 to 15,000 students is both possible and desirable. Of course, we will reassess enrollment projections at regular five-year intervals, reevaluating the projected rate and distribution of growth.

In twenty years the character of the Santa Cruz campus will still be largely undergraduate, with a strong bent toward liberal education. Ninety percent of the undergraduate students will be in the arts, letters, and sciences. In this environment, the task of imparting fundamental intellectual skills of writing, analytic thinking, and use of mathematics and other tools will have a high priority in the allocation of resources and development of programs.

Affirmative Action. Growth will allow significant progress toward affirmative action for students, staff, and faculty, at a rate otherwise impossible.

THE PHASES OF GROWTH

UCSC's planning will distinguish between two distinct phases of growth.

Phase One: 1985 to 1991. The first phase spans the next five to seven years. During this period several important strategic tasks must be accomplished, setting the stage for significant and more rapid enrollment growth into the next century. By pursuing a short-range increase of from 800 to 1500 students by 1989-90 (see Enrollment Plan, below), we will be able to ameliorate the most damaging of the effects of past truncation and put into place the programmatic foundation for full participation in the rapid growth predicted in the mid-1990s.

In addition, the campus will endeavor, with the President's support, to correct problems associated with an inadequate distribution of classrooms by size; improve its infrastructure of roads, utilities, and other support facilities; increase the number of faculty offices; provide student housing; and establish administrative space.

Although the campus has ample land for new facilities, current facilities are severely limited. If UC Santa Cruz is to accommodate planned enrollment increases without dislocation and without the attendant problems that overcrowding would impose on the surrounding community, new facilities must be scheduled, and planning completed, before the students arrive. As a small campus UCSC has little flexibility, and even a temporary degradation of the living and instructional environment would damage our recruitment and retention of students.

Phase Two: 1992 to 2005. This phase covers the period during which the demographics for the nation, and California in particular, will produce a rapid increase in university enrollment.

THE ESTABLISHMENT OF PRIORITIES

In implementing the plan, campus leaders will have to make difficult choices among competing requests for resources. The soundness of their decisions will depend in large measure on the quality of the criteria they use to evaluate the alternatives. UCSC will allocate its resources to efforts that promise to achieve the following goals:

- strengthen programs of distinctive excellence
- introduce new graduate, professional, and applied programs based on internal strengths and external opportunities
- respond to significant student-workload shifts
- pursue affirmative action in faculty hiring
- support programs that increase enrollment of under-represented minorities
- improve student recruitment and retention
- strengthen general education and fundamental intellectual skills

I. ENROLLMENT PLAN

UC Santa Cruz plans to enroll 12,000 to 15,000 students by the turn of the century. To achieve this level of growth over the next two decades we must deal with a complex array of factors.

Changing demographics will continue to make predictions difficult. The recent sharp increase in enrollment surprised University planners and brought about a reassessment of enrollment forecasts. The most recent, and still preliminary, projections for the University foresee continued growth in demand through 1988, despite the decline in high school graduates. By 1993, however, when the demographic downturn reaches its nadir, enrollments for the University as a whole are expected to drop. Subsequently, the college-age population will rise rapidly, bringing about an upward enrollment trend extending into the next century.

The number of new UCSC students in the fall of 1984 increased by 240 over the fall of 1983. Freshman applications were up 50 percent at the close of the fall 1984 open enrollment period, and the campus expects an increase of 300 students in 1985-86.

Two years do not make a trend, however, and UCSC cannot be certain that growth will continue. The University's new multiple-application admissions process will introduce another set of variables into application patterns. In addition, the college-age population of the state is expected to consist of increasing proportions of minorities. The effects of these changes are difficult to predict.

Our strategy in the face of these uncertainties is integral to the plan itself. We intend to mold a creative academic program that will (1) attract students who would not previously have applied to UCSC and (2) improve student retention. The task is a challenging one, involving not only the academic program but the entire fabric of campus intellectual and social life.

Enrollment Scenarios. Because of the uncertainties ahead, our enrollment plans take the form of a range within which growth is expected to occur. Our desired average growth rate is 300 students per year for the next five years, bringing the campus to 8,500 students in 1989-90 (Table 1). The lower boundary of the range is conservative; growth at that modest pace (Table 2) would allow the campus to reach 7,770 students by 1989-90. Figure 1 summarizes the enrollment plan.

After 1989-90, the upper range of our target reflects growth at a more rapid pace than that of the previous five years. Growth during the 1990-2000 decade will equal that of the early growth years of the campus. After the 1990s, the rate of increase will decline, with enrollment reaching 15,000 in 2005 (Table 3). The conservative trend line shows a pattern of growth that rises to a

target of 12,000 in 2005. Our trend lines take into account the early-1990s dip in eligible students.

Graduate student enrollment will increase to approximately 10 percent of total enrollment--790 to 875 students--in five years, and to 15 percent by 1995. In twenty years, the percentage will stabilize at between 15 and 20 percent of total enrollment (see Table 3).

TABLE 1

NEAR TERM PROJECTION (5 YEARS) -- DESIRED
(1985-86 through 1989-90)

	Actual 1984-85	Projected				
		1985-86	1986-87	1987-88	1988-89	1989-90
UNDERGRADUATES						
Arts, Letters & Science	6,311	6,485	6,620	6,725	6,820	6,925
Lower Division	2,778	2,820	2,900	2,940	2,955	2,970
Upper Division	3,533	3,665	3,720	3,785	3,865	3,955
Applied Programs	105	175	300	430	570	700
Lower Division	105	175	215	275	370	425
Upper Division	0	0	85	155	200	275
All Undergraduates	6,416	6,660	6,920	7,155	7,390	7,625
Lower Division	2,883	2,995	3,115	3,215	3,325	3,395
Upper Division	3,533	3,665	3,805	3,940	4,065	4,230
GRADUATE STUDENTS						
TOTAL CAMPUS ENROLLMENT	6,994	7,280	7,600	7,900	8,200	8,500

TABLE 2

NEAR TERM PROJECTION (5 YEARS) -- CONSERVATIVE
(1985-86 through 1989-90)

	Actual		Projected			
	<u>1984-85</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
UNDERGRADUATES						
Arts, Letters & Science	6,311	6,425	6,435	6,420	6,485	6,480
Lower Division	2,778	2,795	2,830	2,850	2,865	2,840
Upper Division	3,533	3,630	3,605	3,570	3,620	3,640
Applied Programs	105	170	270	340	415	500
Lower Division	105	170	185	185	240	300
Upper Division	0	0	85	155	175	200
All Undergraduates	6,416	6,595	6,705	6,760	6,900	6,980
Lower Division	2,883	2,965	3,015	3,035	3,105	3,140
Upper Division	3,533	3,630	3,690	3,725	3,795	3,840
GRADUATE STUDENTS	578	605	660	690	740	790
TOTAL CAMPUS ENROLLMENT	6,994	7,200	7,365	7,450	7,640	7,770

TABLE 3

POTENTIAL GROWTH (20 YEARS)

	<u>Actual 1984-85</u>	<u>Near-Term Projection (1989-90) Conservative</u>	<u>Desired</u>	<u>Long Range Target (2004-05) Lower Range</u>	<u>Upper Range</u>
UNDERGRADUATES					
Arts, Letters & Science	6,311	6,480	6,925	9,180	11,475
Lower Division	2,778	2,840	2,970	4,590	5,740
Upper Division	3,533	3,640	3,955	4,590	5,735
Applied Programs	105	500	700	1,020	1,275
Lower Division	105	300	425	510	635
Upper Division	0	200	275	510	640
All Undergraduates	6,416	6,980	7,625	10,200	12,750
Lower Division	2,883	3,140	3,395	5,100	6,375
Upper Division	3,533	3,840	4,230	5,100	6,375
GRADUATE STUDENTS	578	790	875	1,800	2,250
TOTAL CAMPUS ENROLLMENT	6,994	7,770	8,500	12,000	15,000

**UC Santa Cruz
Twenty-Year Plan
Enrollment Growth**

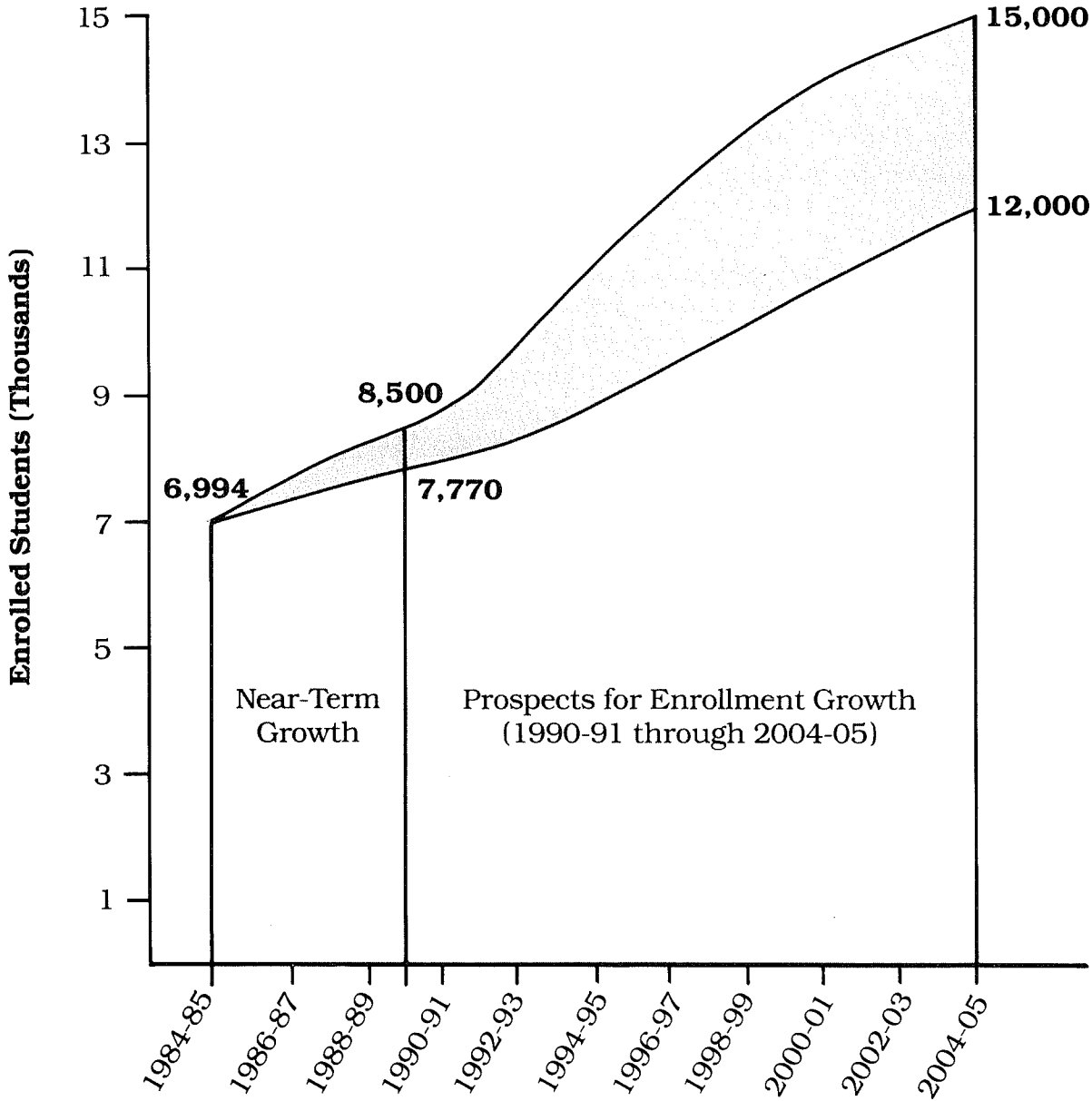


Figure 1

II. UNDERGRADUATE PROGRAMS

Throughout its brief history, UCSC has aimed for excellence and distinctiveness in two aspects of undergraduate education: degree programs in the arts, letters, and sciences, and general education. There are few other major public universities where faculty with comparable research achievements teach a student body characterized by such a high percentage of undergraduates. We will continue this tradition as we expand. Indeed, we intend to maintain and improve the undergraduate program by diversifying and enriching degree programs, adding younger faculty with fresh energy and idealism, continuing to emphasize critical inquiry as well as professional skill, continuing our commitment to interdisciplinary programs and courses, and expanding and improving utilization of the residential colleges.

Historically, the Santa Cruz campus undertook a bold experiment: to provide, within a public research university, an undergraduate education characterized both by attention to the quality of student thought and expression as an integral part of course content, and by emphasis on development of the whole person. The experiment was bold for at least four reasons: 1) these goals are not quantifiable, with the result that success is difficult to measure; 2) there were few models to follow; 3) research faculty often are not successful at such endeavors; and 4) no additional resources were provided as incentives to take these risks.

The historical goals of UCSC will become more important in the coming decades when many students will be less academically prepared and more vocationally oriented than in the recent past. During the last year, three reports on the status of American undergraduate education have deplored the "decline and devaluation" (Association of American Colleges Committee) of precisely the kind of education UCSC has sought to provide. Nationally, the percentage of bachelor's degrees in the arts, letters, and sciences, as opposed to vocational and professional programs, has dropped from 49 to 36 percent in the last decade (National Institute of Education Report). While these national reports' criticisms of curricular unstructuredness in the letters and sciences and of excessive vocationalism in professional programs may be less relevant to the UC system than to some others, their pleas for faculty involvement with more than the best undergraduates, intellectual synthesis and intensity on the part of students, and student evaluation of urgent social issues are well taken and much needed.

In order to achieve its difficult, but increasingly important, goals, UC Santa Cruz initially developed some atypical structural characteristics: a narrative evaluation grading system; a curricular organization in which all courses have equal five-unit credit (equivalent to semester courses), and in which a normal

undergraduate workload is three courses per quarter; affiliation of both faculty and students with residential colleges that have some curricular responsibilities; the expectation that all faculty are to teach undergraduates and that most are to teach lower-division students; and the requirement that all students complete a comprehensive examination, or a senior thesis, within their major.

The campus remains committed to those structural patterns that are necessary to provide excellent and distinctive undergraduate education but is ready to reevaluate others that are not. A period of renewed growth will provide opportunity for continued experimentation and improvement in this regard.

Existing Quality in Undergraduate Programs

Our undergraduate endeavor attracts students whose combined verbal-quantitative SAT scores place them second to UC Berkeley in the UC system. By many objective measures--national fellowships awarded to UCSC graduates, admissions to graduate and professional schools, scores on the GRE, MCAT, and LSAT--UCSC offers an undergraduate education that is distinctive and highly successful.

One of the clearest indicators of quality in undergraduate education is the proportion of graduating seniors who win national fellowship competitions. For two consecutive years two Santa Cruz graduates were awarded Mellon Fellowships for graduate work in the humanities. The National Research Council's figures for National Science Foundation fellowships awarded per capita place UCSC second in the UC system and sixteenth in the nation in 1982, the most recent year for which figures are available. In Fulbright Fellowships received per capita, Santa Cruz ranked thirty-third nationally (fifth among public universities) in 1984.

Independent study is an important component of undergraduate education. Thirty-eight percent of major degree programs require a senior thesis as evidence of intellectual synthesis and effective communication skills.

Administrative support for innovative undergraduate programs is evidenced by the fact that a major portion of University Instructional Improvement Program funding is allocated annually for course development and innovation. Examples of new courses developed within the last two years under the auspices of this program include Third World Cinemas and the West, The Hispanic Vision, Hebrew and History, and The New Immigration.

A number of existing courses have been restructured in order to meet rigorous new general education requirements instituted in the 1984-85 academic year.

Strong interdisciplinary programs characterize UCSC's undergraduate program. In 1983-84, 29 percent of our faculty participated in the teaching of 203 interdisciplinary courses. In addition, a variety of field programs and internships offer students opportunities to broaden their studies beyond the realm of the traditional classroom in such fields as community studies, environmental studies, language, legal studies, health care, psychology, and science communication.

Undergraduate Research

Since UCSC's inception, undergraduate research has played an unusually important role in the educational process. In 1983 and 1984, for example, faculty of the Biology Board published 32 papers with undergraduate students as coauthors. The Psychology, Environmental Studies, and Chemistry Boards also stand out in this regard. Participation by students will continue to be a prominent feature of undergraduate education, enriching faculty research while generating considerable educational impact.

Necessity of Continued Improvement

Despite these achievements, UCSC shares problems with most other public research universities and has other problems unique to itself. As elsewhere, there is a growing gap between the expectations of a research faculty and the goals and preparation of students. As elsewhere, the increasing specialization of faculty may make the students' task of integrating their undergraduate experience more difficult. As elsewhere, we are unable to attract and retain ethnic minority students in arts, letters, and sciences programs in percentages comparable to their proportion in the population. Despite efforts to provide effective advising within our colleges, our student services, like those elsewhere, are increasingly provided by professional staff rather than by faculty, and we must improve contact between these two groups.

Due to our early emphasis on critical inquiry and liberal education, we have few degree programs from which a profession can be entered with only a bachelor's degree. The absence of graduate students in some disciplines has deprived students of experienced teaching assistants and large research programs in which to participate.

Goals

- (1) The campus will give high priority to the strengthening of excellence and distinctiveness in undergraduate degree programs, and to general education, taking advantage of the uncommon commitment of existing faculty to this area of increasing national need. Consistent with this goal, we will implement the following strategies:

- Disciplinary majors will be strengthened. Depth and breadth of specialized instruction within boards will be rounded out, and requirements for the majors will be expanded as necessary to include attention to effective communication and socially responsible use of specialized knowledge and skills.
 - Multidisciplinary degree programs and courses will be strengthened where there is potential for excellence, building from strong disciplinary bases. In an increasingly interdependent and rapidly changing society, academic flexibility is advantageous to both students and the university. UCSC's relatively high percentage of campus instructional effort outside the conventional academic disciplines should be maintained in a way that uses campus talent to address changing needs.
 - Comprehensive general education will be maintained for all students, however vocationally oriented. We will try to educate people of vision and humanity who develop a lifelong commitment to learning, while at the same time preparing them for successful careers.
- (2) We will increase the number of professionally certified undergraduate degree programs and of "applied tracks" within existing arts, letters, and sciences degree programs. By the middle of the next decade, it is expected that approximately 10 percent of UCSC's undergraduates will be enrolled in such programs.
 - (3) We will seek to improve the rate of student retention. Our goal will be to increase the number of students who complete undergraduate degrees at UCSC (five years to degree) from the present 37 percent to 50 percent, by 1990.
 - (4) We will seek to improve our recruitment and retention of underrepresented ethnic minority students, and to increase their proportion in the student body.
 - (5) We will seek to increase the recruitment and retention of women in the sciences.
 - (6) We will take advantage of the residential colleges in a way that integrates the social and intellectual aspects of undergraduate education, especially during a student's first year.

Implementation

- (1) There exists a valuable synergy between growth in graduate and research endeavors, on the one hand, and undergraduate excellence on the other. We have already seen the importance of participation in research by undergraduates. Increases in undergraduate student enrollment will generate teaching assistantships. In those humanities and social sciences boards that develop new Ph.D. programs, it will be possible to provide teaching assistants who are trained in the disciplines to which they are assigned, something we cannot now guarantee. Such T.A.s will not substitute for faculty; rather, they will replace inappropriately trained assistants. We will also introduce programs, building on those already in place, which ensure that every Ph.D. candidate gains teaching experience.
- (2) In general we will undertake only those multidisciplinary programs which can draw from strength within disciplines. However, we will consider fixed-term or permanent appointments for a core faculty within multidisciplinary programs if this is necessary to ensure excellence.
- (3) Administrative support and resources will be provided to implement and revise the campus's new general education requirements. This support includes the expectation of, and effective incentives for, teaching by most faculty at the lower-division as well as upper-division level. It may also involve an organized teaching initiative to improve entry-level instruction.
- (4) We will offer two categories of applied programs. One is the traditional professional program, of which computer engineering is the campus's most prominent example. The other leads directly to a professional career, but from a liberal arts major augmented by a cluster of applied courses. Examples of the latter at Santa Cruz are business economics and science communication. Both programs require completion of all requirements for a major in a traditional discipline--economics or a science--and both provide in addition the opportunity to study techniques for the application of scholarly knowledge to practical problems. Through the campus's extensive network of internships, students gain on-the-job experience in their specialty. Following the models provided by these programs, other UCSC boards of studies will devise similar pathways appropriate to their disciplines for students who wish to enter the work force directly after earning their bachelor's degree. Current and proposed programs in writing, bilingual and science education, language studies, and film/video are in this category.

Owing to the strict and extensive accreditation requirements

for traditional professional programs there is little scope for distinctiveness within the professional courses. We will strive for special excellence outside the core of required courses, especially in the following respects: 1) all students in applied and professional programs will meet liberal arts general education requirements amounting to at least one full year of course work; 2) all such students will be distributed among the residential colleges so that they can participate in the colleges' broader intellectual and social life; and 3) all will satisfy the comprehensive requirement within the major, i.e., they will synthesize and focus their undergraduate experience through a senior thesis, comprehensive examination, or professional internship.

- (5) We will pay special attention to our undergraduates' ability to think clearly and communicate precisely. The curriculum offered by the campus's strong writing program will assume an increasingly important place at all levels of our undergraduate education. This may require some permanent positions and long-term appointments.
- (6) We will explore new opportunities for individualized instruction, perhaps by upper-division and graduate student tutors in a collegiate context.
- (7) We will adopt several strategies for recruitment and retention of minority undergraduates:
 - We will attract and retain more minority faculty, staff, and graduate students. The campus will step up its efforts to seek out minority candidates in all recruitments. Special emphasis will be placed on recruiting minority candidates to those positions that have high impact on the quality of undergraduate life: all teaching positions, the staff of the residential colleges (preceptors, R.A.s, etc.), and key administrative and staff positions in student support services (Financial Aid, Counseling, Student Activities, etc.).
 - We will create a climate in which ethnic diversity is promoted, studied, discussed, and integrated within the curriculum and the social life of the campus. The residential colleges provide a unique asset in this regard, which we will utilize. The campus's recent addition of an ethnic studies requirement to its general education program as well as continued support for curricular development along these lines are part of this strategy.
 - We will strengthen and expand our academic and support programs that are of special interest and importance to the academic success of minority students. UCSC

already has several unique academic programs of special support to minority students:

The Natural Sciences Division sponsors three programs aimed at increasing the number of minority students admitted to graduate or professional schools in the health sciences: the Minority Biomedical Research Support (MBRS) Program, the Minority Access to Research Careers (MARC) Program, and the Health Careers Opportunity Program (HCOP).

The Humanities Division sponsors a unique and innovative Spanish for Spanish Speakers Program, which through a series of courses and special instructors addresses the writing and language needs of students from Spanish-speaking backgrounds.

The Graduate Division sponsors the Minority Mentor Program, which offers students the opportunity to work closely with an individual faculty member.

The Oakes Science Center, at Oakes College, provides an innovative series of lower-division courses in biology, chemistry, and mathematics that have been designed to meet the special needs of often underprepared minority and disadvantaged students.

We will also strengthen our academic support programs that meet the special needs of minority students. The Educational Opportunity Program (EOP) provides academic counseling and advising as well as intensive tutoring in writing and lower-division courses to over 800 minority and disadvantaged students on the campus.

The Campus Writing Program, sponsored by the Humanities Division, also addresses the writing needs of UCSC students, through instructors and writing tutors assigned to each of the eight colleges.

We will attempt to develop programs of similar effectiveness for women, particularly in the sciences.

- The increased availability of applied programs will, we believe, provide an effective means of recruitment and retention. We will monitor entrance requirements and provide enrichment programs as necessary in order to increase equality of opportunity in applied programs.

Residential Colleges

The collegiate structure is one of UCSC's most distinctive features. Each undergraduate student and each faculty member is affiliated with one of the eight residential colleges. The colleges house about 45 percent of the undergraduates in their dormitories and provide office space for most of the faculty in the humanities and the social sciences.

The decentralized colleges at UCSC developed as a diversified group of support systems and loyalty structures. As such, they have proved important to the academic and social lives of many of their students. The colleges provide a more intimate social infrastructure for students to adjust to, interact within, and grow out from. They have generally been effective in delivering services, providing some extracurricular activities, and resolving problems on a personalized level. In the absence of other loyalty structures such as intercollegiate teams or fraternities, the colleges also have played an important role for alumni, providing them with a way of maintaining contact, interest, and support. For many faculty, intellectual and social life has been enriched by membership in a college, which brings them into contact with other faculty, staff, and students from a perspective usefully different from a departmental one. Faculty who have participated in collegiate founding and development testify that their associations in colleges have promoted productive curricular and scholarly interaction with faculty from other disciplines.

The collegiate idea has proved successful over the first twenty years of the campus; the colleges have become productive units for studying and living. At the same time, the role of the colleges has evolved as the campus has adapted to changing conditions. The colleges were originally envisioned as the primary centers of formal academic programs. Now, the responsibility for academic curricula is vested almost completely in the academic divisions with their boards of studies and interdisciplinary committees, and the colleges have assumed fuller responsibility for student life. The colleges still have an academic role. They provide advising for their students, and they maintain student academic records. Each college offers a required freshman core course that provides an introduction to university work together with intensive supervision in writing; some colleges offer additional courses. The colleges offer programs of speakers, seminars, conferences, and artistic presentations that supplement the formal curricula. More generally, they provide a center for interdisciplinary exchange and program development that enriches the university experience of faculty members and students.

In the future, the presence of increased numbers of minority students within all of the colleges as well as increased diversity in the staff of the colleges will provide opportunities for the development of greater understanding and appreciation of ethnic

and cultural diversity for all members of the college community.

The task in the years ahead is to enhance the effectiveness of the colleges. It is envisioned that there will not be major changes in the collegiate structure of the campus, but that the colleges will become stronger and better able to support the academic and nonacademic lives of their students.

A significant side of the colleges' academic mission is in the area of academic advising and monitoring of students' progress. Colleges will take greater responsibility for lower-division advising; an enhanced upper-division advising and record-keeping system will take place primarily in the boards of studies.

In the early years of the campus, college faculty exercised fairly autonomous control over their college activities since faculty had a formal academic affiliation with the colleges. In addition, the composition of a college faculty tended to be very diverse since almost every board of studies was represented in every college. This system was changed in the mid-1970s. College provosts and faculties are no longer directly involved in the appointment and advancement of ladder faculty. Rather, the faculty of boards of studies and academic deans have ultimate responsibility for academic personnel actions. Faculty have moved between colleges, usually in order to create groupings of people with similar interests. In a few cases, most of the members of a board of studies have aggregated in a single college. In other cases, less formal interdisciplinary groups have gathered together.

General Education in the Residential Colleges

Each college presents a core course that is required of first-year students. The core course emphasizes broad intellectual themes, an introduction to university-level work, and close attention to writing and critical thinking. Core courses provide students with a common academic experience in a residential setting. This experience has been successful in encouraging and facilitating intellectual dialogue among new university students with a wide diversity of experiences and interests but little opportunity for such dialogue. Colleges also provide a mechanism for certain kinds of educational flexibility, such as individual majors.

The collegiate academic programs are in need of routine monitoring and evaluation, for they are critical to the academic success of the students. Meeting a high standard of excellence is a challenging task for the core courses, for they are broad in scope, frequently interdisciplinary, and often deal with material outside the primary scholarly activity of any individual faculty member. External reviews will be useful to assess their quality. Additional assessment will be obtained by careful attention to students' evaluation of how these courses meet their fundamental

goals. In addition, these courses will need to be integrated systematically with the general education curriculum of the campus.

III. GRADUATE AND PROFESSIONAL PROGRAMS

Growth since 1978

UCSC's 1965 Academic Plan called for early emphasis on the collegiate undergraduate program--understandably, since a new and different kind of program needed special attention. By the 1970s, however, when the campus's graduate studies were to have been built up, the national scene in higher education had changed in ways that made the inception of new graduate programs difficult. As a result, by 1978 graduate enrollment (330) hovered at 5 percent of total enrollment, nowhere near the anticipated figure of 15 to 20 percent.

Despite the limitations on campus growth, graduate programs in a number of boards have flourished, most notably within the Division of Natural Sciences. The eminence of these boards demonstrates the capacity of the campus to mount and sustain world-class graduate programs. Indeed, their success within the UC Santa Cruz framework should serve as a model for future development.

In 1978 a decision was made to give special attention to the expansion of graduate training. At that time only eleven graduate programs existed at UCSC; more than half of the boards of studies had no graduate students. All of the existing programs were at the doctoral level and all were academic programs, none being applied or professional. Two-thirds of the students were in the Natural Sciences Division; only 8 percent were minorities, and 27 percent were female. Various short-term goals were set: to double the number of graduate students (to 660) and the percentage of graduate students (to 10 percent); to involve a far greater proportion of the faculty in graduate work than in 1978, when less than half were involved in graduate studies; and to balance the graduate program by adding some master's work to the eleven doctoral programs, applied programs to what had been an exclusively academic program, and programs outside the natural sciences to offset the skewing of graduate programs toward that division. Efforts were also to be made to increase the percentages of minority and female graduate students.

Most of the goals set in 1978 have been met, and the remainder are on the verge of being achieved. Graduate student numbers are up from 330 to 580 and are still increasing. The proportion of graduate students is up from 5 percent to 8 percent and is increasing. The total number of graduate programs has increased from eleven to eighteen, and three new ones have been proposed; in addition, four more will be proposed in the coming year. When these programs are implemented, the proportion of Santa Cruz faculty involved in graduate work will increase from under 50 percent to over 90 percent. The number of minority graduate students has tripled, while the minority percentage of the total

graduate enrollment has increased from 8 percent to 13 percent. The percentage of graduate students who are female has risen from 27 percent to 43 percent. A better balance among academic divisions has also been achieved, with natural sciences now accounting for 58 percent of total enrollment, down from 66 percent. Particularly noteworthy is the fact that in recent years the first graduate students in the fine arts have been admitted.

Ph.D. Programs. The overall emphasis of the graduate program at Santa Cruz is and will continue to be heavily on doctoral work. In 1983-84, for example, 26 percent of the graduate academic degrees awarded in the University system were at the doctoral level and 74 percent at the master's level, while at Santa Cruz that year 47 percent of the degrees awarded were at the doctoral level. For Berkeley, the figures were slightly higher than the systemwide figures--28 percent doctoral, 72 percent master's--but the figures still show far less concentration on doctoral degrees than is the case at Santa Cruz. Only San Diego's figures approach those of Santa Cruz--44 percent doctoral, 56 percent master's. These figures reflect the fact that until 1979 most of the programs at Santa Cruz were at the doctoral level. Our recent institution of some master's programs will not alter our primary emphasis on doctoral-level graduate training.

Master's Programs. In boards that currently lack any graduate programs, institution of a master's program can serve to strengthen the board and prepare the way for a doctoral program that might not yet be appropriate. Where adequate employment opportunities exist, it may be appropriate temporarily to place more emphasis on work at the master's level, for the current quality of applicants at that level is much higher than it has been traditionally. But the inevitable long-range goal for a major university campus is to institute thriving doctoral programs. At Santa Cruz, we will maintain and enhance our distinctiveness by bringing together interdisciplinary clusters of faculty and students for doctoral training.

Continued Development of Graduate Work

Santa Cruz has, in brief, made serious and successful efforts to enlarge and strengthen its graduate program--to diversify its content, its students, and its faculty--and to make graduate work a more important part of campus life. Nevertheless, the dearth of new FTEs associated with the lack of growth during the past decade threatens to undermine the continued health of even our most successful programs. In the next period of the campus's development the anticipated increases in enrollment will generate the additional FTEs urgently required to shore up and revitalize existing programs and to generate new ones. To facilitate the orderly growth of the graduate program, a high priority will be

given to building on the strengths of our already successful programs.

Boards with programs on the threshold of excellence will be strongly encouraged to develop strategies for reaching their full potential with the help of additional resources. Finally, in a climate of growth, the ultimate goal to be achieved over the next twenty years is the implementation of vigorous graduate programs in all the basic disciplines. By 1990, we expect about 850 graduate and professional students, approximately 10 percent of an expected campus total of 7,800 to 8,500. By 1995, we plan to reach a level of 15 percent graduate and professional students in a total campus enrollment of 8,800 to 11,000 (see Figure 1 in Enrollment Plan, above). Accordingly, a spirited search will be made for new programs with a demonstrated potential for academic excellence. Expansion of the graduate programs will thus proceed by a process of selected development over the twenty-year period.

We will take advantage of the introduction of professional programs to strengthen existing academic disciplines. If the faculty of the new professional programs are appropriately selected, they will contribute to a solid foundation upon which Ph.D. programs may then be launched.

Affirmative Action

We will also seek to make additional progress in graduate student affirmative action, maintaining and increasing the gains of the last few years. The excellence of Santa Cruz's graduate student affirmative action program has been nationally recognized in the past few years through UCSC's success in competing for federally funded fellowships ("Graduate and Professional Opportunity Program" Fellowships). In 1983 the campus tied with one other institution in the nation for the highest number of these fellowships awarded. In 1981, the score received by the campus proposal for the Institutional Grant portion of the program was the highest in the nation; in 1981, 1982, and 1983, the campus received a higher number of new and continuing fellowships than all other UC campuses combined, though its graduate enrollment was only about 2 percent of the systemwide total during those years.

Placement of Graduates

Whenever a new graduate or professional program is created, career placement services will be introduced in the board of studies offering the degree. Faculty uniquely possess the expertise and professional leverage to support their Ph.D. graduates in the job market.

IV. RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITY

The research mission distinguishes the University of California from other sectors of public higher education in California. The character of teaching in a major university with a national presence is determined by the central fact of faculty involvement in research and other creative scholarship. In the classroom, students (graduate and undergraduate alike) encounter not simply well-informed teachers, but teachers who work actively at the frontiers of knowledge. Students are taught, then, by individuals who are not simply purveyors of received information, but creative, original thinkers themselves. Students thus not only receive the current state of knowledge in a discipline but are challenged to rethink and go beyond it, following the role model set by their teachers in the daily process of thinking creatively and conducting scholarly endeavors. We therefore recognize the paramount importance of excellence in scholarship for the instructional programs of the campus at all levels.

The limitations on excellence in research and other creative activity are the limitations of productivity and creativity in the faculty, and thus attention to the quality of the faculty is the most important single means of assuring high quality.

Even with a substantial cadre of strong faculty who are distinguished teacher-researchers, and the necessary facilities and organized research activities in place or anticipated, Santa Cruz cannot expect to be known as a campus where distinguished scholarship is done unless a creative research climate is cultivated. To this end, academic administrators will, as basic policy, constantly encourage individual faculty as well as organized research groups to expand their horizons and to seek increased extramural funding. This policy is especially important in the case of junior faculty. Board chairs will be given flexibility and discretionary authority in adjusting teaching loads so that research needs and productivity can be taken into account.

Extramural Research Support

The decade 1973-74 to 1983-84 has shown a steady increase in extramural support, with proposals submitted increasing by 25 percent, awards received by 48 percent, and award dollars by 236 percent (not adjusted for inflation). During these years, faculty numbers were relatively unchanged. Increases were due largely to three factors: the activity of organized research units, the expansion of the graduate program, and the maturing of the faculty. The trend appears to be accelerating; data on research awards for 1984-85 indicate that the year will be the best ever, with the dollar figure for awards almost double what it was three years ago. With continued expansion of the campus graduate programs, expansion of existing and new organized

research endeavors, construction of needed new facilities, and the inception of new programs such as computer engineering, we can be confident that extramural funding will continue to increase at a rapid pace.

In order to facilitate organized research and assist individual faculty, the campus will provide incentives and support. Short-term (three-year) seed funding will be made available to newly formed groups and to individuals, particularly junior faculty. Computing support and clerical services (including manuscript typing) will be increased. Funds for visiting scholars will be provided. These resources and services, along with physical facilities, constitute the "infrastructure" of support essential to an environment in which research thrives. Funds for organized research activities will be used to leverage external funds and provide assistance during the early stages of research program activities. Library resources are of special importance in a university, and Santa Cruz intends to improve its holdings in a way that complements the development of programs and the growth of the campus.

Rank among the top 100 research institutions in the nation, measured by the receipt of federal research funds, is a campus goal for the next decade. UC Santa Cruz's ultimate goal is to join the ranks of the leading research universities of the nation.

V. FACULTY

Maintaining faculty excellence is largely a matter of day-to-day decision making in each board of studies, but there are some general precepts that will, as a matter of policy, guide the campus in its next phase:

- (1) The most important resource of the University is a cadre of faculty scholar-teachers of the highest distinction, whose advances in scholarship excite and stimulate colleagues and students throughout the international university world. The intellectual excitement they generate attracts students and junior faculty of potential intellectual distinction, creates the University's reputation for intellectual excellence, and attracts essential external funding. Maintaining a strong faculty core is our first campus priority. Whenever an individual faculty member resigns or retires, it will be campus policy promptly to seek and appoint an individual with clear potential for equal or greater distinction.
- (2) Enlarging the group of faculty who can perform leadership roles in scholarly activity on the campus by virtue of their national and international presence will be a high campus priority in the next phase; any vacated or new FTE will be viewed as an opportunity to accomplish this objective. The graduate and divisional deans will continuously encourage all boards of studies to remain alert to any possibility of recruiting truly outstanding original scholars at all ranks, and their efforts to do so will be fully supported by the Chancellor and Academic Vice Chancellor.
- (3) Since faculty of this stature set a standard of creative excellence that stimulates activity around them and tends to raise the intellectual level of their environment, it is campus policy to ensure that each board of studies on the campus enjoys the presence of researcher-teachers whose originality, creativity, and productivity are of the highest order.
- (4) For these reasons, commitment to undergraduate teaching, excellence in research, and potential for contribution to a graduate program will be prominent criteria in the selection and advancement of ladder faculty.
- (5) In the recruitment and appointment of minority and women faculty, UCSC will recognize the special, less conventionally accepted contributions to campus intellectual life that affirmative action appointees are capable of providing.

Affirmative Action

Santa Cruz has established an important and continuing commitment to the achievement of a diverse faculty. We have done so not only that we might correct historical patterns of underutilization of women and minorities, and not only in order to maintain a faculty more nearly representative of an increasingly diverse student body, but to ensure a wide range of scholarly activities essential to the enrichment of a contemporary curriculum.

Santa Cruz has made considerable progress toward this goal: 23 percent of our faculty are female and over 12 percent are minority, the largest such percentages within the University. Part of our success in recruiting minority faculty in recent years is due to the initiation of a Target of Opportunity Program (TOP) in the fall of 1982. By the end of the 1984-85 academic year, nine underrepresented minority faculty will have been appointed as a result of the program. We have been particularly fortunate in being able to appoint minority women faculty, thus accomplishing both objectives of our affirmative action goal.

Until now, the TOP program has depended on the ability of the academic divisions to reallocate FTEs from boards of studies to the program. Beginning with 1985-86, FTEs specifically for the TOP program have been identified in the allocation of new FTEs to UCSC. In the future, a portion of each year's allocation of new FTEs to the campus will be set aside for the program.

Our progress in hiring more female and minority faculty has not been restricted to the TOP program. Since 1982, Santa Cruz has appointed seven women faculty (four Caucasian and three minority) and two minority males aside from the TOP appointments made during those years. While in 1982 women and minority faculty constituted 29 percent of new appointments, in 1983 and 1984 they were 50 percent and 44 percent, respectively, of all new hires.

In the future, UCSC will make a commitment to increasing the proportion of faculty women in the natural sciences, where they are fewest.

It is not enough simply to hire minority and women faculty. We must provide them with the circumstances to become productive teachers and research scholars. We acknowledge that these faculty often incur extra demands on their time, as mentors to students, advisors to groups, and in other ways connected with their special circumstances.

We will pay particular attention to those periods in careers when extra help can have a large impact. Whether this help is in the form of released time, research assistance, or travel support will depend upon the individual situation. The board chairs and the deans will monitor the progress of each such appointment to ensure that the faculty member develops to maximum potential.

VI. ORGANIZED RESEARCH PROGRAMS

New and existing organized research activities are described below. Organizational names are abbreviated as follows: Division of Humanities (Hum), Division of Natural Sciences (NS), and Division of Social Sciences (SS). The status of each endeavor is identified: whether it already exists, is in process (a formal proposal having been submitted), or is under preliminary discussion. ORA stands for organized research activity; ORU, organized research unit; MRU, multicampus research unit.

Center for Marine Studies (NS: existing)

The Center for Marine Studies, an ORU established in 1976, has research clusters in marine biology, marine mammals, ocean processes, marine geology and geophysics, marine natural products, neurobiology, and aquatic toxicology. The program already has achieved international recognition; the marine mammal group has the largest number of researchers of any academic institution in the United States. In addition to on-campus facilities, CMS operates the Long Marine Lab, a research vessel and Ano Nuevo Island. Under construction at Long Marine Lab is a 50-foot and a 30-foot tank as part of a major bioacoustics facility. Future plans at Long Marine Lab call for a marine bio research and teaching complex and a major analytical/aquatic toxicology building. (Regental action has approved a name change to Institute of Marine Sciences, effective August 1, 1985).

Colonial Discourse (Hum: preliminary discussion)

Growing out of the major conference on "Europe and its Others" held last summer at the University of Essex, an international group for the critical study of colonial discourse is establishing a center at Santa Cruz. The group's present tasks are to publish an international newsletter describing works in progress, to compile an annotated bibliography of entries suggested by its members, and, in the San Francisco Bay area, to sponsor talks, colloquia, and small conferences. The group also plans to publish periodically papers from its conferences and lecture series. Liaison groups composed of faculty and graduate students are forming at Berkeley and Stanford. Planning has been initiated for quarterly Bay Area gatherings.

Comparative and International Studies (Hum, SS: existing)

Faculty from sociology, history, politics, and economics participate in the seminars sponsored by the ORA for Comparative and International Studies. Since the ORA's founding in 1978, associated faculty have been concerned with issues relating to the comparative historical relations of state, society, and economy, and the political relations between the northern and southern

nations. Participating faculty have organized conferences, seminars, and lectures in addition to undertaking research projects. They have encouraged student work in areas of interest and have developed a prize competition for student essays as well as a graduate student fellowship competition. Currently between 20 and 25 faculty participate regularly in the activities of the ORA on Comparative and International Studies.

Computer Graphics (NS: preliminary discussion)

Several research areas in the Division of Natural Sciences are converging, suggesting the development of a major research effort in the area of computer graphics. The Computer Engineering Board, which will add a graduate component within the next year or two, will have a research emphasis in computer graphics. The Mathematics Board includes faculty with international reputations in the application of mathematics to computer graphics. Faculty in both chemistry and computer and information sciences are developing research programs in three-dimensional computer display and other practical aspects of computer graphics. Some of this work is of special interest to several Lick Observatory faculty. These diverse groups, unified by a single technology, will join to develop a computer graphics research capability of great originality.

Cosmogony and Cosmology (NS: preliminary discussion)

UCSC's close interaction between astronomers and physicists provides an ideal milieu for studying the origin (cosmogony) and the evolution and structure (cosmology) of the universe, a field that unites scientists studying the smallest identifiable particles with those investigating the largest observable structures.

A recent UCSC collaboration of this sort produced the first well-defined model of the universe's "dark," or nonluminous, matter (probably subatomic particles). Dark matter makes up 90 percent of the universe and, through the gravitational force it exerts, controls the universe's development. The success of this and other UCSC collaborations, as well as the promise of access to the Ten-Meter Telescope and the Stanford Linear Accelerator Center, has led campus researchers in these areas to consider forming an organized research unit to blend more fully their scientific ideas and techniques.

Critical Theory (Hum, Arts: preliminary discussion)

Planning is now under way to create an organized research group in critical theory, drawing on the campus's exceptionally strong group of theorists in the literature, History of Consciousness, and philosophy faculties, and on the strong theoretical orientations of many students in the literature and History of Consciousness graduate programs. Critical theory is becoming an increasingly prominent and important part of the humanities.

One important research cluster within the larger critical theory group will be that focusing on representation and performance. This group will build on the various performances, workshops, and outreach activities of the campus's young, increasingly visible, and highly promising Shakespeare Santa Cruz. It will employ faculty from several boards in the humanities and arts and will focus attention on the problematic relationship between text and performance, that is, on the tension between academic and theatrical interpretation in the study and production of Shakespeare. The history of cultural representations from the Renaissance to the present will be addressed, as will the theatricalization of culture and the impact of the print revolution. Other activities will include comparative, structural, and historical studies of media, both as forms of representation and as functions of communication. Many of the research group's topics and ideas will be staged and tested by a repertory company composed of UCSC students and faculty.

Dickens Project (Hum: existing)

The Dickens Project has evolved from an intercampus program financed by the intercampus program fund in 1981 to a unique and major research innovation in the humanities supported by seven campuses within the UC system. The project brings together faculty and graduate students to participate in an annual research seminar, with findings published in Dickens Studies Annual, the major forum for Victorian cultural study and Dickens research. Additional activity includes an annual graduate student research presentation and a faculty exchange program.

The Dickens Project has become a highly successful pioneering program, having adapted to the humanistic enterprise some of the best aspects of the scientific model of research and graduate apprenticeship. There has been, and will continue to be, significant growth in the project, as evidenced by the participation of scholars from England, France, Israel, China, and other nations, as well as such U.S. institutions as Stanford and the University of Texas.

Environmental Field Program (SS: existing)

The Environmental Field Program is a multifaceted ORA that supports student projects and faculty-led student research teams. The ORA supports these projects with grants, equipment, logistics coordination, and editorial assistance for finished reports. Studies undertaken by the unit have included a comprehensive resource survey of a desert wilderness area, a case study of National Park Service management problems, and an experimental project to develop sampling techniques for areas of suspected archaeological significance. Currently a proposal is under consideration to expand the program to include faculty and students from the Santa Barbara and Riverside campuses.

Environmental Studies--Agroecology (SS: existing)

Located on the 2000-acre Santa Cruz campus, the Farm and Garden are instructional and research facilities devoted to agroecology and administered by the Agroecology Program of the Environmental Studies Board. The facilities are designed to give students the opportunity to gain practical skills in organic horticulture and animal husbandry. At the same time, the Farm and Garden serve as outdoor laboratories for basic agroecological research and for courses in appropriate technology, ecology, and natural history.

Environmental Toxicology (NS: preliminary discussion)

The Division of Natural Sciences is currently discussing a degree program in environmental toxicology, with a research focus in aquatic toxicology. Organizationally, such a research effort at Santa Cruz will be located within the present Center for Marine Studies but will represent a major new direction in the center's activities. This new research initiative will respond to serious concerns in the state regarding toxic substances. The eventual repository of almost all environmental toxins is water: freshwater systems, the marine environment, surface water, and groundwater. The campus now hosts research projects investigating trace elements (e.g., selenium, cadmium, lead) in rivers, streams, and the oceans. A study to determine the speciation and mobility of chromium in soil/groundwater systems is in progress, as is a study of pollution effects on fish in San Francisco Bay. The goal of another such project is to determine the kinds, amounts, and fates of organic toxicants in freshwater and marine systems as well as in bird populations.

Feminist Studies (Hum, SS: existing)

In 1984, the original research group in feminist studies was created to help support the scholarly work of approximately 35 faculty from the humanities, social sciences, and arts who were involved in gender research and to encourage their collaboration with over 40 graduate students also working in gender-related areas. An ongoing faculty seminar, a works-in-progress series for faculty and graduate students, distinguished visitors, an active lecture series, and the formation of research groups that include undergraduate as well as graduate students all contribute to the vitality and importance of this research group. The conferences and publications planned for the future will also give the feminist studies group increasing visibility and influence in the national women's studies community.

High Technology and Social Change (SS: existing)

Another ORA, dealing with high technology and social change, is destined to grow and possibly merge with the ORA in Social Behavior and Energy Conservation. The high technology group has been especially successful in involving students in the research

activities of the participating faculty. During the short period since its inception, it has sponsored two national conferences whose proceedings will be published. The group, composed primarily of faculty associated with the Boards of Studies in Politics, Community Studies, History of Consciousness, Computer and Information Sciences, and Computer Engineering, has also brought its research expertise to bear on local as well as national concern. It has recently completed a study of the high-technology industry in Santa Cruz County.

Human Genome Institute (NS: preliminary discussion)

The genetic information parents pass on to their offspring resides entirely in the genome: a set of chromosomes, composed of DNA molecules, that guides all aspects of physical development and differentiation in an organism. Were it possible to "read" the chemical constituents of DNA molecules, scientists would have access to all the information that determines the inheritance of physical characteristics. The technology already exists to read and decode the total sequence of the approximately three billion nucleotides that constitute the DNA of the human genome. This formidable task will someday be accomplished; UCSC should move boldly now to secure a place in the forefront of this important field. This could be accomplished with an institute located on the Santa Cruz campus, equipped with its own laboratory building and guest residence, with space for a permanent staff of 50 to 75 scientists and technicians. The institute would offer, in addition to research facilities, continuous state-of-the-art courses in cloning and sequencing, as well as in-house internships for course graduates. The institute would also serve as a repository for information, which could be linked by computer to other nucleic acid databases and to research groups elsewhere in the world.

Institutional Analysis and Social Policy (SS: existing)

The research program in institutional analysis and social policy involves faculty and students from sociology, politics, community studies, and history in research on the interactive relationship between the form and structure of social institutions and public policy. Policy issues in areas such as health care, urban policy, agriculture, energy, migration, multinational corporations, and information and data systems have been studied by members of the group. This spring the ORA in Institutional Analysis and Social Policy will host a major conference on campus on the social impact of the domestic policies of the Reagan Administration.

Landels-Hill Big Creek Reserve (SS: existing)

The Landels-Hill Big Creek Reserve, located in Big Sur, is a quasi-autonomous unit loosely affiliated with the Environmental Studies Board. The reserve consists of 4,000 acres of rugged terrain 90 miles south of the campus on the spectacular Big Sur

coast. It provides a natural laboratory for students of the wildlands environment.

Lick Observatory (NS: existing)

Lick Observatory was established in the 1880s. A part of the University of California since 1888, the MRU is used extensively by observers from other UC campuses. Lick is a world-class observatory with a distinguished faculty including many who are members of the National Academy of Science. It operates a number of major telescopes at Mt. Hamilton, near San Jose. Each two years out of three, in July, the Lick Observatory shares in hosting a conference on topics in astronomy and astrophysics, which brings international scholars and students to the Santa Cruz campus.

Lick astronomers work on a wide variety of astrophysical problems, including solar system and star formation, stellar evolution, the origin and evolution of the galaxy and external galaxies, abundances of the chemical elements, and the size, structure and evolution of the universe. To enhance their capacity to study this range of difficult problems, Lick's astronomers are now playing leading roles in the design and construction of the unique multi-faceted Keck ten-meter telescope, which will be the largest in the world.

Literacy in a Democracy (Hum: preliminary discussion)

After eight years of experience with the Central California Writing Project, and with the strengthening of the Campus Writing Program to include courses that place writing in academic, political, and social contexts, the campus has now in the planning stages an institute to explore the nature and teaching of literacy in a democracy. This project will bring together University faculty who have made a serious commitment in recent years to improving education at all levels and teachers, community workers, writers, librarians, and school administrators. Following the model established by the Central California Writing Project, this institute will combine attention to theory with practical applications in classrooms and the community. The institute will help UCSC play a significant role in the national effort to improve education at all levels.

Molecular Biology and Biochemistry (NS: preliminary discussion)

There is a very preliminary proposal to consider a research grouping to study biological macromolecular structure and function.

Nonlinear Phenomena (NS: in process)

The application of nonlinear studies to research at UCSC ranges across a broad spectrum of disciplines. Investigations in

seismology, wave propagation in the oceans, spectral analysis, physical oceanography, and population biology, as well as the new computer engineering program, depend on and will benefit greatly from the development of advanced techniques in applied mathematics.

The last few decades have seen significant advances in applied mathematics, especially in techniques involving nonlinear problems. These techniques are now diffusing into traditional fields of science, and they have already been successfully applied to long-standing and important problems in a number of disciplines. The full impact of these advances has yet to be felt, however, and is unlikely to be until a confluence of mathematicians and scientists is organized.

The campus's proposal brings together outstanding faculty interested in nonlinear problems in physics, mathematics, earth sciences, and astronomy and astrophysics. UCSC's research, together with products of collaboration the campus will undertake with UCLA and UCSD, promises to contribute significantly to the study of nonlinear phenomena.

Observatories (NS: preliminary discussion)

The University of California presently operates two ground-based optical-infrared facilities: Lick Observatory, headquartered at UCSC, and Mt. Lemmon Observatory, near Tucson, Arizona. An additional observing station, operated entirely on soft money, is headquartered at UCSD. These facilities will soon be joined by the much larger Keck Observatory, a joint enterprise with Caltech. The new observatory's ten-meter telescope will be operated almost entirely with UC funds, although the facility itself will be managed through a freestanding joint corporation. These operating funds, although they contain provisions for instrument construction in California and operations in Hawaii, provide no resources for engineering and technical facilities in California, where UC faculty and support staff are located.

UC astronomers therefore propose to establish a multicampus research unit called UC Observatories, to be headquartered at UCSC, which will provide scientific and technical services, leadership, and coordination for all UC ground-based facilities, namely, the UC part of the Keck Observatory, Lick Observatory, and Mt. Lemmon Observatory.

There is general agreement that UC scientists' ability to use the Keck Observatory most productively will depend heavily on the existence of technical and shop resources located in California, where the faculty itself is located. The large, experienced, and dedicated Lick Observatory shop staff and their facility on the Santa Cruz campus make UCSC an especially desirable location for the establishment of a central managing unit for UC observatories.

Pacific Basin (NS, SS, Hum, Arts: preliminary discussion)

A Center for the Study of the Pacific Basin will direct its attention to the cultures, economies, oceans, and coasts of the Pacific region. The Pacific nations are playing an expanding and vital role in the world, and productive study of these regions will have to be interdisciplinary. The center will bring together scholars and students in the social sciences, natural sciences, humanities, and arts. For example, serious study of Pacific Basin economic and political problems will require, in addition to the perspectives of economists and political scientists, the contributions of historians, sociologists, linguists, and anthropologists. Despite increasing economic interdependence, the Pacific Basin is still marked by great cultural diversity, as is evidenced in its literature, languages, history, art, religion, philosophy, politics, and law. The next decades promise new and provocative opportunities to address questions of economic development and of social and cultural practices.

In the natural sciences, too, there is much to learn about the coastal zone of the Pacific. The coastal zone includes the coastline and the continental shelf, with its buried mineral wealth and resource-rich waters. This region supports one of the world's great fisheries, and it is drastically influenced, and increasingly threatened, by human activities. The Pacific coastal zone is therefore in urgent need of imaginative and sustained interdisciplinary research by chemists, physicists, biologists, and earth scientists, as well as by social scientists.

Predatory Bird Research Group (SS: existing)

The UCSC Predatory Bird Research Group, affiliated with the Environmental Studies Board, is developing methods to ensure the survival of the peregrine falcon and other endangered species of predatory birds. The project facility on the UCSC campus has become the West Coast center for studies on captive breeding of predatory birds. It is certain to attract additional extramural funding in the next few years.

Race, Ethnicity, and Class (SS, Hum: preliminary discussion)

Drawing on faculty from at least eight social sciences and humanities boards, this new research group will focus initially on the examination of the role and meaning of race, ethnicity, and class in American national life. Its central concern with comparative ethnic studies will also enable it to facilitate research on ethnicity and class in an international context. This group holds great promise for becoming a distinguished center in the UC system for comparative ethnic and cultural studies. Although most of the faculty involved will be in the social sciences, a number of humanities faculty are also expected to participate.

Redwood Research Institute (NS: existing)

The Redwood Research Institute, a program concerned with the biology of the redwood, was developed in 1980 in response to the continued demand for wood and wood products in the face of a growing world population and dwindling natural resources. The initial focus of the Redwood Research Institute is on the culture of cells and tissues in vitro of selected superior redwood genotypes and the selection of clones of superior form, growth rate, and wood characteristics that are adapted to specific habitats. Other species of commercial interest are now also studied.

Santa Cruz Area Study (SS: in process)

The Social Sciences Division manages a number of substantial research resources or projects, some of which may achieve ORA status within the next few years. An example is the Santa Cruz Area Study, which is engaged in a study of transients and other community problems. Jointly funded with the City of Santa Cruz, this is a prototype study to explore the feasibility of the University bringing its research expertise to bear on a problem of great concern to the local community. It may lead to the formation of an ongoing ORA.

Santa Cruz Institute for Particle Physics (NS: existing)

In SCIPP, Santa Cruz has a world-recognized research program in high energy physics, with collaborative research programs at the Stanford Linear Accelerator Center, at Fermilab, and with European research groups. Recently, the experimental effort was augmented by transfer to UCSC of an eminent group of particle physicists from Princeton. With excellent programs in particle physics and astrophysics, UCSC is well placed to develop the interface between these fields. High energy theorists and theoretical astrophysicists have begun to develop a coherent and plausible account of the very early universe and of dark matter.

Science, Technology, and Society (Hum, SS, NS: preliminary discussion)

The Science, Technology, and Society Program is designed to promote investigations into the social and cultural dimensions of science and technology. It focuses on the history of science, the philosophy of science, and contemporary social issues that involve the practice of science and engineering, with a special emphasis on the responsible use of scientific technology. Drawing upon the work of UCSC faculty and prominent visiting scholars, the program will attempt to invigorate the dialogue between the sciences and humanities.

Seminar in Applied Economics (SS: existing)

The Seminar in Applied Economics supports research of the

economics faculty by publishing a working-paper series, sponsoring colloquia involving visitors as well UCSC economics faculty, and sponsoring scholarly conferences. The seminar's events have included conferences on urban economic problems, economic relations between the United States and Mexico, state and local finances, rent control, antitrust and regulation, and the economics of public debt. It has also sponsored seminars by presidential economic advisers and winners of the Nobel Prize in economics. Conference proceedings have usually been reproduced as a published volume. The Seminar in Applied Economics was organized when the graduate program in applied economics was founded, and it has proven to be a valuable stimulus to research as well as a resource to the instructional program.

Shakespeare Santa Cruz (Hum, Arts: preliminary discussion)

Organized creative activity in the fine arts has reached a high level of distinction in the recently established Shakespeare Santa Cruz. Begun in 1982, this group has already succeeded in attracting actors of international renown, including several from the Royal Shakespeare Company, not only for the summer season but also for the academic year. Plans include continuing innovative improvisation of traditional Shakespeare staging, and critics and dramaturges will continue to present seminar sessions relating to the plays for the current season. Shakespeare Santa Cruz will interact closely with the critical theory research group described above.

Social Behavior and Energy Conservation (SS: existing)

A group of psychologists and sociologists studying social behavior and energy conservation has recently gained ORA status on the campus. This group has undertaken a number of studies designed to gain knowledge of factors involved in the adoption or nonadoption of various energy conservation systems or devices. Preliminary studies have demonstrated that the social factors concerning energy-conserving behavior are at least as important as engineering considerations.

Synchrotron Radiation Research (NS: preliminary discussion)

Research facilities capable of producing X-rays by accelerating charged atomic particles to speeds approaching that of light have recently become an important tool in the study of problems in biochemistry, physics, surface science, and crystallography. The Stanford Linear Accelerator Center now has such a facility, and UCSC physicists and other campus scientists are exploring the possibility of a joint Stanford-UC (systemwide) program that will allow UCSC faculty to expand their already substantial research programs in condensed matter physics, phase transitions, and X-ray absorption.

Syntax Research Center (Hum: existing)

The center, established in 1982, is administered by the Board of Studies in Linguistics. Its research focuses on the syntax of natural languages, with emphasis on those languages whose structure differs significantly from English. Linguistics has interdisciplinary connections with the social and natural sciences; the SRC supports research ranging from the philosophy of language to computational text-analysis tools. The center hosts distinguished visitors-in-residence and an annual conference that draws leading scholars to the campus. Together with research by UCSC faculty which is partially supported by the SRC, these activities have brought the SRC to a position of national distinction as a center of linguistic research.

Tectonics (NS: in process)

The tectonics ORU will build upon strengths of faculty in geophysics, geology, physics, and mathematics who are researching three aspects of tectonics phenomena: surface manifestations, transformations within the earth's interior, and convection. The faculty share a common interest in quantitative approaches designed to elucidate the physics of the forces that shape the earth and to predict their tectonic manifestations.

Centrally involved in the program will be the Earth Sciences Board, which recently drew high praise from external reviewers for the quality of the curriculum and the faculty. That team's report found that "the talent in the Earth Sciences Board plus the data forthcoming from the national programs make UCSC an ideal place to establish an ORU for the study of tectonic processes at continental active margins."

Translation Institute (Hum: preliminary discussion)

Organized in 1979 as the UCSC Summer Translation Institute, this intensive four-week workshop has made it possible for undergraduate and graduate students in the Literature and Language Studies Boards to complete translation projects and participate in theoretical discussions on the general subject of the translation of literary texts, which has come into its own recently as an activity recognized as being at the center of interpretive, critical, creative, and linguistic activity.

Plans are now being developed to expand the summer institute into a year-round translation institute that will foster symposia and scholarly exchange on topics of a more theoretical nature related to translation, while also creating a focal point for distinguished translators and students of translation to present their work for critique and publication.

Vision Research (SS, NS: in process)

The ORU in Vision Research proposed by the Social and Natural Sciences Divisions is designed to facilitate research collaboration between the several existing vision research groups currently active at Santa Cruz. While the joint activity is already well established, the development of new multidisciplinary projects as extensions of ongoing research holds great promise. The vision research group will focus on emerging areas such as the development and plasticity of vision, factors contributing to visual loss in the elderly, mapping of retinal receptors' communication with the brain, and the mechanisms of visual excitation.

VII. THE HUMANITIES

The Humanities Division is composed of a resourceful and engaged faculty who offer high-quality undergraduate majors in traditional humanities disciplines: history, linguistics, literature, philosophy, and the promising new program in language studies. External reviewers have recently singled out the linguistics and philosophy programs for their excellence. The division also oversees a number of innovative and successful interdisciplinary majors, including American studies, legal studies, and women's studies, all of which require a substantial senior thesis or project.

In addition to steadily developing graduate programs in history and literature, the division administers the innovative interdisciplinary program in History of Consciousness, one of the most selective graduate endeavors within the humanities in the University of California. Proposed graduate programs in linguistics and women's studies are also likely to achieve considerable visibility.

The most prominent research at Santa Cruz in the humanities is in the areas of critical and interpretive theory, syntactic studies in linguistics, and comparative historical studies. Each category is well represented in current and planned graduate programs and organized research enterprises.

HUMANITIES PROGRAMS

	Undergraduate	Graduate	Research*
Existing/ Approved	American Studies History Language Studies Legal Studies Linguistics Literature Philosophy Women's Studies	History M.A., Ph.D. History of Consciousness Ph.D. Literature Ph.D.	Carlyle Project Comparative and Intl. Studies Dickens Project Feminist Studies Syntax Research Center
In Process**		Linguistics Ph.D.	
Under Preliminary Discussion	Asian Studies Communications History of Consciousness	Comparative and Intl. Studies Ph.D. Creative Writing M.F.A. Jurisprudence Ph.D. Women's Studies M.A., Ph.D.	Colonial Discourse Critical Theory Literacy in a Democracy Pacific Basin Race, Ethnicity, and Class Science, Technology, and Society Shakespeare Santa Cruz Translation Institute

*Research programs consist of focused activities involving faculty groups.

**Defined as submitted formally by the dean to the central administration and Academic Senate committees.

The Humanities Division at UCSC is a central element of the University's research, teaching, and service missions. This campus prides itself on the fact that humanistic concerns have been structurally built into all of its academic divisions and that there is a history of faculty cooperation across divisional lines on behalf of those concerns. However, this critical dimension of campus academic life is most strongly focused in the Humanities Division, which administers eleven undergraduate programs, three graduate programs, and three organized research activities, while balancing a mix of disciplinary and interdisciplinary interests. Divisional faculty also play key roles in the intellectual lives of all of the campus's residential colleges.

This division, like the others, grew rapidly but rather unsystematically during the campus's first decade. When the campus's enrollment growth unexpectedly ceased during the mid-1970s, most humanities boards were left out of kilter, with critical needs unmet. Over the next several years, in the context of severe budgetary constraints, a number of the division's senior faculty retired, died, or departed, mostly without replacement, adding still further to the imbalances and gaps left from the earlier period and preventing the division from pursuing a series of previously planned initiatives.

In spite of these obstacles, the division has hired a series of productive scholars and academic leaders. They have revitalized many of our programs. And the enforced pruning, though painful, produced tighter curricular programs, which attended more aggressively to student needs. On many fronts the division is leaner and livelier than ever before: several research groups have been organized this year; enrollments are rising faster than the campus average; curriculum has been sharpened and balanced; graduate programs have been tightened and their advising improved--all in the face of key faculty losses. During this period of retrenchment, two divisional programs--History of Consciousness and linguistics--have achieved national visibility.

The divisional programs will share in growth over the next decade. Most will fortify and extend their undergraduate programs. Several new attractive undergraduate programs will be created. All the division's graduate programs will be further enlivened and expanded, and several new graduate enterprises will be developed. A series of new interdisciplinary research groups will also be founded. Particular attention will be given to increasing the attractiveness of the humanities to minority students and to meeting affirmative action goals in the recruitment of a first-rate faculty.

DEGREE PROGRAMS

American Studies

Only six years old as a formal undergraduate major, the American Studies Program has proven an innovative and popular program involving faculty from history, literature, politics, anthropology, sociology, and psychology. Among its major services has been its central role in the fostering of the campus's ethnic studies offerings. Over the next decade, as several new key Americanists are appointed, American studies will expand its contributions to the campus's general education curriculum, particularly in the area of multicultural studies, and plans to develop within the History of Consciousness program a formal graduate track. American studies faculty can also be expected to play leading roles in the proposed new organized research activities in race, ethnicity, and class and literacy in a democracy. This division will plan to make several appointments in American literature, history, cultural analysis and theory, and ethnic and comparative studies in support of this program.

Asian Studies

The campus presently offers opportunities for individual majors in East Asian, South Asian, and Southeast Asian studies, as well as for a minor in East Asian studies. Over the next decade, these three components will be more closely integrated, as the general area of Asian studies is fortified on this campus in response to rapidly increasing student interest and to the growing reputation of present faculty scholarship in this area. Several new appointments in support of Asian studies will be made during this period.

At present a minor, offered as an adjunct to several humanities and social sciences undergraduate programs, East Asian studies also hopes to develop into a formal undergraduate major. East Asia is defined as China, Japan, and Korea. Each is distinct, but together they form a unit bound closely by culture, contact, war, and economics. East Asia includes enduring cultures, vital societies, a supereconomy--Japan--and more than a quarter of the human race. The obstacles to fruitful study of this general area have been formidable: the languages are difficult; the region is distant; access is often denied; collaborators are hard to enlist. The next twenty years, however, promise the confluence of new opportunities and provocative intellectual questions in areas such as comparative economic analysis, complex social systems, social and cultural practices, intellectual and public life, language and language acquisition, language and computation, and global regimes. Some of these issues may be addressed by faculty now in place. Well-defined commitments to acquire new recruits whose inquiries center on these and other productive questions can achieve a core group in this area, also making possible the recruitment in several disciplines of well-qualified

graduate students with an East Asian specialty.

History

Even in the face of several critical faculty losses over the past few years, the History Board has been able to reverse the decline in its number of undergraduate majors and increase lower-division enrollments. It has also founded a graduate program--which now stresses comparative modern social history--that was favorably evaluated by a recent external review committee. The infusion of several key positions will enable both the graduate and undergraduate programs to achieve their full potential as central elements in the campus's liberal arts activities. Such resource augmentation will also enhance the History Board's strength in modern social history and its already-demonstrated ability to make important contributions to other campus programs, including the ORA in Comparative and International Studies and the planned activity in race, ethnicity, and class, as well as the majors in American studies, Asian studies, Latin American studies, Modern Society and Social Thought, and women's studies.

History of Consciousness

One of the oldest graduate programs at UCSC, History of Consciousness is a unique interdisciplinary Ph.D. program that from its inception has attracted highly motivated, talented students. Since its restructuring in 1978 and the addition of several eminent senior faculty and a number of extremely promising younger faculty, the program has rapidly shown its power to become one of the most distinguished, selective, and nationally visible graduate programs on this campus and, in fact, within the University of California. Its present scholarly emphases are in the areas of cultural theory and semiotics, political and social thought, and feminist studies. The program is committed to state-of-the-art experimental research in these much-discussed scholarly domains. It encourages dissertations on topics that necessarily span disciplinary frontiers, drawing on the expertise of a faculty board composed of 21 members. Over the next decade, History of Consciousness will grow considerably, filling an obvious national need for high-level graduate training in theoretical work in the humanities. In addition to expanding its tracks in cultural theory, feminist studies, and political theory, it will open new emphases in the history of art, film studies, and American studies. The board also has begun to offer the foundation of what should become an undergraduate honors major in modern cultural studies.

Language Studies

Language Studies offers rigorous sequences leading to speaking, reading, and writing proficiency in Chinese, French, German, Hebrew, Italian, Japanese, Russian, Spanish, and Spanish for Spanish speakers. Even without a campuswide language

requirement, instruction at UCSC has consistently generated strong and growing enrollments over the past decade, and there is every reason to believe that this growth will continue steadily over the next decade, not only in the European but in the major Asian languages offered by the campus. The latter are attracting substantial numbers of economics and computer and information sciences majors. Business and technical Japanese, for example, can become an exceptionally useful part of applied economics and the proposed interdisciplinary program in engineering management, if those programs are conceived in international terms. Similarly, the incorporation of the Spanish for Spanish speakers program into the campus's mainstream language instruction has increased the campus's potential to attract and retain Hispanic students from around the state.

In the next ten years, Language Studies plans to consolidate and enhance its new major, which has already surpassed enrollment expectations. The program will strengthen its course offerings and increase research in the three categories whose combination makes the major unique not only at UCSC but in the UC system generally: languages, linguistics, and, especially, language "context." In language instruction, the program will continue to build on current theoretical developments in the area of second language acquisition. In linguistics, increasing emphasis will be placed on the history and structure of particular languages and language families (e.g., Romance languages). The program plans to enhance significantly work in applied linguistics and sociolinguistics, with emphasis on such topics as dialects, bilingualism, and the relationship between language and social stratification. In the "context" area, while continuing to rely largely on courses offered by various boards of studies in humanities and social sciences, Language Studies will develop advanced seminars and research in language and culture and the theory and practice of translation (oral and literary); these will build on and synthesize work in specific languages and language areas. The program foresees close cooperation and possible merger with the various area studies majors. It also hopes to contribute to such proposed new programs as communications.

Legal Studies

The Legal Studies Program is a small, rigorous interdisciplinary major drawing faculty primarily from philosophy, politics, economics, psychology, anthropology, and environmental studies. In three years of operation, it has developed a highly committed cohort of students. Since all legal studies students are required to pursue double majors, they have the option of graduating without their legal studies degree if they are admitted to graduate or professional school before completing their senior thesis. The stress on analytical methods, the pursuit of common questions across disciplinary lines, and the experience of collective and individual research have been beneficial even to students who do not complete all the requirements for the major. In

addition, the existence of the major has strengthened the curricular and extracurricular offerings on law for the campus as a whole. Current plans for a graduate program in jurisprudence and institutional analysis, and for an original research group in law, science, and ethics, should strengthen the faculty and curriculum of the legal studies major.

Linguistics

Since its reorganization five years ago, the Linguistics Board has rapidly moved to become what a recent external review committee called one of the best undergraduate linguistics programs in the country. The rigorous undergraduate major attracts excellent students, and the program also offers a very popular series of lower-division courses that serve students in computer and information sciences, psychology, literature, language studies, and other fields. The undergraduate program will continue to grow in response to its high quality and energy. Building on faculty strengths in linguistic theory and analysis, a planned Ph.D. program in linguistics will rank among the best nationwide in its areas of concentration.

Literature

The Board of Studies in Literature is a complex and unusual administrative structure that links scholars who elsewhere might form separate departments of English and American French, German, Spanish, and Italian literature, classics, or creative writing. The decision implicit in the arrangement to study literature from a general theoretical standpoint, rather than in the narrower framework of a single national tradition, has led to unique and distinctive strengths in both the program and faculty.

FOREIGN LITERATURES: Particularly in the foreign literatures, the broader, more diverse intellectual climate made possible by connections between differing national traditions has fostered theoretical and critical writing of the first order. At the same time, the structure has proved flexible programmatically, in the face first of dropping national enrollments in foreign literature, then a concomitant flux of more socially oriented students into language as the traditional national hegemony of literature over languages gives way to broader-based kinds of study. At present the foreign literature faculties at Santa Cruz are small; they include a number of eminent senior faculty as well as very promising scholars of the associate rank. We expect the increased involvement, over time, of foreign literature faculty with the graduate program, the projected ORA in critical theory, the new language studies major, and comparative courses at the undergraduate level. To accomplish this, however, a careful resource assessment must be made, since the foreign literature major programs are both tight and small; virtually no further changes are feasible without either adding new faculty or reducing the smaller major programs to literature minors.

CREATIVE WRITING: The Santa Cruz campus has always counted a number of gifted writers among its undergraduate and graduate populations, individuals who go on to win prizes, publish, and establish themselves as writers. The program attracts students to Santa Cruz (it is specially recommended in one of the national guides to colleges), and normally about a quarter of the students who major in literature major in creative writing. It has gained this reputation because of the association of a number of distinguished writers with the campus. Historically, the campus has been the home of two national publications, Kayak, under the editorship of playwright George Hitchcock, and Quarry West. The program is prepared to expand its offerings in feature writing, news writing, journalism, and film script writing, perhaps in combination with other units. The faculty is also exploring tentatively a proposal for a nonresidential M.F.A. program and would welcome eventually establishing a writing center on campus, as a way of giving much-needed focus to its work.

ENGLISH AND AMERICAN LITERATURE: The English faculty are clustered most densely in the areas of early English texts, including Shakespeare and the Renaissance, and the nineteenth and twentieth centuries. American and English studies have been in transition ever since the dominance of New Criticism ended, calling the most basic critical principles into question. The present disorder is not, however, simply a weakness, for it generates much excitement and inevitably brings a more sophisticated relation to old and new materials alike. Thus the traditions of literary interpretation, the structure of the canon, the nature of textual analysis--and even of what a "text" actually is--are all being challenged.

There is now a particular focus on canon reformation in America, on rethinking what American literature is and reexamining established understandings in the light of new patterns of inclusion and exclusion. Growing interest in works by nonwhite American populations, particularly in the black, Chicano, Asian-American, and Native American traditions--as well as the pressing need to recognize major women authors--argues that the next American appointment should represent these issues in the board and further increase the diversity of the small core faculty.

GRADUATE PROGRAMS: The graduate program in literature seems at a turning point, having achieved some degree of recognition as a small, innovative program with the ability to attract good students and produce graduates of high quality, whose dissertations and books have been published in major presses (four in 1984, and more anticipated in 1985). Its faculty has achieved increased visibility through maturity of younger scholars, continued productivity and renewal of older members, and selective, very effective recruitment for key replacements. The board has now decided to shift from biannual to annual admissions and to begin steady movement toward a fuller, more stable curriculum, in conjunction with intensified student recruitment and development of

a generally greater national presence. The board is now at work on these goals and anticipates modest expansion of the program in the areas of French, classics, and critical theory, as increased population on campus enables it eventually to make a few well-chosen appointments.

Philosophy

By means of careful curricular revision several years ago, the Philosophy Board has achieved large increases in its lower-division enrollments, while continuing to attract an unusually large number of philosophy majors. The board has about 75 majors, in absolute terms the third largest number of philosophy majors within the UC system (after UCLA with 95 and Berkeley with 86), and in proportionate terms the largest percentage of philosophy majors relative to the size of the undergraduate student body in the UC system. The undergraduate program was described by the external review committee that examined the board and its program early in 1985 as "one of the more successful undergraduate programs in philosophy in the UC system." As a part of the major in philosophy, many of the students write senior theses, and those reviewed by the external review committee were judged to be "of high quality, clearly reflecting considerable effort on the part of students and faculty alike." The board's most important objective in the foreseeable future is to assure the continued vitality and success of its undergraduate program of instruction, both for majors and nonmajors. Although the board does not offer a graduate program, several faculty members participate in the History of Consciousness graduate program, and such contributions can be expected to increase over the next decade, as can philosophy faculty participation in such research groups as critical theory and literacy in a democracy. The board will in addition be considering over the next year whether to undertake a graduate program at some point in the future. As new faculty positions become available over the next decade, the board intends to achieve strength in philosophy of language, philosophy of mind, philosophy of action, epistemology, and logic.

Women's Studies

The Women's Studies Program is the largest and most successful of women's studies programs in the University of California system, with substantially more majors (at least 70) and more participating faculty (29) than at any of the other University centers. The program, which received strong praise in a recent external review, offers a varied lower-division curriculum that attracts many students and a core program for its majors that emphasizes feminist theory and methodology. Because of the outstanding quality of its feminist faculty, involved in interdisciplinary work across the humanities, social sciences, and arts, and because of the program's integral relation to the ORA in Feminist Studies, Women's Studies is fast becoming one of the most exciting and visible centers of interdisciplinary feminist scholarship.

in the nation.

Writing

The Campus Writing Program's first priority is to offer a coherent, effective series of courses for all entering students. This nondegree program has achieved success in developing innovative approaches to composition and journalism, in its training of graduate students, and in its work with both faculty in college programs and teachers in local primary and high schools--areas which should expand over the next few years.

The expertise, imagination, and commitment of the writing program faculty have long been recognized throughout the UC system. And while it has attained wide and significant status in the field of composition, through presentations and national publications on classroom work, its national influence remains more an instance of example than of publications about the theoretical assumptions behind the program's work. The definition of several new faculty positions in support of technical writing, rhetorical theory, and applied rhetoric will not only increase its visibility but allow it to meet expanding student interest in its offerings, as well as to contribute to the anticipated programs in communications, critical theory, and literacy in a democracy.

New Academic Program

Communications

Although faculty from all academic divisions will likely contribute in important ways to the campus's new undergraduate program in communications, and to the eventual development of a new graduate program in communication theory and policy, existing and new humanities faculty will play key roles in this program, particularly faculty from linguistics, literature, History of Consciousness, and language studies. This program should not only attract a considerable number of new students to this campus but contribute substantially to the new organized research activities in critical theory and science, technology, and society. This division will plan to make appointments in cultural theory, semiotics, language studies, linguistics, and American studies in support of this program.

VIII. THE NATURAL SCIENCES

The Division of Natural Sciences has already achieved maturity in its academic and research programs. Each program offers graduate training in addition to a strong undergraduate curriculum. Research of the highest quality is pursued in all areas. Santa Cruz has some research programs of the highest international eminence, such as those of Lick Observatory and the Center for Marine Studies.

The division will enlarge and enhance its existing programs. In addition, it will add new programs that will enrich the educational and vocational opportunities open to Santa Cruz students and place the campus more squarely in the mainstream of modern science and technology.

Promising new thrusts are numerous and some, conspicuous. We will wish to assemble an even stronger astronomical organization, perhaps to be called the University of California Observatories, to administer the giant Keck Observatory as well as other UC facilities. Joining a new Organized Research Unit in Tectonics will be a unit to deal with the nonlinear processes of the universe, the processes that determine so much of what will be, but which have been beyond the power of science prior to the advent of computers. On the more practical side, we will extend our engineering program to include electronics and industrial automation, and we will join in a program to produce skilled, yet broadly educated, managers of high-technology enterprises. We will establish a program to study and deal with environmental toxicology, with special emphasis on the aquatic resources that are so vital to the state of California. Perhaps we will be able to mount a massive endeavor to solve one of the most important and profound of scientific mysteries, the exact and total description of the human genome, the material of human cells that determines every aspect of the anatomy and biological life history of human beings.

NATURAL SCIENCES PROGRAMS

	Undergraduate	Graduate	Research*
Existing/ Approved	Biochemistry and Molecular Biology Biology Chemistry Computer and Information Sciences Computer Engineering Earth Sciences Mathematics Physics Psychobiology	Astronomy and Astrophysics Ph.D. Biology Ph.D. Chemistry M.S., Ph.D. Computer and Information Sciences M.S., Ph.D. Earth Sciences M.S., Ph.D. Marine Sciences M.S. Mathematics Ph.D. Physics M.S., Ph.D. Science Communication Certificate	Arboretum Center for Marine Studies Lick Observatory Redwood Research Institute Santa Cruz Institute for Particle Physics
In Process**		Computer Engineering M.S., Ph.D. Environmental Toxicology M.S.	Nonlinear Phenomena Tectonics Ten-Meter Telescope Vision Research
Under Preliminary Discussion	Biotechnology B.S. Electronic Engineering B.S. Environmental Engineering B.S. Industrial Automation B.S.	Applied Physics M.S. Biotechnology M.S., Ph.D. Electronic Engineering M.S., Ph.D. Engineering Management M.S., Ph.D. Environmental Engineering M.S., Ph.D. Industrial Automation M.S., Ph.D. Neurosciences Ph.D.	Aquatic Toxicology Biotechnology Computer Graphics Cosmogony and Cosmology Human Genome Institute Isotope Geochemistry Nuclear Magnetic Resonance Imaging Pacific Basin Science, Technology, and Society Synchrotron Radiation UC Observatories

*Research programs consist of focused activities involving faculty groups.

**Defined as submitted formally by the dean to the central administration and Academic Senate committees.

The Division of Natural Sciences is the largest on campus in terms of undergraduate major students, graduate students, contract and grant support, and organized research units. It is composed of eight boards of studies, associated teaching programs, organized research units, and specialized research facilities. All boards except astronomy and astrophysics grant undergraduate degrees. With the exception of the newly established Computer Engineering Board, graduate degrees through the Ph.D. are awarded by all boards. Computer engineering will begin a graduate program within two years. A master's degree can be earned in marine sciences; the Science Communication Program awards a certificate. Special committees supervise degrees in psychobiology and biochemistry.

Three established organized research units are supervised by the division and report to the dean of natural sciences: Lick Observatory, established in 1888; the Center for Marine Studies, approved in 1976; and the Santa Cruz Institute for Particle Physics, established in 1980. All are active research centers involving large numbers of faculty, staff, and students.

The division also manages the Richter Seismological Laboratory, proposed as the next campus ORU (Tectonics), and a redwood research laboratory. It operates a computer science/mathematics learning laboratory, equipped with a variety of computer and video learning aids, which is used by students from beginning level through advanced graduate status. There is an active research group in vision, another in biochemistry, one in non-linear phenomena, and one in geophysics. A research group in aquatic toxicology is about to be instituted.

DEGREE PROGRAMS

Astronomy and Astrophysics

The Board of Studies in Astronomy and Astrophysics, which incorporates the faculty of Lick Observatory, is one of the premier astronomy departments in the world. Five active faculty, along with one emeritus professor, are members of the National Academy of Sciences. This gives Santa Cruz more members of the Academy than any other astronomy department or program in the nation. The philosophy of the board is that astronomy is properly a graduate discipline, so an undergraduate degree is not awarded. However, there is an extensive general education and service undergraduate teaching program presented by the board. The observatory/board is recognized as one of the strongest optical observational astronomy groups in the world, a status that can only be further enhanced as the proposed Ten-Meter Telescope (TMT) project moves forward (in collaboration with Caltech). The establishment of the board of studies added to Lick's existing observational strengths a very strong theoretical component, and the two aspects are well integrated. In the future, the observatory/board expects to add significant research capabilities in infrared astronomy, an area of research not adequately represented--in comparison with the enormous scientific potential of the field--on any UC campus, and perhaps in radio- and/or space-based astronomy, while retaining traditional strength in optical instrumentation. The infrared expertise will be directly linked to the development of the TMT, the special strength of which will be infrared observations.

A multicampus research unit (MRU) is to be established to operate both Lick Observatory and the TMT from the UCSC campus. Data reduction and the theoretical interpretation of results from this observational program will involve substantial numerical analysis and will stimulate interdisciplinary connections with the new computer engineering program as well as with the Physics Board. Several new research efforts, e.g., the possibility of ORUs devoted to star formation, computational astrophysics, and physics of the early universe, are being explored and would involve collaborative efforts not only with other boards on campus but with Berkeley, Lawrence Livermore Lab, and the nearby NASA-Ames research center.

Biology

The Biology Board has the largest number of undergraduate majors on campus and one of the most successful and active graduate programs. Biology is a very broad discipline, so broad and diverse that it is almost interdisciplinary in itself. On most university campuses, the discipline of biology is organized within several departments: molecular biology, plant biology, neurobiology, etc. Biology at Santa Cruz was deliberately organized as a single board, but that may need to change as growth and

further diversification occurs. In spite of this breadth, at the present time the Biology Board has substantial strengths in developmental biology, marine biology (especially the study of marine mammals), and plant biology. However, all these areas are staffed at only a minimum level and need to be substantially increased. There is no redundancy, so faculty leaves require the hiring of temporary faculty.

A distinctive feature of the board is that it contains a number of minority faculty. This has allowed the development of federally funded graduate and undergraduate programs to assist disadvantaged students. These programs have received national recognition.

We foresee the necessity, over the next decade or so, of a significant increase in the size of the Biology Board. At the present time the board is seriously understaffed by any reasonable standard that can be applied to a major university. A doubling of the size of the board would make it comparable in strength to other UC campuses of similar size such as Irvine, Santa Barbara, and San Diego. Such an expansion would allow us to deal more effectively with undergraduate needs and provide more focused and prominent research activities. Those activities would, in turn, result in substantial growth of the graduate program and of research grants awarded to the campus.

The Biology Board's most urgent needs are for young faculty who a) apply the new and rapidly expanding molecular biological techniques to fundamental problems of cell and developmental biology and neurobiology, and b) use computer modeling and other theoretical approaches to investigate central problems in areas of organismic biology such as population genetics, ecology, and evolution. Appointments such as these will not only greatly strengthen the board but encourage enhanced collaboration with the Chemistry, Computer Engineering, and Environmental Studies Boards. Because of its proximity to the ocean and the already strong marine biology research program focused at the Long Marine Lab, new appointments in this area would allow Santa Cruz to have the strongest academic marine biology program in the country.

Chemistry

The discipline of chemistry is a basic component of many of the natural sciences. For example, the spectacular advances made in recent years in molecular biology are due in part to a precise understanding of the chemistry of biological molecules, both large and small, which are of critical importance to the functioning of living organisms. The Chemistry Board is represented by faculty in the subfields of organic, physical, inorganic, and biological chemistry. The graduate program in chemistry is the second largest on the UCSC campus. Some of the faculty have established national and international reputations, which attracts significant research funding.

The relatively small size of the board (fifteen FTE) has resulted in heavy teaching loads, particularly because of the need to teach service courses at the introductory level for other science disciplines. Furthermore, the number of faculty in each subfield is at best marginally sufficient to meet intellectual and logistic "critical mass" requirements. Also, chemical research in the late twentieth century is instrument intensive. A small group of colleagues in a subfield needs to have available nearly as much high-powered instrumentation as a larger group in the same subfield at another university, but finds it difficult to obtain grants to provide all that is needed. However, the recent acquisition of a high field nuclear magnetic resonance spectrometer is an encouraging sign that the Chemistry Board's critical shortage of instrumentation may ease.

For these as well as other reasons, the Board of Studies in Chemistry must increase its number of faculty. Of course, faculty growth carries the implication of concomitant increase in space. The Chemistry Board anticipates expansion in the areas of biochemistry (including bioinorganic chemistry), theoretical chemistry, organometallic chemistry, and analytical chemistry. Analytical chemistry will assume new importance at Santa Cruz as research and education in environmental toxicology increase as expected. Also, as normal turnover in faculty occurs, new appointments will be made to cultivate new areas ripe for exploitation. The proposed increases will allow the Chemistry Board to maintain high-quality undergraduate (with a viable senior research component) and graduate instruction and top, develop in selected areas of chemistry, distinctive and innovative research programs.

Computer Engineering

The Computer Engineering Board has just started at Santa Cruz. The first students are now in their initial year, and a graduate program will begin in a year or two. In the meantime, the head of the Computer Engineering Board is busy recruiting faculty, developing curriculum, admitting students, and establishing research links with other science faculty and major industrial computer-related firms. When the program has matured, we expect it will have a faculty group that will support a significant expansion of the current computer engineering program beyond the initial areas of digital design, computer architecture and systems, workstations, special-purpose and parallel computer hardware, graphics, and image processing. Expansion would include added emphases in digital communications, VLSI design and design tools, and software engineering. Santa Cruz also has an excellent opportunity to move from computer engineering, as presently defined, into a more comprehensive program that would involve electronic engineering (including instrumentation and real-time control), manufacturing automation engineering (computer-aided manufacturing), bioengineering and environmental engineering (which could draw on strengths in biology and

environmental studies), and, eventually, an engineering management program at the graduate level. The latter could take advantage of campus strengths in economics and psychology as well as computer and information sciences and the other proposed engineering programs. This plan would broaden our programs in a cohesive and integrated way, making them much more attractive to students and potential industrial collaborators and donors, and could be accomplished with much less capital expense than would be involved in establishing a complete engineering school.

Computer and Information Sciences

The Computer and Information Sciences Board was originally intended to be an innovative group that would emphasize information, communication, and systems theory, while also having the now-traditional computer science areas of architecture, computer languages, algorithm design, and artificial intelligence. However, the board has had difficulty in establishing a focal point. The original plans were predicated on a campus design that called for a student body of 27,000 or so. The rapid change in plans for the future of the campus, which hit in the mid-1970s, was especially hard on CIS. The board had fewer faculty than expected, and basic disagreements existed among them as to priorities. Moreover, an explosion of student interest in computer science in the late 1970s, a development which seems to continue unabated, has resulted in a board seriously understaffed to handle what has become the second largest undergraduate major on campus. After a decline in faculty numbers in the late 1970s, some FTEs have been added to the board, restoring it to ten, one position fewer than a decade ago.

The board has been recruiting successfully during the past two years, but more needs to be done. The inauguration of computer engineering has come at a fortunate time. This new board promises to bring to campus faculty with strong research and teaching ties to CIS, and to help in recruiting new faculty. The advent of computer engineering is already showing signs of improving UCSC's ability to strengthen its ties with the computer industry and to seek external support. While in the short run the presence of computer engineering may relieve some of the undergraduate pressure on CIS, the increased visibility of the combined programs will undoubtedly attract additional students of especially high caliber in the future.

The CIS Board has defined five subareas that will form the heart of its program in the future: programming languages and systems, communications, artificial intelligence, graphics and image processing, and theoretical computer science. This establishes a sound foundation, and it will integrate well with computer engineering. Over the next ten years or so, the present board should add faculty in order to provide a satisfactory student-faculty ratio. The current level of undergraduate population is now unmanageable. Additional faculty would also allow us to

triple the size of the graduate program, now at about 25 students.

Earth Sciences

The Earth Sciences Board is one of the most successful on campus. Both the undergraduate and graduate programs have the largest number of students per FTE of any comparable department at other UC campuses. Earth sciences B.S. graduates have matriculated at the best graduate schools. At the graduate level, the board typically accepts about one in six applicants, with the quality of the resulting student body "comparable with that of the premier graduate programs in the nation," according to a recent external review. All eleven faculty of the Earth Sciences Board have active research programs, graduate students, and extramural funding. During 1983-84, total external funding was more than 1.5 million dollars, with recent increases closely related to the proposed development of the Organized Research Unit in Tectonics. The quality of faculty and their research is validated further by the service of seven of the eleven as editors for distinguished journals, by numerous invited lectureships at national and international meetings, and by a continuous flow of significant publications.

The campus must capitalize on the impressive foundation that exists in the Earth Sciences Board. High-quality expansion of the graduate program and significant increases in external funding will follow upon the addition of faculty and research associates. An immediate need is for an isotope geochemist, which would give critical mass to a successful but small research group and would justify presently needed sophisticated analytical facilities. To augment the proposed Tectonics ORU, the board hopes to add new faculty in reflection seismology and geomechanics. To strengthen linkages to marine sciences, the board wishes to appoint a micropaleontologist and a vertebrate paleontologist specializing in marine mammals. Balanced instruction in petrology will require an FTE in metamorphic petrology in conjunction with the addition of a much-needed microchemical analysis facility (microprobe). The maturity of the Tectonics ORU will require addition of research expertise in geophysical inverse theory, convection, and mineral physics.

The proposed additional faculty should be at the very senior or junior levels, to broaden the present narrow range of faculty ages (36 to 52 years). A viable isotope geochemistry program requires people who study both heavy, radiogenic isotopes and light, stable isotopes. It is hoped that an appointment of either a heavy or light isotopist in earth sciences would be matched by the other variety in marine sciences. Development of environmental toxicology would strongly benefit the Earth Sciences Board through use of shared analytical facilities. A program in applied mathematics will be extremely valuable for quantitative training of earth sciences students. Finally, critical

links between the seismic reflection processing program and computer engineering are envisioned.

Marine Sciences

Marine sciences has been identified in all previous campus plans as one of the areas of special campus strength. The commitment to maintain this strength will be continued. Faculty with research interests in marine sciences have been hired by the Boards of Studies in Biology, Chemistry, Earth Sciences, and Physics. In addition, four academic appointments specifically in the marine sciences cover the essential major subfields of biological, chemical, geological, and physical oceanography. This bare-minimum level of a single faculty member in each area falls exceedingly short of a critical mass, however, and plans exist to correct this situation. The Marine Sciences Program faculty ("core" marine sciences faculty coupled with faculty hired by other disciplines) have developed a series of very strong interdisciplinary research and instructional groups, particularly in ocean processes, marine mammals, marine geology and geophysics, and marine biology and ecology. The marine sciences group also provides an analytical chemistry component to the Chemistry Board.

Marine sciences faculty, much as those in astronomy, strongly feel that marine sciences/oceanography properly is a graduate discipline and that students should obtain a solid undergraduate education in a science discipline such as biology, chemistry, geology, or physics. There are no plans for an undergraduate degree. The program now awards a master's degree, but there are plans to expand the program to the Ph.D. level. Doctoral students now working with marine sciences faculty are admitted to graduate programs in biology, chemistry, earth sciences, and physics. Marine sciences faculty also are involved in undergraduate instruction and offer lower- and upper-division elective courses. The marine sciences teaching program is closely tied to the Center for Marine Studies ORU. As the ORU develops its research activities, more and more students will be attracted to the campus, and the need for graduate and undergraduate teaching will increase.

Five areas within marine sciences are receiving increasing international recognition: ocean processes, marine mammals, marine geology/geophysics, marine biology/ecology, and food web dynamics. Outstanding graduate students are attracted to Santa Cruz in each of these areas. By the year 2000, there will be a need to add faculty in marine sciences to meet student demand at both graduate and undergraduate levels and to take advantage of research opportunities. Carefully selected appointments, coupled with relevant new appointments in biology and earth sciences, could develop centers of excellence in each of the areas mentioned above.

For example, earth sciences is interested in new appointments in heavy radiogenic isotope geochemistry, reflection seismology, paleoceanography (micropaleontology), and vertebrate paleontology. These appointments support the first three areas mentioned above, and marine sciences faculty support these appointments. On the other hand, marine sciences is interested in a light stable isotope geochemist, who would complement the earth sciences research and instructional program as well. A marine sciences appointment in marine microbial biochemistry, with an oceanographic perspective, is key to the biogeochemistry and food web dynamics group and would be interactive with faculty in the biology academic program. Thus, each new marine sciences appointment will be carefully chosen with the intention to meet needs internal to the marine sciences program as well as to interact with the other science disciplines. New marine sciences faculty would provide a solid and important base for continuing campus focus on the marine environment as a complex, dynamic, important, and still poorly understood system.

Mathematics

As science continues to expand rapidly at Santa Cruz there will be a parallel expansion in mathematics. Almost all science students take calculus for a year, while demand for advanced classes in the sophomore, junior, and senior years is exploding due to increasing student interest in computer and information sciences, communications, computer engineering, nonlinear phenomena, etc. Moreover, mathematics plays an important and increasing role in the social sciences and humanities: economics, sociology, and philosophy are but three disciplines which utilize mathematical fields such as statistics, numerical analysis, game theory, logic, etc. Because of these already large and growing pressures, and because of an absence of growth for some time, the Mathematics Board already has the largest average class size of any math program in the UC system, and probably the largest at any major university in the nation. There is also a need for more high-quality graduate students, both to facilitate an enriched program and to provide high-quality teaching assistants. Accordingly, a large increase in the Mathematics Board's size within ten years is vital. Graduate student numbers should be increased proportionally.

The board now has several major areas of research; these strengths would be supplemented and extended, and a new program in applied mathematics would be instituted. Specifically, the board's current strength in dynamical systems, differential equations, and nonlinear mathematics would be extended in various ways. Mathematicians adept at applications (somewhat broader than the traditional applied mathematics) would not only interface with other disciplines but would also aid in attracting graduate students. An emerging interest in computer graphics should be supplemented; this would fit very well with current planning within computer engineering.

A larger number of graduate students will require a broader base for the board's research effort. Interest in number theory and representation theory should be supplemented, creating a strong group in an area not well represented elsewhere on the West Coast. Appointments also in statistics, numerical analysis, combinatorics, and topology would fill out the program and fit with other campus goals.

Physics

Physics has for the past ten years had one of the highest ratios of undergraduate majors to faculty FTEs in the University of California system. UCSC undergraduates have had unusual opportunities to participate with faculty in research projects, and the required senior thesis allows students to develop substantial projects of their own. These opportunities have started many students on successful careers. The already heavy service load in physics teaching, increased by providing these opportunities, has been steadily growing, however.

The graduate program, although small, has attracted excellent U.S. and foreign students; some of its Ph.D.s are already in leadership positions in academic and research work.

The Physics Board has been able to establish centers of excellence in the following disciplines: particle physics, both experimental and theoretical; high energy astrophysics and cosmology; various aspects of condensed matter and statistical physics; critical phenomena and nonlinear dynamics. Some of the Physics Board faculty, postdocs, and students profit from the availability of nearby research institutions: SLAC (Stanford Linear Accelerator Center, with electron accelerators and collider); SSRL (Stanford Synchrotron Radiation facility); and Lick Observatory (observational astronomy and astrophysics). Six years ago an organized research unit in particle physics was established, called the Santa Cruz Institute for Particle Physics (SCIPP). Recently plans were made to organize a new ORU in nonlinear phenomena; the new ORU will soon be formally proposed.

Based on these recognized strengths, the Physics Board now plans to establish a new master's degree program in applied physics. Its beginning curriculum will be structured differently from that of the Ph.D. program. A large fraction of undergraduate physics majors take jobs in technological companies upon graduation, and advanced applied courses will be of considerable benefit to them in their careers. For our own undergraduates as well as incoming recent B.A.s, a fifth year of study in a master's program in physics, with an emphasis on applied work, may be a cost- and time-effective investment.

There has been a convergence of interest in high energy physics and cosmology: the early universe is the ultimate high energy physics laboratory. UCSC could become an internationally

recognized center for theoretical research on the early universe with the appointment of new faculty members in this area, including people working on the particle physics of the early universe, quantum gravity and superunification, and theoretical cosmology. The condensed matter and statistical physics program has been strengthened recently with top-level appointments in theory and experiment. The experimental effort is still below critical mass, and we propose to expand this general area considerably. The use of synchrotron X-ray radiation is a rapidly developing frontier area in physics, and experiments unthinkable a few years ago can now be done relatively quickly. Significant interest in synchrotron radiation facilities also exists outside the Physics Board. For example, biochemistry is interested in applying X-ray techniques to the study of biological macromolecular structures. The high flux from synchrotron sources now makes investigations of very complicated structures feasible. Earth sciences also has an interest in X-ray techniques, and we anticipate strong interactions with the proposed ORU in Tectonics, particularly in regard to the application of synchrotron radiation X-ray sources.

Psychobiology

Psychobiology is a discipline with focus on the biological basis of behavior. In 1969 Santa Cruz became the first UC campus to offer an undergraduate major in psychobiology. The program involves faculty in the Natural Sciences and Social Sciences Divisions, and it consists of a highly structured series of courses in chemistry, biology, biochemistry, psychology, anthropology, computer sciences, and mathematics. The major is administered by a committee composed of representatives of the above disciplines; it is housed within the Biology Board.

Within the time frame of the Twenty-Year Plan, we expect to see the Psychobiology Committee develop a graduate program. Graduate students may enroll as biology or psychology majors, but neither board has a large enough core of faculty to allow for many psychobiology graduate students. Recruitment of new faculty will be done by existing boards; there are no present plans to establish a Psychobiology Board. As part of the Biology Board's plans for new faculty, molecular biology is a major emphasis. As discussed earlier, a critical need for the Biology Board is faculty able to apply molecular biological techniques to neurobiology, a core area for psychobiology. Similarly, the recruiting plans of psychology, chemistry, and computer and information sciences should yield collaborators for the psychobiology programs.

New Academic Programs

In addition to the ongoing academic programs of the Division of Natural Sciences, expanded as described previously, we foresee the need to establish new teaching and research programs. In particular, there will be both opportunity and need to expand engineering programs here, building on the start we have made

with computer engineering. A program in electronic engineering is a simple and straightforward expansion of the computer engineering effort. This would be a modern expression of electrical engineering, without the heavy industrial aspects of that traditional area. With both computer and electronic engineering in place, a logical further step would be into industrial automation, with an emphasis on robotics.

A new academic and research program in environmental toxicology will be initiated. When fully developed, the program will have both a graduate and undergraduate component, with research supported by a Center for Aquatic Toxicology. This new program will have strong natural links with existing faculty in biology, chemistry, earth sciences, and marine sciences. The program in environmental toxicology is discussed in more detail in the Organized Research Programs section of this plan.

Our programs in computer and information sciences, computer engineering, marine sciences, and environmental studies, together with the new program in environmental toxicology, give us the necessary elements for undergraduate and graduate programs in environmental engineering. The impact of technology on the environment is already a subject of much concern, particularly in California, but academic programs for training and research in this area are sparse, often add-ons to existing programs with different core emphases. We have an opportunity to design a specific program in environmental engineering from the ground up, directed toward applying excellent science to real-world problems.

Programs in place and being developed in economics lead to the possibility of an interdisciplinary program with computer engineering in engineering management (possibly, high-tech management). This program would add an overlay of management skills to people with a solid engineering background; it would be conducted at the graduate level.

Biotechnology is an important field that even now generates considerable student interest. Our already well developed biology program could add this aspect through expansion, at both the graduate and undergraduate levels.

We see the UCSC Arboretum as a generally undeveloped resource, both in an academic sense and as a source of favorable publicity and funds for the campus. The Arboretum offers to many people in the community a chance to interact rewardingly with the campus. Until now, the Arboretum, through the Arboretum Associates, has done a fine job of bringing the community into contact with the campus. These efforts, through a sustained public relations and education effort, should be expanded considerably through the addition of permanent staff. The Arboretum has, over the years, amassed considerable research material that exists nowhere else on the North American continent. The Arboretum's primitive

angiosperms are living fossils of great interest to scientists studying plant evolution and development. UCSC has the Northern Hemisphere's largest collection of such plants. We also have the most extensive collection in the Northern Hemisphere of Southern Hemisphere plants, particularly those of Australia, New Zealand, South Africa, and New Caledonia. We have an extensive collection of conifers, some growing nowhere else in the nation. However, we have no research facility available at the Arboretum for scientists visiting from other institutions. A modest research facility at the Arboretum will open up our collections to extensive scientific work and add a distinctive facet to the campus's reputation as a scientific center.

IX. THE SOCIAL SCIENCES

The Division of Social Sciences consists of boards of studies representing a mix of traditional social science disciplines (anthropology, economics, politics, psychology, and sociology) and innovative interdisciplinary programs (community studies, education, environmental studies, Latin American studies, and Modern Society and Social Thought). The undergraduate programs are popular; for the past several years, roughly 40 percent of the bachelor's degrees awarded on the campus were through these programs. Graduate programs exist in four boards of studies, and several new graduate programs are in the planning stage. The division has a strong research program, and much of the work is interdisciplinary, applied, or policy oriented.

Over the next twenty years, all of the divisional programs will grow at least as rapidly as the overall campus; some programs will likely grow at a faster rate. The shifting ethnic and racial composition of the state's college-age population will probably spur this growth, for over half of the campus's minority graduates completed degrees in the social sciences. For the next several years the business economics program will lead the campus's growth. Enrollments are also expected to increase rapidly in education and allied fields as the demand for elementary and secondary school teachers accelerates. A new interdisciplinary program in communications will contribute to the overall campus growth rate and will involve social scientists from a number of disciplines. Additional growth will be associated with the new graduate programs that will be instituted in the next two to seven years.

Existing research programs, both disciplinary and interdisciplinary, will be strengthened in the coming years, and new initiatives will be vigorously pursued. Several of the most promising new research initiatives involve exploring the social implications of a range of new technologies (computational, electronic, biological, nuclear, etc.). Other promising initiatives explore the ramifications of shifting demographic, economic, social, or political relations.

SOCIAL SCIENCES PROGRAMS

	Undergraduate	Graduate	Research*
Existing/ Approved	Anthropology Community Studies Economics Education Environmental Studies Latin American Studies Modern Society and Social Thought Politics Psychology Sociology	Applied Economics M.S. Education Certificate, M.A. Psychology Ph.D. Sociology Ph.D.	Agroecology Applied Economics Comparative and Intl. Studies Environmental Field Program Feminist Studies High Technology and Social Change Institutional Analysis and Social Policy Natural Reserve System Predatory Bird Research Group Social Behavior and Energy Conservation
In Process**		Anthropology M.A. Environmental Studies M.A., Ph.D.	Santa Cruz Area Study Vision Research
Under Preliminary Discussion	Communications Environmental Engineering B.S.	Anthropology Ph.D. Community Studies M.A. Economics Ph.D. Education Ph.D. Engineering Management M.S., Ph.D. Environmental Engineering M.S., Ph.D. Jurisprudence Ph.D. Social Science Writing Certificate	Integrated Farm System Law, Science, and Ethics Mathematics and Science Education Nuclear Policy Studies Pacific Basin Race, Ethnicity, and Class Science, Technology, and Society

*Research programs consist of focused activities involving faculty groups.

**Defined as submitted formally by the dean to the central administration and Academic Senate committees.

The Social Sciences Division offers undergraduate study through ten boards or committees of study: anthropology, community studies, economics, education, environmental studies, Latin American studies, Modern Society and Social Thought, politics, psychology, and sociology. Graduate work is offered in four boards: economics (M.S. in applied economics), education (certificate program and M.A.), psychology (M.A. and Ph.D.), and sociology (M.A. and Ph.D.). The division's programs account for over one-fourth of the graduate degrees awarded.

Because the campus has from its founding emphasized undergraduate education, a surprising number of undergraduates have served as members of faculty-led research teams and, with faculty, have coauthored a number of scholarly publications. These undergraduates' contributions to faculty research projects testify to the high quality of undergraduate students attracted to UCSC's social sciences programs.

During the next ten to twenty years, existing instructional programs will grow, and new programs will be established throughout the division. New graduate initiatives will be especially emphasized.

DEGREE PROGRAMS

Anthropology

Since 1965 the Anthropology Board has concentrated on providing undergraduates with high-quality preparation in the discipline, and the board has achieved an excellent record of placement of graduates in the nation's best graduate schools. The program's greatest depth is in social and cultural anthropology, with special expertise in Indonesia.

For the past two years, the Anthropology Board has been working toward the inauguration of a master's degree program. It has introduced a few graduate-level courses for graduate students in sociology, education, and History of Consciousness (a multidisciplinary program administered by the Division of Humanities). Assuming University approval of the program, the first anthropology graduate students will be admitted in 1986 or 1987. The board hopes to offer a Ph.D. degree by 1990 or 1991.

Community Studies

Community studies is an interdisciplinary undergraduate program devoted to the study of the process of social change at the community level. The faculty of the Community Studies Board is drawn from a number of social science and humanities disciplines, and several of the faculty members have joint appointments with disciplinary boards. A central feature of the program is a required six-month field study, which serves as the basis for a senior thesis integrating field study with the scholarly work completed on campus. The board has been particularly successful in attracting and retaining minority students preparing for careers in the public sector or organizations concerned with the delivery of social services.

The board anticipates new departures in video documentary research and in the fiscal/budgetary implications of community change. It may also participate in the contemplated program in communications. Its faculty presently offer graduate courses under the Sociology Board. Community studies anticipates developing its own graduate program, probably at the master's level, within the next three years.

Economics

Economics offers outstanding study opportunities within the context of the campus's undergraduate liberal arts program. A new "business economics" track has been added to the major and is expected to grow significantly during the next several years, increasing the Economics Board's undergraduate enrollment growth rate to at least twice that of the campus. The master's degree program in applied economics is now in its third year, and, with 23 to 25 new admissions annually, the program will be at its

planned level of enrollment--approximately 40 students--by 1985-86. The program is expected to continue at the present level or to increase slightly as resources become available in anticipation of the introduction of Ph.D. study. Major educational innovations are under way within the program, including the development of field study and internship placements, a microcomputer lab specializing in business and public-sector microeconomic applications, and a program of entrepreneurial training under the auspices of the Center for Innovation and Entrepreneurial Development (CIED). CIED is supported by extramural funds and offers students opportunities for contact with successful innovators and entrepreneurs.

Economics is also expected to become one of the major resources for a projected program in engineering management, to be offered through the Division of Natural Sciences.

Education

The Committee of Studies in Education offers instruction leading to the teaching credential, a graduate certificate, and an M.A. degree. The Santa Cruz program is particularly strong in bilingual education. Other emphases are on child development, educational policy analysis, and science education. The program must grow, substantially and soon, to meet the imminent needs of our society for additional elementary and secondary school teachers. California's changing demographic patterns and its shifting cultural/ethnic composition are creating unprecedented needs and opportunities, and Santa Cruz expects to contribute significantly to the University's effort in this area.

Like economics, education is expected to be a major growth component of the division during the next several years. It is preparing to serve more M.A. and certificate students and to offer a Ph.D. program, projected to begin in the early 1990s.

Environmental Studies

Environmental Studies is one of the most distinctive undergraduate programs at UC Santa Cruz. It is interdisciplinary, drawing its faculty from the natural sciences, the social sciences, and the professions. Students are required to complete preparatory course work in the natural and social sciences and in the humanities before entering the major. They must develop a program of interdisciplinary studies within the major, and they must also complete a disciplinary concentration (normally a minor) outside the major. Central pathways within the major include environmental planning and natural resource management, agroecology (the application of ecological principles to agriculture), natural history, and the analysis of public policy toward the environment. An internship program contributes additional strength and diversity to the environmental studies program.

The affiliated Environmental Field Program--open to UCSC students--has for a decade involved undergraduates in research problems related to this broad, socially important area of inquiry. This highly successful program may soon be extended to other campuses of the University.

Environmental studies faculty and staff also contribute to the management of the Landels-Hill Big Creek Natural Reserve, the Ano Nuevo Natural Reserve, and the campus's Predatory Bird Research Group. All three of these facilities provide the board with valuable teaching and research opportunities.

The environmental studies faculty are committed to work that is both practical and scholarly. They are currently preparing a proposal for graduate study leading to a Ph.D., with emphases on environmental decision making, agroecology, wildlands management, and the global environment.

Latin American Studies

Latin American Studies is an interdisciplinary program that draws its faculty and curriculum from the social sciences and the humanities. Students divide their course work between the two divisions. They are required to demonstrate Spanish language proficiency, and they are encouraged to take advantage of opportunities for study and field work abroad. Students may complete their bachelor's degree in Latin American studies alone, but they are strongly encouraged to supplement their interdisciplinary program with a disciplinary minor or to pursue a double major. As the campus grows, the program expects to augment the participating social sciences faculty and, increasingly, to address the interests and needs of California's growing Hispanic population and other students whose interests center on the Latin American and Caribbean region. The faculty contemplates introducing a five-year combined B.A. and M.A. program and strengthening its research linkages with ORAs and ORUs on campus.

Modern Society and Social Thought

Modern Society and Social Thought is an interdisciplinary program leading to the bachelor's degree. Its core curriculum focuses on the social conditions and human problems in industrial societies and on theories of social change by which these conditions and problems may be understood. Students are encouraged to complete, in addition to course work in Modern Society and Social Thought, a number of courses offered by boards of studies in the social sciences and the humanities. A senior thesis is required of all students in the major.

Politics

The Politics Board at Santa Cruz reflects a commitment to a superior liberal arts undergraduate education and to the research

mission of the University of California. The politics program has particular strengths in political theory and in comparative/domestic and international/historical approaches to the study of politics. The undergraduate curriculum is rigorous, emphasizing systematic analysis of major thinkers in the discipline and requiring extensive writing. Yet politics is one of the more popular majors on campus; 5 percent of all UCSC graduates major in politics.

While the board offers no graduate degree at present, its faculty participate extensively in other campus graduate programs. Several board members participate in the History of Consciousness program; beginning next year some politics faculty will offer graduate courses for the Sociology Board. Board members regularly serve on dissertation committees for both History of Consciousness and sociology. Politics faculty are also active participants in several of the ORAs on campus, and they participate extensively in interdisciplinary undergraduate programs.

A distinctive graduate program focusing on the study of broad policy and political alternatives is currently under discussion in the board. Broader than the usual public policy programs, this program would draw upon the board's particular strengths.

Psychology

Psychology offers a broad undergraduate program with particular strengths in social psychology and personality theory as well as in cognitive and experimental psychology. The large undergraduate program has maintained its high enrollments despite the moderate nationwide decline of interest in psychology. The board provides supervised experiential field work in connection with the academic program. The graduate program offers doctoral specialization in both social/personality psychology and experimental/cognitive psychology.

When the Psychology Board receives appropriate space for its graduate training and research, the two main tracks of the board, which are now physically separated, will be integrated. Psychology will participate in the new and proposed organized research activities in social behavior and energy conservation; vision research; cognitive science; and race, ethnicity, and class.

In the foreseeable future, the board intends to strengthen its resources and doctoral programs in applied social and cognitive research, in educational, forensic, and health psychology, and in lifespan developmental psychology.

Sociology

Sociology offers a full range of programs from the B.A. to the Ph.D. Significant teaching and research strengths of the board include institutional analysis and social policy, comparative

historical and development studies, microsociology and social psychology, and women's studies. Sociology has been successful in continuing to attract substantial undergraduate enrollments in the face of a declining nationwide trend. It has been especially successful in drawing a small number of highly qualified students to its Ph.D. program and has been able to place them well after completion of their degrees. As the campus grows, sociology is expected to increase undergraduate enrollment and plans to expand the annual graduate student cohort from eight to twelve students. Priority fields for new faculty appointments include contemporary theory, organizations, sociology of law, education, demography, and sociology of aging.

Support Facilities

The Division of Social Sciences makes available a number of support programs and learning tools that greatly enhance the educational experience of both undergraduates and graduate students. Laboratories and work-learn programs are maintained by the Social Sciences Division either as general campus resources or as components of the academic programs. The general labs include the Computational Lab, the Media Lab, and the Third World Teaching Resource Center. The Computational Lab staff assists students and faculty in designing computational projects, trains faculty in the use of computers, and maintains a number of computer systems that support faculty research. The Computational Lab manages several clusters of open-access computer terminals tied to the campuswide computing system. The Media Lab maintains a large inventory of field-oriented audio and visual recording equipment and supports curricular and research projects undertaken by students and faculty. The Third World Teaching Resource Center makes available archival and laboratory materials relating to social and cultural aspects of the Third World.

Program-related teaching laboratories are maintained by the Anthropology Board (archaeology and physical anthropology), Economics Board (microcomputer), Environmental Studies Board (agroecology and natural systems), and Psychology Board (experimental psychology).

Internship and Field-Study Opportunities

Academically oriented field study is a distinctive element of the social sciences offerings at Santa Cruz. Four degree programs--psychology, community studies, economics, and environmental studies--include field studies and internships as part of the major. The Merrill Field Program also sponsors off-campus field study for students from a number of campus programs. Unlike the field-study components of the boards of studies, which concentrate their efforts on local and national placements, the Merrill Field Program sponsors a number of international placements.

New Research Programs

Soon the Divisional Research Committee will review proposals for ORAs in Law, Science, and Ethics; Mathematics and Science Education; and Nuclear Policy Studies. The first of these proposals is authored by faculty from environmental studies, politics, philosophy, and economics. The proposal for a mathematics and science education ORA grows out of several years of successful collaboration between members of the education and mathematics faculty. The proposed nuclear policy studies ORA will draw its faculty participants from politics, economics, sociology, psychology, physics, computer and information sciences, and astrophysics.

New Academic Programs

UCSC's special strengths have been in undergraduate liberal arts education and in innovative multidisciplinary programs. These strengths will form the basis for new programs as the Division of Social Sciences responds to new challenges. For example:

Capitalizing on the successful M.S. program in applied economics, the new undergraduate "business track," and the new computer engineering program, Santa Cruz envisions a new program in engineering management. This program might reasonably provide a double baccalaureate degree or a combination B.A. and M.Sc., in a five- to six-year program.

A new undergraduate program in communications would meet an expressed student demand and build on present strengths at Santa Cruz. Among our strongest programs are psychology, linguistics, and computer and information sciences. These programs, along with anthropology, sociology, community studies, writing, and the proposed film/video pathway, offer resources that can supplement the core instruction in communications now being planned.

As noted above, graduate program proposals are under development or review in three boards of studies: anthropology (M.A.), community studies (M.A.), and environmental studies (Ph.D.). Assuming that these proposals are approved within the next year, the new programs should admit their first graduate students in the fall of 1986 or 1987.

A graduate-level program in jurisprudence is also under consideration by faculty. The program would draw on the faculties of environmental studies, politics, philosophy, and economics. The focus of the program would be on the philosophical, ethical, political, and practical issues of justice in a high-technology culture.

An undergraduate program combined with a graduate certificate program in social science writing has been proposed for further study. The program would be modeled on the very successful

Science Communication Program of the Natural Sciences Division. The aim of the program would be to train social scientists in the skills necessary to present effectively the research findings of social scientists to a lay public.

A graduate program in environmental engineering would combine the resources of boards in the Natural Sciences Division with those of the Environmental Studies Board. (See The Natural Sciences, above.)

X. THE ARTS

Arts faculty envision a UC Santa Cruz twenty years from now with arts programs that have achieved parity with the finest programs on campus. Arts will have institutes and research laboratories equivalent to Long Marine Lab and Lick Observatory. These research and creative institutes, such as Shakespeare Santa Cruz, will seek to explore and define the cutting edges of the arts in theory, aesthetics, history, and practice. They will serve as the breeding ground for important research and creative projects. New technology will play an important role; for example, plans now under way for a video program should lead to a unit that will serve to bring the work of the Arts and the campus at large to a wider public.

In addition, we aspire to improve the quality of our undergraduate programs to the point where they are justifiably recognized as among those of the finest institutions for the study of the arts in the western United States. Since its inception, UC Santa Cruz has proven unusually attractive to arts students. Recent improvements, particularly the newly constructed Elena Baskin Visual Arts Studios, promise to continue this tradition.

The role of the Arts programs at UC Santa Cruz is threefold. They provide: (1) campuswide general education in arts disciplines and in an interdisciplinary core course in Porter College; (2) majors in music, theater arts (with pathways in film, drama, design technology, and dance), art, and art history; (3) resources that humanize and vitalize the cultural life of the campus and surrounding community, a community remarkably hospitable to the arts. In this last role the arts play a special educational role on campus. While most academic programs fulfill general education and preprofessional training responsibilities, the arts programs assume a larger responsibility, that of providing the cultural ambience of the campus, where our students form lifelong patterns of aesthetic appreciation. Each year, in addition to their academic offerings, the Arts boards sponsor many drama and dance productions, recitals and concerts, lectures, films, and art exhibitions. Without this contribution, UCSC would be culturally barren.

Despite the considerable impetus generated by student interest and community support, the potential of the Arts boards and associated programs remains underdeveloped. Pressures to build viable arts programs to meet student demands during the past decade of steady-state resources have led to a disproportionate, indeed untenable, reliance on temporary funding for essential faculty positions in each of the Arts boards. Enrollments in the arts programs remain high, with growth in several areas and considerable pressure for growth in others. The strong enrollments over the past decade countered national trends, reflecting both strong student interest and the Arts programs' good reputations.

The wave of growth anticipated for UC Santa Cruz will provide the campus and the arts programs with an opportunity to redress some fundamental shortfalls and to move forward. As Santa Cruz plans for the twenty-first century, the arts are destined for an important role in balancing the demands of an increasingly technological society.

ARTS PROGRAMS

	Undergraduate	Graduate	Research*
Existing/ Approved	Art Art History Music Theater Arts	Art Certificate Theater Arts Certificate	
In Process**	Film/Video	Art History Ph.D. Music M.A.	
Under Preliminary Discussion	Communications	Art M.F.A. Theater Arts M.F.A.	Critical Theory Pacific Basin Shakespeare Santa Cruz

*Research programs consist of focused activities involving faculty groups.

**Defined as submitted formally by the director to the central administration and Academic Senate committees.

DEGREE PROGRAMS

Art

UCSC's program in the visual arts reflects the prevailing interest of those students who are initially attracted to the physical beauty of the campus itself. The faculty and students share a common interest in nature imagery, ranging from direct observation to highly imaginative abstraction.

The success of the Art Board is attested to by our students' high acceptance rate in the nation's best graduate schools, and by their subsequent professional progress working as artists--as well as in teaching, community art centers, edition printing, and a variety of other related areas. Through the years the board has been achieving this record while serving one of the highest numbers of declared and graduating majors per FTE on the campus.

The goal of the Art Board is to guide individual students toward artistic maturity and independence by teaching them to recognize and exercise their basic sensibilities. The art program is carefully structured, but it supports and encourages individual needs and interests. The board is committed to making the practice of the studio arts available to as many non-art majors as possible. Currently, nonmajors may find the large introductory lecture classes in art history more accessible, but the Art Board would like to work towards permitting nonmajors free access to other introductory courses, such as visual fundamentals, beginning drawing, and photography, as well.

The program of study for the art major (and art minor) includes intensive studio work in painting, printmaking, and sculpture, all built on the base of required visual fundamentals and technique classes.

A limited number of highly qualified students are accepted into a fifth-year certificate program in studio art. This program provides students with additional time to develop their primary studio interests in painting, printmaking, or sculpture; to work in media they have not yet fully explored; and to gain teaching experience, under faculty supervision, in a lower-division studio class.

The excellent new facilities in the Elena Baskin Studios will allow the Art Board to strengthen and expand its programs and develop new initiatives in the next decades. Certain disciplines need to be strengthened or offered more frequently: watercolor (to become a fundamental element in the curriculum), photography (to be added as a new major pathway), graphic design (to add new courses and eventually become a pathway linking with the proposed interdisciplinary communications program), and typography. In addition to the fifth-year certificate program, the board is developing a proposal for an M.F.A. in studio art. Another

pathway for the M.F.A. will be art restoration.

Art History

The Art History Board currently offers its majors--and students from many other disciplines--a compact, comprehensive, and academically stringent coverage of the Western tradition in art from the prehistoric to the post-modern. Its small faculty includes scholars of international standing in architecture and modern art, whose contributions give the program a quality unique among comparable offerings in the University of California system. This program and its specialist faculty are the essential, and irreducible, basis from which art history will expand over the next twenty years in two main directions:

- a. offering a far larger, more consistent, and scholarly coverage of every kind of non-Western art--a clear demand on campus, and one which reflects the demographic trends of the community beyond the University; and
- b. introducing a unique spectrum of cultural studies in the form of a graduate program in history, theory, and criticism of art. The program would constitute a special path to a Ph.D. in the campus's History of Consciousness program.

Theater Arts

The Theater Arts Board has, since its inception, been an applied program and expects to maintain that focus during the coming period of growth. The board stresses the values of performance and production reinforced with scholarship--a mixture of theory and practice which uses theory to inform practice. In all pathways, dance, film/video, drama, and theater technology, it strives to graduate students who are lovers of the art, aware of its history and its potential, and on their way to becoming skilled and informed practitioners of the art. While the board proposes to enlarge programs and add new programs, it firmly stresses the consolidation and improvement of the undergraduate program to a point at which its quality will be unmatched in the country. Because each of the four pathways in the board is small, they do not function as independent programs. The growth of the board will lead to a gradual restructuring, resulting in four stable, independent programs under the umbrella of Theater Arts.

As a natural extension and enhancement of the board's film program, a new video program will offer a strong combination of studies in the theory and history of video and in video and television production.

An M.F.A. in theater arts will be built on the present fifth-year certificate program, and will offer the option of a one-year mentorship program or a two-year M.F.A. program. In its first

years, the M.F.A. program will concentrate on the areas of Renaissance performance and dramaturgy, subsequently expanding into the areas of dance, film, and theater design and technology.

At present, the ethnocentricity of Theater Arts is broken only by a single course in Asian theater. The area of non-western and latino theater and dance studies will be expanded, with particular emphasis on a course of studies that will be relevant to the ethnic composition of the California population.

A program of studies of notation scores will lead to the establishment of a repertory dance ensemble. This unit will perform classical ballet and modern dance works as recreated through notation scores. The current program in dance technique will be enhanced and augmented to include studies of movement analysis.

The Shakespeare Santa Cruz festival will continue as a performance unit under the sponsorship of the campus. In addition, Shakespeare research and instructional arms will be developed.

Music

The integration of scholarship and performance has constituted the basic philosophy of the Music Board since its inception at UC Santa Cruz in 1969. Our curriculum requires students to develop both performing skills and intellectual tools. We expect our music majors to acquire a broad and substantial foundation for further academic or performing studies, a teaching career, or other vocations which involve music. Students may prepare for graduate work in performance, composition (including electronic techniques), musicology, and ethnomusicology.

The music major at UC Santa Cruz has grown from 48 in 1980 to 105 in 1985. The critical mass necessary for a well-balanced music program is nearly in place. The board expects to increase the number of undergraduate majors to approximately 150 over the next years. While continuing its substantial commitment to music general education offerings, the Music Board wishes to focus its resources on improving the quality of the undergraduate major and moving toward the institution of a graduate program. After the M.A. program is in place and running well, we expect to propose a Ph.D. component, possibly in conjunction with the History of Consciousness program on this campus. We see the institution of graduate programs as absolutely essential to the development of an artistically and intellectually vital music program at UCSC, one which seeks to further its national standing.

We hope to increase our activities in the study of musics of non-Western cultures, particularly those of the Pacific Basin and the Americas, and we hope to encourage the study of the relationship of technology and music in our electronic music studio and budding graduate program.