



**Department of Biology  
University of San Francisco**

**Self Study**

*External Review Visit: April 11-13, 2007*

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**Summary**

This document describes the current status of the Biology Department of the University of San Francisco and includes a summary retrospective of the past 10+ years, including an overview of the last Self Study/External Review that was completed in February 1993. Overall, the department is a very successful and productive component of the University. We are the strongest science department relative to numbers of majors and courses taught for both our curriculum and service courses for non-Biology programs. The latter include the University Core Curriculum, Nursing, Exercise and Sports Science, Environmental Science, Biochemistry and several minor programs at USF. This report will highlight the accomplishments of our twelve full time faculty members, outline the undergraduate and graduate curriculum, and describe our current resources for teaching and research. We have identified four major challenges that serve as the basis for our short- and long-term efforts to improve on the continuing success of the Biology Department. These challenges are related to insufficient number of faculty to deliver our curriculum, concerns about the academic performance of students, limited technical support personnel for day-to-day departmental operations, and the ever-prevailing issue of lack of space. Our proposed strategies for addressing these challenges involve better management of student numbers, implementation of programs and policies to enhance student success, and increased reliance on part time faculty to match the escalating demand for classes each semester.

# **Department of Biology University of San Francisco Self Study**

## **1. Introduction**

### **Our Mission**

The Department of Biology offers a program designed to prepare students for a broad spectrum of careers in the life sciences. Many of our entering freshmen are planning for careers in human health, and the Biology major curriculum provides the opportunity to satisfy all requirements for admission to professional schools (e.g., medical, dental, pharmacy and veterinary schools) and graduate programs in the life sciences.

### **Undergraduate Program Objectives**

- a. Lay the foundation of a common core of Biology and supporting courses.
- b. Provide access to the most recent concepts, techniques and instrumentation in biology.
- c. Offer a diversity of lecture, laboratory and field courses that reflects the various facets of biology.
- d. Give students ample opportunities for significant research experiences at the undergraduate level.
- e. Provide to students interested in health-related and other professional post-graduate schools, the best and most comprehensive information available on curricula and graduate programs.
- f. Establish a framework for the consideration of the ethical issues and responsibilities inherent in the application of science and technology.
- g. Foster the Jesuit ideal of an educational atmosphere where learning continues outside the classroom and beyond a baccalaureate degree.

### **Department History and Current Status**

The University of San Francisco is 150 years old and the first university established in the city of San Francisco. We have approximately 5400 undergraduate students in programs associated with the College of Arts and Sciences, and Schools of Business, Nursing and Professional Studies; and 3200 graduate students in these along with the schools of Law and Education. The College of Arts and Sciences has seven science departments: Biology, Chemistry, Physics, Mathematics, Computer Science, Environmental Science, and Exercise and Sports Science. The Biology Department is one of the oldest departments at the University and has traditionally had the largest number of majors within the sciences (Figure 1). Currently we have 280 undergraduate majors, 8 Biology minors, and 110 students with other majors (mostly undeclared science) formally advised by our faculty. There are nine graduate students in our Master of Science program. Of the twelve full time faculty, eight are tenured, two are probationary tenure-track, and two are term (non-tenure track) appointments. We usually have one to several part time faculty teaching each semester. Support staff are one program assistant (secretary) and the shared services of two science technicians from the Chemistry Department.

In addition to offering required and elective courses for students majoring and minoring in Biology, we also provide two courses for non-science majors to satisfy the University's Core Curriculum requirement in laboratory science (The Science of Life and California Ecology), three service courses for the School of Nursing (Microbiology, Human Anatomy and Survey of Human Physiology), and one course for the Gerontology minor (Biology of Aging).

Students majoring in Exercise and Sports Science, Environmental Science and Biochemistry have required Biology courses for their curricula. Non-biology students who are minoring in Neuroscience or who wish to use General Biology I or II to satisfy the Core requirement in laboratory science also enroll Biology courses. In addition, non-science majors planning to apply to post-graduate health professional schools (e.g., medical school, dental school, pharmacy programs, physical therapy programs) take the yearlong sequence of General Biology and/or the other service courses listed above. We taught 2831 student credit hours during the spring 2006 semester and 3226 in fall 2006.

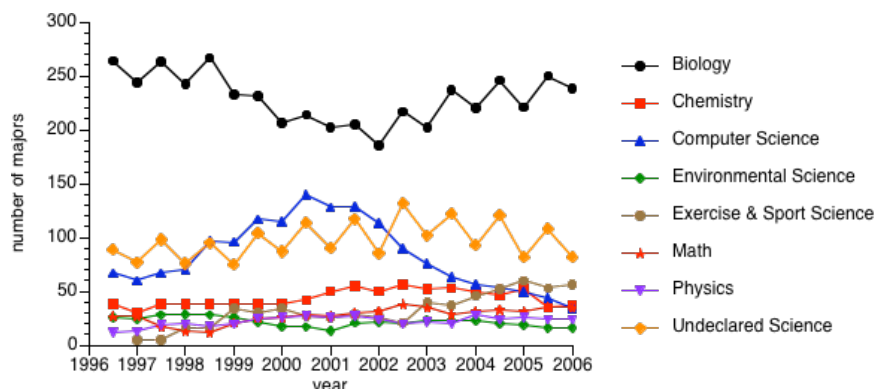


Figure 1. Number of majors in the various science departments at USF over the past ten years (data plotted by semester; e.g., 1996 = Spring 1996, 1996.5 = Fall 1996). Note: Most undeclared science students who remain in science become Biology majors. Drop in student numbers each spring is ~8% and most probably reflects students who did not successfully complete General Biology and/or General Chemistry.

The Biology Department is a very successful, vibrant and vital component of the University. We provide required courses (most with laboratories) for hundreds of students every semester. In addition to teaching and extensive advising responsibilities, the faculty are active participants in all aspects of the University community, and most have strong research programs. We are members of numerous college and University-wide committees; are academic advisors for approximately 50 students each; have research programs that include undergraduate and graduate student participation; serve as faculty advisors for six different student organizations; and participate as volunteers in many University, professional and community organizations and activities. The department is very collegial, and we have an exceptionally friendly work environment.

### Major Challenges

Our primary challenges relate to the staffing and space required to deliver courses to the large number of students that want and need to register for Biology classes. As will be further elaborated below, these are continuing issues from years past and were the primary issues highlighted in our last program review (1993). In addition, there is an increasing concern about the academic ability of students admitted into the Biology program in recent years. We present our view of these challenges in this section and have developed a strategy to deal with these issues that is outlined in the final section of this document.

#### A. Staffing

Owing to the increasing demand for Biology courses by majors and non-majors, and limited number of full time faculty, we have been faced with increasing difficulties in providing a sufficient number of courses each semester. Full time faculty are working at or above the contractual workload. A part time faculty member is hired every semester for the Nursing

microbiology course, and we have been very fortunate to have someone who is willing to teach this course on a permanent part time basis. About every other semester when full time faculty are not available, we hire part time faculty to teach the Nursing anatomy course. Unfortunately, we do not have a consistent part time instructor for this course.

More recently, we have been unable to sufficiently staff upper division Biology courses. Therefore, at the last minute, faculty have been reluctantly accepting teaching overloads, often with financial compensation. For example, five faculty are teaching more than 10 units this semester to accommodate all students who require Biology classes.

We are currently engaged in establishing a teaching partnership with the University of California San Francisco so that we can provide teaching opportunities for post-docs and graduate students. We expect that this program will give us the means of staffing courses that cannot be covered by our full time faculty. A pilot program in Fall 2006 has been very successful, and we are expanding the program in Spring 2007.

### *B. Academic quality of students*

Despite the fact that the University has seen an increase in the number of undergraduate applications (4600 in 2003 to 7100 in 2006), there has not been a demonstrable change in academic performance of incoming science students. Too many students are not prepared for a rigorous academic program. In addition, the Biology Department has had a noticeable decline in the number of exceptional students admitted into the Biology major. This situation may be partially related to a decline in the number of University Scholars. Up until four years ago the University Scholars Program provided a 75% annual tuition scholarship to students with high GPA and SAT scores. In 2002, the policy was changed so that University Scholars now receive only \$16,000 per year toward the approximately \$42,000 required for tuition, room and board. In addition there has been a recent increase in the minimum GPA and SAT scores required to qualify as a University Scholar.

The reduced number of academically talented students has negatively affected faculty morale. In the past, students like the University Scholars provided academic leadership and served as role models of academic excellence for other students to emulate. These high performing students also provided the opportunity for collaborative and interactive learning with faculty. The current lack of these students is perceived by the faculty as detrimental to the Biology program at USF, and an impediment to teaching effectiveness and faculty professional development.

### *C. Space*

The Biology Department does not have adequate space for teaching or research. There are dedicated teaching labs for general biology, microbiology, and anatomy/physiology and these rooms are utilized on most days from 8:00 AM to 8:30 PM. There is a biotechnology teaching lab that has equipment and instruments for molecular biology-based courses and cannot be used as a general purpose teaching lab. The only other space available for lab and field courses is a small room that seats 12-15 students that is also used for seminars and meetings. There is some use of research labs for teaching, but in most cases, this use is not practical because of room configuration and size. We have no dedicated space for teaching field courses and are greatly limited as to the kinds of laboratory activities that can be planned with these courses. There are also no common use spaces for faculty and students to use outside of class times for meetings, study groups and social gatherings.

The University has increased its research expectations of faculty, but current dedicated research space (not including teaching laboratories) averages 240 ft<sup>2</sup>/faculty member,

which is well below the mean of 566 ft<sup>2</sup> at similarly sized institutions\* (see Appendix A). Thus, there is inadequate space for current faculty and absolutely no available labs or offices for recruiting new faculty. There is no practical way to rearrange existing space to provide an office or lab for a new faculty line. While the University is planning for expansion of the science building with a new wing to provide new teaching spaces, this project is at least several years away and will not address our immediate space needs. Moreover, there is no plan to evaluate existing space in the Harney Science Center to redistribute space among departments as needed. As an example of the allocation of space on the third floor of the science building, the Dean's Office utilizes one faculty office and one laboratory/office complex; and a computer classroom and another laboratory/office complex are assigned to the Department of Environmental Science.

Considering the lack of space and unlikelihood of acquiring more full time faculty, our strategy is to more carefully manage and limit the number of Biology majors so that we can accommodate necessary courses with the current level of staffing and space available. (See Section 8 Strategic Plan for details).

## 2. Faculty Biographies

Abbreviated *curriculum vitae* are included in Appendix B and full *curriculum vitae* will be available in the Dean's Office during the External Review Committee's campus visit.

**Timothy J. Brady** is an Assistant Professor (term faculty) in the Department of Biology. He received his B.A. and B.S. from the University of Washington in 1984, an M.S. from the University of Washington in 1987, and his Ph.D. from the University of California, Berkeley, in 1996. Prof. Brady studies the ecology and evolution of forest tree species, especially the pines of western North America. He teaches two Core Curriculum courses as well as Evolution, the capstone course for Biology majors.

**Paul Chien**, Professor, grew up in Hong Kong and earned two B.S. degrees in Chemistry and Botany from The Chinese University of Hong Kong. After getting his Ph. D. in Marine Biology from University of California at Irvine, he went on to study the biology and rehabilitation of giant kelp beds in Southern California at California Institute of Technology. Teaching at USF since 1973, and being a District Director of Beta Beta Beta Biological Honorary Society, he is interested in promoting undergraduate research. Many of his students have published papers with him in international journals. His research interests ranging from cellular structure and function in marine algae and invertebrate animals to effects of heavy metal pollution as well as biological detoxification mechanisms. Paul Chien has also been active in promoting Sino-American academic exchanges. Eight Universities and medical schools in China have honored his services.

**Jennifer Dever**, an Assistant Professor, earned her Ph.D. in Zoology from Texas Tech University (2000). She focuses her research efforts on conservation genetics issues. Jennifer is specifically concerned with the preservation of species diversity, and uses molecular techniques to determine levels of genetic variation in threatened populations and identify evolutionary significant units for proper management. The following is a brief description of three projects with which she is currently engaged. Jennifer has been working to determine the amount of gene flow and genetic structuring of the foothill yellow-legged frog, a threatened species of Northern California and Oregon. This is of considerable interest, because due to habitat destruction and the introduction of exotic species, amphibian species

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\* Data from Earl Walls Associates.



diversity is decreasing at an alarming rate. To reach the conservation goal of preserving amphibian species, fundamental questions are being addressed such as: what is the level of gene flow in existing populations and how are individuals dispersing throughout the watershed. She is also working in collaboration with the Department of Herpetology at the California Academy of Sciences on the identification of frog species collected in Myanmar. Her work will directly contribute to the Myanmar Herpetological Survey Project to determine species ranges in order to establish new areas for preservation. Jennifer is also collaborating with Dr. Scott Nunes to examine the population genetics of Belding's ground squirrel. In particular, they are examining sub-populations just east of Yosemite National Park, to combine genetic data with behavioral observations to better understand the impact of relatedness on behavior. Jennifer has taught an Introductory Biology class (intended for majors with a limited background in science) and the Principles of Biology I class. She regularly teaches Principles of Genetics, two service learning upper division biology classes: Female Biology and Conservation (also a field course), and another field course: Herpetology. She is also the Chair of the Graduate Program. Her current university service includes an elected seat on the Policy Board for the USSFA and an appointed Co-Chair of the WASC Task Force Educational Effectiveness Review and co-creator of the Graduate Teaching Assistantship Workshop.

**Deneb Karentz**, Professor, has a joint appointment to the Departments of Biology and Environmental Science. She is a marine biologist with expertise in plankton ecology and ultraviolet (UV) photobiology. Deneb has an MS degree from Oregon State University (1975) and a PhD from the University of Rhode Island (1982). Her graduate research focused on the physiological ecology of phytoplankton and this work initiated an interest in the use of molecular techniques to study ecological questions. Her post-doctoral training at the University of California San Francisco was on the molecular genetics of inherited human disorders caused by DNA repair deficiencies. Current research activities include investigations of biological responses and defense mechanisms of marine organisms to UV exposure, particularly in relation to ozone depletion in Antarctica; and continuation of work on understanding the molecular basis of DNA damage and repair in the context of human disease. Deneb teaches undergraduate courses in Biology and Environmental Science; and graduate courses in the Environmental Management Program. In addition to service at USF, she is an Associate Editor for the journal *Phycologia* and a US representative on a subcommittee of the Scientific Committee on Antarctic Research. Deneb has been involved in field research and teaching in Antarctica since 1986 and has served in a variety of positions that have provided advisory support to the US Antarctic Program.

**Leslie King**, Instructor (term faculty), majored in Zoology at the University of California at Davis and has a Master's Degree in Physiology from San Francisco State University. Her graduate research focused on hemoglobin-oxygen affinities in adult and fetal swell sharks (*Cephaloscyllium ventriosum*) and she has participated in field studies of shark behavior and feeding in the Bahamas. She maintains an active interest in shark reproduction and behavior. Hired in 1993 as a full-time instructor in the Biology Department, Leslie teaches general biology lecture and laboratory courses and human physiology for Nursing majors and also coordinates undergraduate laboratories and laboratory teaching assistants.

**Scott Nunes**, Associate Professor, was born in San Francisco and grew up around the Bay Area. He received his bachelor's degree from the University of California at Santa Cruz and Ph.D. from Michigan State University. He also spent time at the University of Nebraska at Omaha as a post-doctoral research associate. His research focuses on animal behavior and its relationship to physiological and ecological variables. As an undergraduate, he acquired field experience studying blue monkeys and spotted hyenas in Africa, and Beechey ground squirrels along the California coast. In the past, he has completed research projects

examining hormonal and energetic elements of dispersal, play, and maternal behavior in ground squirrels, hormonal correlates of paternal behavior in marmosets, and biological rhythms in ground squirrels and African grass rats. Since starting at the University of San Francisco he has evaluated questions regarding hormonal and neural substrates and functional benefits of play behavior in ground squirrels as well as the evolution of social systems in ground squirrels. His current research involves summer field studies in the Sierra Nevada. Courses he has taught at the University of San Francisco include General Biology I, Human Physiology, Human Anatomy, Neurobiology, Endocrinology, and Biology of Human Aging. He is active in the University of San Francisco's Neuroscience group. He also coaches for Special Olympics.

**Mary Jane Niles**, Professor, received her Diploma in Nursing in 1978 from Binghamton General Hospital School of Nursing, and worked as an R.N. until 1986. During that time she completed a B.S. in Cell and Molecular Biology at San Francisco State University (1985). She then went on to the University of California at Berkeley, where, in 1992, she completed her Ph.D. in Immunology. During the subsequent 14 years as a faculty member at U.S.F. Mary Jane has served as a research advisor to ten Masters students and numerous undergraduates; Her research addresses IgM synthesis and assembly in terminally differentiated B cells, or plasma cells. In particular, she is working toward the identification and characterization of a rough endoplasmic reticulum (RER)-associated enzyme, which is thought to catalyze the formation of IgM-IgM and J chain-IgM disulfide bridges. Her course repertoire includes Virology, Molecular Biology, Immunology with lab, and Molecular Genetics and Biotechnology with lab (upper-division), and Cell Physiology and General Biology (lower-division). Mary Jane has contributed chapters on immunology to several textbooks: Campbell's *Biology* (editions four through seven), *Human Physiology* by Germann and Stanfield (First edition), *The World of the Cell* by Becker, Reece and Peonie (Third edition), and *Microbiology: A Photographic Atlas for the Laboratory* by Alexander and Strete (First edition). In addition, she co-authored *Laboratory Exercises in Organismal and Molecular Microbiology* by Alexander, Strete, and Niles (McGraw-Hill, 2003, first edition). She currently serves as Secretary of the USF Faculty Association, as Advisor to the U.S.F. Chapter of Beta Beta Beta Biological Honor Society, and as Chair of the Pre-professional Health Committee.

**Patricia J. Schulz**, Professor, is a native of Oak Park, Illinois. She received her bachelor's degree in Biology at Dominican University, River Forest, Illinois, her masters in Biology at Fordham University while conducting research on the effects of ultraviolet and visible radiation on seed germination with Richard Klein at the New York Botanical Garden. She did her Ph.D. in Botany at UC Berkeley studying the ultrastructure and cytochemistry of embryo and endosperm development in angiosperms under William A. Jensen. She taught for several years in the Biology Department at Dominican University and was a visiting professor in the Botany Department at UC Berkeley before taking a position as assistant professor at USF in 1978. Her research in the field of angiosperm embryology has expanded to include the effects of chemical hybridizing agents on wheat pollen development. She is also engaged in collaborative studies on the ultrastructure of marine invertebrate tissues exposed to heavy metals. She has taught courses in general biology, plant physiology, histology, cell ultrastructure, and electron microscope techniques. She manages the departmental Electron Microscope laboratory that houses a Zeiss EM 900 transmission electron microscope. Her university service has included membership on the Davies Committee, the Pre-Professional Health Committee, the Promotion and Tenure Peer Review Committee, the Faculty Advisory Committee to the Lane Center for Catholic Studies and Social Thought, and serving as Faculty Advisor to the Jesuit honor Society (Alpha Sigma Nu) and the Omicron Theta Chi Pre-Professional Sorority.

**Juliet Spencer**, Assistant Professor, was born in upstate New York and then moved to Massachusetts where she received her B.S. in Biotechnology at Worcester Polytechnic Institute. Seeking warmer weather, she moved south and completed her Ph.D. thesis on herpesvirus capsid structure at the University of Virginia. After completing a post-doctoral fellowship studying immune response to influenza viruses at UVA, she moved to San Francisco Bay Area and worked in the biotechnology industry, focusing on drug discovery for human and viral G-protein coupled receptor targets. In addition, she taught cell and molecular biology courses part-time for UC Santa Cruz-Extension's Biotechnology Certificate program. Since coming to USF in 2003, Professor Spencer has developed an NIH-funded research program studying immune evasion strategies of herpesviruses. She enjoys teaching General Biology, Cell Physiology, Microbiology, and Cancer Biology and also acts as faculty advisor to the USF Women in Science organization. When not hunting down microbes, she enjoys yoga, taking cooking classes, and hiking with her husband and two dogs.

**Gary L. Stevens**, Professor, received his B.S. from California State University at Long Beach, and an M.S. in and Ph.D. from the University of California at Davis in Zoology. He began at USF in 1970 after completing the Ph.D. He has studied small mammal demographics in Alaska and Papua New Guinea. He also participated in a multiyear ecological monitoring of the Geothermal Steam Plants in the Geysers, Ca. He has taught a range of courses but is currently teaching mainly human anatomy for non-majors or majors and a vertebrate ecology field class titled California Wildlife for Biology majors. He maintains a small vertebrate teaching collection. For a period of several years in the 1970s and 80s, he served as associate dean for Arts and Sciences including a short stint as Acting Dean.

**John Sullivan**, Professor, grew up in the Boston area and graduated from Dartmouth College with a biology degree in 1968. His graduate education at the University of Hawaii, under the direction of the parasitologist Thomas C. Cheng, was interrupted by military service, including 16 months in Vietnam. He completed his Ph.D. in 1976 in Dr. Cheng's lab at Lehigh University. Prior to joining USF as the Fletcher Jones Chair, Dr. Sullivan worked in a variety of research and teaching positions (UCSF's International Center for Medical Research in Kuala Lumpur, Malaysia, Downstate Medical Center, The National Institutes of Health, The Medical University of South Carolina, Lamar University, University of the Incarnate Word) and along the way completed 20 years of service in the Army Reserve, retiring as a lieutenant colonel. He has also taught an introductory biology summer course at Stanford University, and regularly teaches parasitology at San Francisco State University. At USF, he has taught General Biology I and II, General Parasitology, and Animal Toxicology. His research is directed at the role of the molluscan immune system in responding to parasitic infection and foreign tissue transplants, mainly at the organismal and histological level. He is specifically interested in the interaction between the schistosome parasite, a major cause of human disease, and the snail intermediate host, and his studies have been supported by grants from WHO, DOE, NIH, NSF, and other agencies. In addition to his teaching and research, he self-publishes a photographic atlas of parasites that has been adopted as a required text in parasitology courses at several major universities.

**Christina Tzagarakis-Foster**, Assistant Professor, majored in Biology at the University of San Francisco and received a Ph.D. in Microbiology from the University of California, Davis in 1999, where she studied gene regulation of nuclear hormone receptors in Dr. Martin Privalsky's laboratory. After completing her doctorate, she continued her studies with nuclear hormone receptors in Dr. Dale Leitman's laboratory at the University of California, San Francisco. She specifically studied the role of Estrogen Receptors in breast cancer. During her post-doctoral fellowship, Christina also was an adjunct faculty member at both

San Francisco State University as well as Dominican University of California in San Rafael. Hired in 2005, Christina has returned to USF as an assistant professor in the department of Biology. She teaches General Biology II, Endocrinology, and Molecular Medicine. When she is not in the classroom, Christina has a very active laboratory with both graduate and undergraduate students. Her research is focused on studying the Dax-1 (Dosage Sensitive Sex Reversal, Adrenal Hypoplasia Congenita, critical region on the X chromosome, gene 1) protein, an "orphan" receptor of the nuclear receptors. She has found that Dax-1 is a potent transcriptional repressor and is able to block the growth of breast cancer cells using a mouse model system. Currently, Dr. Tzagarakis-Foster's research is focused on investigating the mechanism of repression by Dax-1 as well as examining the role of Dax-1 in preventing breast tumor formation in women. Outside of her time teaching and carrying out research at USF, Christina enjoys spending time with her husband and two young boys.

### **3. Synopsis of 1993 Self Study: Report of External Reviewers and Response**

The last review of the Biology Program at USF was in 1993. A self study was prepared and an external committee of three reviewers came to campus. This committee submitted a report to the University and over the next few years the Biology Department drafted a development plan based on the external review and the University response to the reviewer's recommendations. While there were numerous issues evaluated in the 1993 study, they can be summarized in two key (and related) areas: faculty workload, and limited resources related to faculty/support staffing and space. Below is a brief summary of the priority issues from 1993 and how these have been dealt with in the intervening years.

Both the faculty and the 1993 external committee agreed that the workload of Biology faculty had been progressively increasing over the years and was continuing to escalate. In addition to increases of student numbers in courses and the redistribution of workload credit calculations from a previous model, it was felt that there was a lack of recognition for efforts outside the classroom that were contributing to the higher demands on faculty time. These unrecognized out of classroom efforts included issues such as large number of advisees (50 or more per faculty), supervising directed research with undergraduate and graduate students, organizing graduate seminars, involvement in student recruitment, participation in the Pre-Profession Health Committee duties/activities, writing of numerous recommendation letters, editing of the department's Wasmann Journal, and having the primary responsibility for maintaining laboratory equipment and facilities.

The 1993 External Review Committee recommended the addition of new faculty positions. This was accomplished by the establishment of the Fletcher Jones Endowed Chair in 1996 and the addition of a non-tenured term faculty line in 1999. While there have been four other new faculty hired since 2000, these were replacements for retired faculty. An additional retirement occurred in 2006, but this position has not been made available to the Biology Department. The 1993 External Review Committee also recommended hiring of faculty with expertise in mammalian physiology, endocrinology, and neurobiology and this has been accomplished with the new hires made over the past seven years. However, faculty numbers have remained the same and very little has changed in the time faculty have to devote to the issues listed above, with the exception of the demise of the Wasmann Journal.

Both the department and the 1993 External Review Committee identified the lack of resources, such as space and technical support for laboratory preparation and overseeing of equipment and facilities, as a major impediment to efficient use of faculty time. The 1993 External Review Committee recommended the addition of a centrally located stockroom, the

establishment of a media preparation center, and hiring of a full time technician to oversee equipment and facilities. A new technician was hired in the Chemistry Department in 2002 and the Biology Department has benefited from this added position; however, there has been little progress in regard to the majority of the 1993 recommendations.

This 2006 self study document of the Biology Department will echo many of the issues raised in the 1993 review of our program. However, we are now proposing a course of action that might more adequately address specific areas of concern without expecting the University to provide more staffing and space. As mentioned above, a primary strategy will be to establish a better management policy for controlling student numbers (see Section 8 for details).

## 4. Curriculum

### University Core Curriculum

In 2002, the University adopted a new Core Curriculum, a suite of courses required for all undergraduates, regardless of major. There is a University committee that approves courses for the Core requirements and these courses fall into the following categories:

- Area A. Foundations of Communication (8 units)
- Area B. Mathematics and Science (8 units) (automatically fulfilled within the Biology major)
- Area C. Humanities (8 units)
- Area D. Mission (Philosophy, Theology, Ethics) (12 units)
- Area E. Social Sciences (4 units)
- Area F. Fine and Performing Arts (4 units)

In addition, students must include at least one course that has a cultural diversity perspective and one course that has a service learning component. These can be satisfied within one of the other Core course areas or with a course in the major. In Biology we have three upper-division courses with service learning (Biology of Cancer, Female Biology and Conservation Biology). Science majors in the College of Arts and Sciences must also demonstrate proficiency in a foreign language equivalent to the second semester of a college-level course. This can be satisfied through actual coursework or a placement exam score.

### Undergraduate Biology Major

The Biology curriculum at USF is in line with Biology programs at other US universities. In addition to the Core Curriculum, all students are required to complete yearlong sequences in General Biology, General Chemistry and Introductory Physics; take at least one semester of Organic Chemistry (the majority take the full year); and a semester of Biostatistics, Cell Physiology, Genetics, and Evolution (our capstone course). In addition, students choose five upper division Biology courses. Of these, at least one must be a "field" (ecology) course and at least two more must have a laboratory or field component (see Appendix C for more detail of the major requirements and the suggested timetable for completion of Core and major courses). The overall program goals, learning outcomes and assessment parameters are presented in Appendix D.

Biology majors can specialize in a Molecular Biology emphasis, undertake the Biology Honor's Program, minor in Neuroscience with additional courses in Psychology, and minor in Chemistry within the Biology course requirements. Some students choose to minor in Mathematics or Environmental Science, and less frequently in non-science disciplines.

There have been two major changes in the undergraduate Biology curriculum since Fall 2002 (Table 1):

1. A transition from a mixture of 3-, 4-, and 5-unit Biology courses to a uniform 4-unit format (in compliance with the university-wide adoption of a 4-unit course model).
2. The institution of more stringent course and grade prerequisites for students to progress through the established sequence of Biology courses. (The Chemistry Department has adopted similar grade requirements for the inorganic and organic chemistry courses that are required for Biology majors.)

Table 1. Changes in the Biology curriculum since Fall 2002 (primarily related to the University's adoption of a 4-unit course standard).

<b>Courses</b>	<b>Prior to 2002</b>	<b>After 2002</b>
Biology and Writing	<ul style="list-style-type: none"> <li>• 1-unit course for freshman</li> <li>• Linked to writing requirement</li> </ul>	No longer offered
General Biology I and II	<ul style="list-style-type: none"> <li>• 5-unit courses, two labs/week</li> <li>• Biology I offered in spring</li> <li>• Biology II in fall</li> </ul>	<ul style="list-style-type: none"> <li>• 4-unit courses, one lab/week</li> <li>• Sequence starts with either course; each offered both semesters</li> </ul>
Cell Physiology	3-unit course	4-unit course
Upper division Biology requirements	<ul style="list-style-type: none"> <li>• Genetics (3 units)</li> <li>• Field course (4 units)</li> <li>• Electives (17 units): two 4-unit courses with lab (minimum), plus three 3-unit courses (lecture only or combination of lecture/lab)</li> <li>• Evolution (3 units)</li> </ul>	<ul style="list-style-type: none"> <li>• Genetics (4 units)</li> <li>• unchanged</li> <li>• Electives (16 units): two 4-unit courses with lab (minimum), plus two 4-unit courses (with or without lab)</li> <li>• Evolution (4 units)</li> </ul>
Math requirement	None for major, was included in university requirements	Biostatistics, also fulfills current Core mathematics requirement
Organic Chemistry	Ochem I (with lab) and Ochem II, or single-semester Fundamentals of Ochem (with lab)	Unchanged
Course and grade prerequisites and corequisites	<ul style="list-style-type: none"> <li>• Gen Chem I prereq for Gen Biol I</li> <li>• Gen Biol I prereq for Gen Biol II</li> <li>• Gen Biol I and II with <math>\geq</math>C- prereq for Cell Physiology</li> <li>• Ochem coreq for Cell Physiology</li> <li>• Cell Physiology with <math>\geq</math>C prereq for all UD Biology courses</li> <li>• 2.0 science GPA for graduation with Biology major</li> </ul>	<ul style="list-style-type: none"> <li>• No prereq for Gen Biol I</li> <li>• Gen Biol I and II in any order</li> <li>• Unchanged</li> <li>• Unchanged</li> <li>• Cell Physiology and OChem <math>\geq</math>C as prereq for Genetics; Genetics with <math>\geq</math>C prereq or coreq for UD Biology courses</li> <li>• 2.0 science GPA and <math>\geq</math>C- in Evolution for graduation</li> </ul>

In general, the change to the 4-unit course model has given students somewhat less flexibility in completing graduation requirements, as only four courses are taken each semester. This has resulted in a less broad-based biology education, since only seven upper division Biology courses typically are taken instead of eight in the previous version of the curriculum.

The changes in course and grade prerequisites for progression through the major have been quite successful in ensuring that students are able to complete all requirements for

graduation. Also, identifying students having difficulty in the sciences at an early stage in their academic careers provides them with the opportunity to consider other options and still graduate in a reasonable timeframe.

### **Service Courses in Biology**

We offer six service courses in Biology that fulfill curriculum requirements for the University Core, the Nursing major, the Exercise and Sports Science major, the Neuroscience minor or the Gerontology minor. These courses are not applicable to the Biology major requirements and are generally not taken by Biology students. Several of these courses (e.g., microbiology, physiology, anatomy) are in high demand by students needing them for professional school application pre-requisites (e.g., physical therapy, physician's assistant, etc.).

Among the Core Curriculum courses offered by the Biology Department only two are designed for non-science majors. These are The Science of Life (Biology 100) and California Ecology (Biology 102). Both courses include lectures and labs, and the latter includes Saturday field trips. Biology 100 is a survey of biologically relevant chemistry, cell biology, physiology, genetics, evolution, and ecology. Biology 102 helps the non-science student to answer questions about the geological and climatic cataclysms, natural biological interactions, and human activities that have shaped California's ecosystems.

Both of these Core courses are filled to capacity each semester and it is only owing to lack of faculty that the Biology Department does not offer more than two Core Biology courses for non-science majors. The department views this situation as a great disservice to USF students. There are relatively few choices of laboratory science classes designed specifically for non-science majors at USF (e.g., Astronomy from the Physics Department, Get a Grip on Science from the Chemistry Department). We feel that USF students should have more opportunities to take Biology courses to satisfy the Core requirement for laboratory science; but we are unable to staff more of these courses.

Our other lower division service courses (Human Anatomy, Human Physiology, Microbiology, and the Biology of Aging) are also always filled to capacity each semester. These classes usually close, preventing all students who want to enroll from doing so. An additional drawback of lack of staffing and teaching space is that the Biology Department is unable to offer any Freshman Seminars. These are fall semester courses restricted to freshmen, limited to 15 students and provided with special budgets to fund course activities. Most Biology faculty would very much like to teach one of these courses, but we cannot release anyone from their standard teaching workload.

### **Undergraduate Research Experience**

The Biology Department provides many opportunities for undergraduates to gain research experience. This can be done on a volunteer basis or for course credit (Biology 398 and 498). The Biology Honor's Program involves completing a more extensive research project and includes the writing of an honor's thesis. Student research can be conducted within the department under the guidance of a faculty member, or at another local laboratory (e.g., University of California San Francisco, Environmental Protection Agency, Department of Public Health, etc.). While we support many student requests for research opportunities, faculty are somewhat reluctant to take on the added workload because no credit is given for mentoring research activities of students.

### **Graduate Program**

The Biology Department offers a Master of Science Program. A student who has successfully completed the program will be well prepared to enter into a technical position in a research

or industrial laboratory, or to continue further postgraduate work (often this is medical school). (See Appendix E for specific learning outcomes and assessment.) The MS degree requires that students undertake an active research project that culminates in a formal written thesis, plus complete a total of 24 units in Biology or Biochemistry (16 units of coursework).

A Graduate Committee comprised of three faculty members reviews applications to the graduate program. Students are not accepted into the program unless a specific faculty member in the department is willing to sponsor them. Although students are required to complete 16 units of coursework, we are unable to offer dedicated graduate-level courses (other than a graduate seminar offered every other year). Instead, students enroll in upper division undergraduate courses and are required to complete additional work in those classes.

The graduate program is relatively small and enrollment tends to fluctuate from year to year (0-9 students per year over the past ten years). There are complex reasons for this variation. These include limitations on faculty time for mentoring, the high cost of living in San Francisco and the related lack of graduate stipends. While the University provides eight full tuition scholarships, the only other funding available to our graduate students is through very small teaching assistantship salaries (\$2-3000 per semester). The department has instituted a Grants-in-Aid program for supporting undergraduate and graduate student research and travel costs for scientific meetings. This support (maximum \$2500) is made possible by the generous contributions of donors to the Biology Gift Fund.

Despite its relatively small size and lack of support, the graduate program makes an important contribution to research conducted for certain faculty in the Biology Department. However, it must be noted that the University does not provide any encouragement for the department to maintain or further develop the Master's Program.

## 5. Faculty Workload

At USF, the faculty workload is negotiated between the Administration and the faculty union (USF Faculty Association) at 30 units per academic year (estimated to require 40-45 hours of work per week). Of these 30 units, six units are to be devoted to non-teaching activities (e.g., advising, committee work, administrative duties, etc.) and 24 units to teaching and research. A minimum of 18 units must be devoted to teaching and this is the standard teaching load for tenured and tenure-track faculty. Term faculty have no compensation for research and are required to teach the equivalent of 12 units per semester. Part time faculty are limited to 8 units of teaching per semester.

### Teaching

Teaching workload has been negotiated at 9 units per semester and prior to 2002 was the equivalent of three 3-unit courses. With the conversion in 2002 of each course in the College of Arts and Sciences to 4 units, each faculty member is now required to teach 36 units over a 2-year period (4 semesters). In most other departments, this equates to three "light" semesters of eight units each (two 4-unit courses) and one "heavy" semester of 12 units (three 4-unit courses). In the Biology Department, our laboratory/field courses have separate course numbers for the three units of lecture and the 1 unit of lab (generally one 3-hour lab session per week) that make up a 4-unit course (e.g., Biology 320 Human Physiology lecture = 3 units, the corequisite lab is Biology 321 = 1 unit). However, each 4-unit combination of lecture and lab courses for students is considered as six teaching units for faculty. As a result, the current workload distribution for Biology faculty is three "heavy" semesters at 10 units (one lecture-only course for 4 workload units and one lecture-



laboratory combination course for 6 units of workload) and one “light” semester at 6 units (one lecture plus laboratory course for 6 workload units) within each two-year period. We perceive this difference in the distribution of heavy and light semesters over a two-year period as inequitable relative to the workload distribution in other departments.

While time preparing for lectures is considered roughly equivalent regardless of the course topic, time devoted to grading, office hours, help sessions and other forms of faculty-student communication is directly proportional to class size. The average Core course size at USF is 28 students and the average “major/elective” class size is 20 students. For General Biology, the Biology Core courses, and the other service courses, the class sizes for lecture average 75-100 students each semester. Required sophomore and junior level biology courses also have significantly larger class sizes than the University norm; Cell Physiology and Genetics classes are usually 60-80 students each. Our upper division courses are typically limited to 12 students for laboratory/field courses and 15 students for lecture only courses (with the exception of Genetics and Evolution). However, we often have to add additional seats to provide for the large number of majors and undeclared science students that we have at the University. It is important to note that we accommodate student demand to whatever extent possible, and that our mean class sizes in upper division courses are consistently higher than for the other laboratory science departments (Chemistry, Environmental Science and Physics) (see Appendix F for supporting data).

In the past five years, high (and sometimes unexpected) student demand for upper division courses has resulted in Biology faculty frequently taking on “overloads” with extra lab sections or additional teaching assignments that increase their contact hours with students beyond the level stipulated by the contract. For example, in Fall 2006 we have five faculty teaching overloads. Three of these are courses with extra lab sections added. In most cases faculty receive remuneration for this extra workload, in a few instances the extra workload will be counted toward future semester obligations, and some faculty volunteer their time and do not receive any compensation. As discussed below in the planning section, we have several proposed actions to address this specific problem of too many students and not enough courses and faculty.

It should be noted that despite the fact that it has become a significant challenge for faculty to provide the one-on-one student-teacher interaction on which we pride ourselves at USF, the Biology faculty feel that we do successfully manage to find ways to interact with and form strong bonds with many of our students. We also provide many opportunities for students to learn biology outside of a traditional classroom. As mentioned above, Biology faculty members supervise numerous graduate and undergraduate research projects; and we serve as faculty advisors for a number of student science clubs (see below).

One of the unique aspects of workload for Biology faculty is time spent preparing for teaching activities in laboratory and field courses. There are no support staff to assist with laboratory preparation for upper division courses. The required level of effort varies significantly from course to course. Biology faculty have to submit the orders for course supplies; prepare solutions, reagents, equipment, instruments, and demo experiments for each lab course; and are responsible for travel arrangements, ticket purchases and gear for field trips. After the lab, faculty are responsible for breakdown and clean up. With the exception of General Biology and most service courses (e.g., anatomy, physiology and microbiology), laboratory sections are “prepped” and taught directly by a faculty member without any teaching assistants.

Added to our teaching workload is the fact that the Biology faculty are the primary caretakers of laboratory and field instruments and equipment. Many of these items are used for both teaching and research activities. Fortunately, we also have the part-time assistance of two very competent, but highly overworked instrument technicians from the Chemistry Department. However, it has become increasingly difficult for them to address all of our

needs. (For example, the yearly summer “overhaul” of our teaching microscopes, which includes cleaning, repairs, and preventative maintenance in preparation for the upcoming academic year, did not take place over the summer in 2006.)

The department chair has significant additional administrative duties and receives a 3-unit release from teaching per semester (more detail below under governance). The chair of the Pre-Professional Health Committee is a biology faculty member and this position also has a high workload above and beyond what is formally recognized by the University (more detail on the responsibilities of both of these positions is presented in following sections).

## Research

Of the 30 units of workload per year contracted by each faculty member, six units are allotted for the pursuit of scholarly research. While there is little time for research activities during the academic year, the majority of Biology faculty members have research programs in fields as diverse as the UV photobiology of marine organisms, transcriptional regulation in breast cancer, population genetics, viral immune evasion, animal behavior, and parasite-host interactions. The University has several programs that provide faculty with an opportunity to apply for institutional research support. These include the Faculty Development Fund and the Lily Drake Cancer Research Fund. Biology Faculty have taken full advantage of these resources to obtain funding for research supplies and equipment, student stipends and travel to meetings. In addition, our faculty apply for and receive external funding from the National Institutes of Health and the National Science Foundation. We also publish in a wide variety of peer-reviewed journals as evidenced by the publication lists in individual *curricula vitae* (see Appendix A).

## Service

By contract, faculty are expected to devote the equivalent of three units each semester to service activities. Biology faculty members are dedicated to providing quality service to the community, the University, our colleagues, and our students.

### A. Committees

At USF, Biology faculty serve on a wide array of committees, including the College Curriculum Committee, the Science Peer Review Committee, the Joint University-Library Advisory Committee, the Faculty Development Fund Committee, the Valedictorian and Dean’s Medal Selection Committees, the Undergraduate Strategic Enrollment Council, the University of San Francisco Admissions Advisory Board, and the New Science Building Committee, just to name a few. In addition, our faculty members are active in the USF Faculty Association, two holding elected positions and providing significant leadership for the union. Biology faculty members also serve on several new faculty search committees each year and are dedicated to helping bring the best and brightest new talent to USF.

### B. Advising

One of the most important roles of Biology faculty, and perhaps the one activity that takes up the most time after teaching, is academic and career advising. We take this responsibility quite seriously and have devised and implemented a very effective advising system (see Appendix G for details).

Advising is a particularly time-intensive activity for Biology faculty, with each advisor assigned approximately 50 or more advisees. These advisees include declared Biology majors and minors, undeclared science majors (many of whom eventually declare the Biology major), and non-Biology majors and non-degree post-baccalaureate students who are completing pre-requisites for medical or dental school. While each advisor is called upon

to address student questions and concerns related to these programs, pre-health advising primarily falls upon the Chair of the Pre-Professional Health Committee (PPHC), who is a Biology faculty member.

Historically, the Chair of the PPHC, and the bulk of the Committee's activities, has been centered in the Biology Department. However, in the 1993 External Reviewer's Report, it was noted that,

*"The large number of pre-professional students adds an extra dimension to the faculty workload, as they require extra advising and letter writing and help with their applications to the professional schools. Since there is now no release time given for this, it may be appropriate to shift the administrative aspects of this work to a University office such as Academic Advising or the Dean of Students Office."*

Thus in 1995, an administrator in Academic Services took on the role of PPHC Chair, and the functions of the Committee were then carried out by him and his administrative assistant. However, the position of PPHC Chair moved back to the Biology Department in 2000, at the request of the Dean of the College. The current Chair of the PPHC is now a Biology faculty member whose responsibilities include advising undergraduate, graduate, and post-baccalaureate students seeking entrance to health professions programs; maintaining each candidate's PPHC file; scheduling practice interviews; writing the bulk of the committee letters of recommendation; sending letter packets to health professions programs; publicizing PPHC services and events; organizing the annual "Health Professions Alumni-Student Dinner" each Spring; and maintaining and assembling acceptance data for other University offices (e.g., Institutional Research, Alumni Relations, the College of Arts and Sciences, and Admissions). There is no special workload recognition provided for this service to the University.

The Chair of the Biology Graduate Admissions Committee, as well as faculty who mentor students in the Master of Science in Biology Program, provide academic and career advising for graduate students.

### *C. Other Service Contributions*

Biology faculty provide a wide variety of other services to students and the University. These include

- Writing letters of recommendation for scholarships, internships, employment, and applications to medical schools and graduate programs.
- Serving as faculty advisors to science- and career-focused student organizations and regularly attending and participating in student-centered and student-organized events.

*Beta Beta Beta National Biological Honor Society, Omicron Alpha Chapter:* Tri-Beta functions as an honor and professional society for students in the biological sciences. Its activities are designed to stimulate interest, scholarly attainment and investigation in the biological sciences, and to promote the dissemination of information and new interpretations among students of the life sciences. In addition, the Omicron Alpha chapter is a service organization.

*EnVision:* This is a student-run environmental club committed to bring environmental awareness and change to the USF community and beyond. The club activities are focused on promoting environmental sustainability on campus and the members work closely with campus food services and USF Plant Services to educate the University community on best practices for maintaining a "green" campus. EnVision sponsors the USF Earth Day celebration.

*Omicron Theta Chi Sorority:* This club is a pre-professional honor sorority established to stimulate higher academic achievement, provide service to the community, encourage friendship and cooperation among students interested in the careers in the health sciences as well as other pre-professional areas of study, and to instill loyalty and support in the University of San Francisco.

*Omicron Theta Chi Fraternity:* This is a pre-professional fraternity for students who have an interest in seeking higher degrees in areas including but not limited to medicine, law, business, and dentistry.

*USF Marine Biology Club:* Students interested in marine biology and the conservation of the oceans organized this student club. The group organizes local beach clean-ups, volunteers to help Bay Area marine ecology organizations (e.g., the Farallones Society) and plans activities such as visits to the Monterey Bay Aquarium.

*USF Women in Science:* This organization is affiliated with the National Association of Women in Science. Its mission is to support and encourage University of San Francisco's female students in their pursuit of the sciences.

- Recruiting new students for USF: Faculty are often asked by the Admissions Office, the Dean's Office, ROTC or the Athletics Department to meet with prospective students and their families. We also participate in the annual USF Phonathon, contacting admitted students who have not yet committed to attending USF and we always have at least one representative at any of the Admissions or College events to which we are invited (e.g., USF Preview Day, Major/Minor Fair).
- The Biology Department has recently created two awards for Biology majors. The Semester Awards are given out each semester to upper division Biology majors who demonstrated a high level of academic achievement in the previous semester. Three to five awards (\$500 each) are given each semester at a departmental luncheon for faculty and recipients. The Edward Kessel Award (\$1000) is given to an outstanding graduating senior based on academic achievement, service to the department and career potential. The award is presented at a dinner for graduating seniors. Awards are funded from donations to the Biology Gift Fund.
- Faculty volunteer to organize and present seminars for the Biology Department Brown Bag Lunch Seminar Series.
- Attendance at events sponsored by department-related groups (e.g., Pre-professional Health Committee events, βββ "Meet the Faculty Night", etc.).

On their own time, Biology faculty serve the community by coaching teams for the Special Olympics; mentoring disadvantaged youth; participating in numerous charity walks, runs, and marathons; aiding with local park and beach clean-up projects; giving science talks at local schools, Girl Scout events, community organizations and workshops such as the annual Expanding Your Horizons in Math and Science Workshop at Skyline College; etc.

## **Governance**

The Biology Department operates within the framework of the union contract and the policies established by the Dean's Office. We do not currently have any problems with governance within the department or with higher levels of administration. The Department has historically been a very collegial group of faculty and we are usually unanimous or easily reach consensus in making decisions on curriculum and policy.

The department Chair is elected by secret ballot and by a simple majority of full time Biology faculty members. The Chair is compensated with release time of three teaching units per semester. The Chair of the department is a member of the USF Faculty Association

(faculty union) and as such, is a true colleague to the faculty, not part of the administration. The Chair is elected for a 3-year term and provides leadership for the department. The Chair is accountable to the Dean in areas such as communication with faculty, student advising, course scheduling and staffing, budgeting, program development and review, recruitment, hiring of part time faculty, report writing, planning department functions, and approval for all student forms (e.g., course substitutions/waivers, petitions to enroll at another university, change of program, directed study registration, etc.).

The Chair determines the schedule of department meetings at the beginning of each semester, based on faculty teaching schedules. Agenda items are requested from the faculty and meetings are typically held for an hour every two-three weeks during the semester. Minutes are recorded and distributed by the Chair. The Chair also represents the department at monthly College Council and College of Science Executive Council meetings.

Unlike the situation at many institutions, where a program assistant filters all contact with the department chair, the USF Biology chair is directly accessible by phone, e-mail or a knock on the door. As a result much time is spent as an *ad hoc* advisor fielding questions from students (majors and non-majors), non-departmental faculty, administrators and the general public.

## 6. Students

### Student Demographics

USF students are typically first generation college students, working part time, and commuting as upper classmen. From 1993 to 2005, we have averaged  $237 \pm 19$  declared Biology majors each year. This number does not include an additional 150 or more students (Biology minors, undeclared majors and others) who are advised in Biology. For example, during the Fall 2006 semester we had approximately 400 students on our advising list, and over 70 of these students are undeclared majors considering Biology as their major.

During the past twelve years  $60 \pm 6$  freshmen entered USF as Biology majors each fall (Figure 2A) and  $39 \pm 9$  students graduated each year. New students have been primarily female and Asian (Figure 2B). The average SAT scores have been fairly consistent during this time with a verbal mean of  $533 \pm 7$  and a mean math score of  $553 \pm 9$ . The overall Biology student profile is similar, with 70% of declared majors female and the largest proportion Asian ( $16 \pm 7\%$ ) (Table 2). The Biology Department also has a significant number of transfer students each year, but the University has not provided data on transfers for us to analyze this group separately in this report.

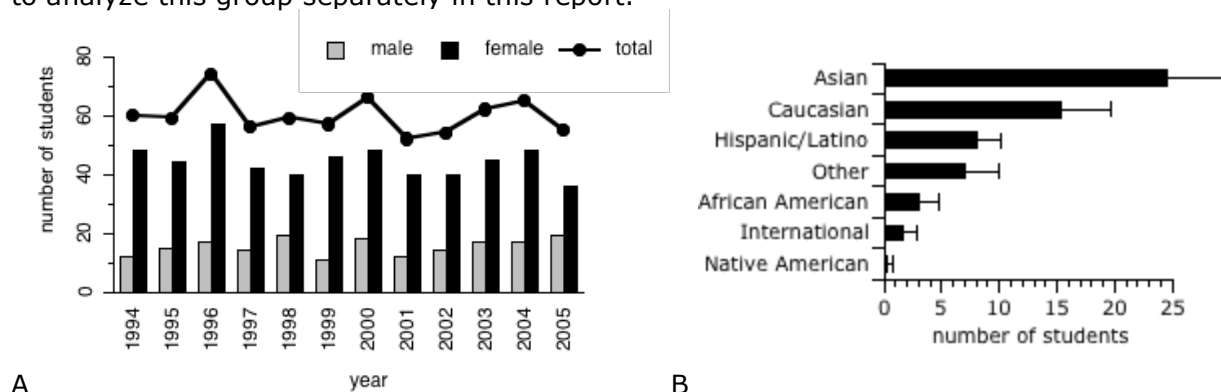


Figure 2. A. Total number of freshman, males (shaded bars) and females (solid bars) entering USF as Biology majors from Fall 1994 to Fall 2005. B. Mean ethnic make up of Biology freshman students from 1994 to 2005 (with standard deviation).

Table 2. Mean percent and standard deviation of all Biology majors (first-, second-, third- and fourth-year students) listed by sex and ethnic background, 1993-2005.

<i>Category</i>	<i>Mean percent</i>
<i>Sex</i>	
Female	70±5
Male	30±5
<i>Ethnicity</i>	
Asian	42±4
Caucasian	26±6
Other	12±3
Hispanic/Latino	12±2
International	4±1
African American	3±2
Native American	<1±0

It is difficult for us to determine how many of the students entering as freshman Biology majors are actually part of the group that graduates from USF as Biology majors. A portion (~8%) of the incoming freshman class does not successfully complete General Biology and/or General Chemistry and change to a major outside of the sciences. Our perception of these students is that they are not sufficiently prepared (whether in terms of work ethic, study skills, aptitude, or secondary school preparation) to undertake what is one of the more demanding majors at USF.

### **Student Recruitment**

Faculty members have minimal involvement in recruitment of new students. Historically, faculty members have volunteered for annual "Phonathon" evenings at which professors call accepted students who have not yet decided where to matriculate. The Biology Department did not participate in the Phonathon in Spring 2006, given that the enrollments in the major are very high and there has been no indication that this activity increases student yield. Faculty members continue to support recruitment by answering questions from prospective students and their parents via email, phone calls, and campus visits. We also accommodate special requests from the Athletics Department. When asked, we participate in any USF Admissions events on campus (even though these are most often held on weekends).

### **Student Outcomes**

Since USF Alumni Relations does not track our graduates effectively, most of our information about where students go after USF is from faculty who are keeping in touch with our alumni on a personal basis. We have a reasonably high success rate of students applying and being accepted to medical school (68±12% over the past ten years) and this information is readily available from the PPHC. Below are a few examples of the kinds of careers our Biology alumni undertake:

- Medical and other health professions programs (see Appendix H)
- Laboratory research positions at universities, research institutes, pharmaceutical and biotechnology companies, government agencies
- Masters and Ph.D. programs
- Various non-science professions

## 7. Current Resources

As mentioned above, staffing and space were the primary concerns during the last program review in 1993 and these continue to be our major challenges in 2006 and the foreseeable future. Below is a summary of our current situation.

### Classroom Facilities for Lecture and Laboratory Courses

The teaching labs on the third floor of the Harney Science Center are dedicated to Biology Department courses and we have control of scheduling these rooms (Table 3). They are used primarily for our courses; but when needed and if available, have also been used for classes offered by the Chemistry Department and the Environmental Science Department.

Table 3. Teaching laboratory space in the Harney Science Center that is scheduled by the Biology Department. (During Fall 2006, 606 students enrolled in 17 different courses were taught in these rooms.)

<i>Room number</i>	<i>Maximum student capacity</i>	<i>Room use</i>
340	16	Various upper division courses (lecture and/or laboratory) and as a meeting/seminar room
314	24	Human Physiology and Human Anatomy laboratories
322	24	Microbiology laboratories
346	24	General Biology laboratory
349	12	Biotechnology laboratory
305	9	Upper division laboratory

It is difficult to teach lecture courses in laboratories; therefore, the University assigns lecture classes to other rooms around campus. These include classrooms at Lone Mountain, the School of Education, Malloy Hall or Cowell Hall. Most of our faculty teach with multimedia presentations, so a crucial issue is availability of "smart classrooms" (those with built-in projection equipment). The University's system for supplying projection equipment to "non-smart" classrooms is unreliable and so the Department has purchased several LCD projectors for class use. Faculty carry these to classrooms.

Based on recent increased demands for Biology classes, we are faced with some severe limitations on being able to offer courses because of lack of suitable lecture and lab space. Many upper division courses do not have dedicated labs and the Biology Department has always had a problem with room assignments for field courses. The University is planning to add a wing to the science building and fund raising is underway, but actual construction will not happen for at least several years and so our short-term outlook is not good. Moreover, the focus on the new wing has severely impacted any plans for renovation or even maintenance of existing facilities in the Harney Science Center.

For the near future, the University is facing a crucial shortage of classrooms. The remodeling of one of the largest buildings on campus (Kalmanovitz Hall) has temporarily eliminated a large portion of the classroom inventory. This has impacted not only classes, but also the availability of rooms for meetings and social events. We expect that the completion of this remodeling and the eventual addition of a wing to the Harney Science Center will alleviate most of the space issues that we are dealing with now.

### **Instruments and Equipment for Research and Teaching**

Over the years the Biology Department has acquired a fair amount of equipment and instrumentation that is used for teaching and research (see Appendix I). The main issue related to instruments and equipment is lack of technical support for proper maintenance and repair.

### **Support Personnel (Lab and Office)**

The Biology Department has one program assistant who staffs the department office. This person is responsible for all of the daily operations in Biology. This includes a wide array of responsibilities to faculty, students and the University administration. People tend not to stay in this position for more than a few years and we have been very fortunate to have excellent office support in the last three program assistants. The program assistant is responsible for processing student worker personnel forms, preparing purchase orders, receiving shipments, assigning advisees, maintaining advisee files, interacting with students and department visitors, handling phone calls, distributing mail, running errands, collecting syllabi and final exams for the Dean's office, and generally assisting faculty with whatever is required. Occasionally student workers are hired to assist in the office, but that is left to the discretion of the program assistant. Given the large number of Biology majors and the number of students taught in Biology, the Biology program assistant has a much larger workload than a similar position in other science departments with much fewer students.

Two people who are housed in the Chemistry Department provide technical support to Biology. These personnel are excellent, but cannot handle all of the demands from both departments. As a result Biology faculty take on a lot of responsibility for general maintenance of equipment and instruments. The Biology department is large enough and has sufficient instrumentation to warrant at least a full time technician and its own stockroom. Moreover, the continued acquisition of very sophisticated computerized instrumentation makes it less and less likely that faculty can continue to operate on this basis (e.g., maintaining the new flow cytometer). Without sufficient and competent on site support, the University will have to consider purchasing complete service contracts from manufacturers.

### **Vehicles**

All of our field courses and some of our other courses include trips off campus. When possible, San Francisco public transportation is used to get students to field sites. The University also has a variety of vehicles for this purpose. For the most part, the current number of vehicles (four SUVs and two 9-passenger vans) and the system for reserving them is quite adequate for our purposes.

### **Computers and Technology**

The University supplies computers for all faculty and staff, as well as for teaching and research laboratories. Faculty have a choice of desktop or laptop, PC or Mac. There is a standard suite of software provided and the department purchases any special software required. Computers are on a three-year replacement cycle. The Biology Department has adequate computer resources.



## 8. Strategic Plan

### Overview

Based on this self evaluation, we have determined that our primary concerns for the Biology Program at USF are related to effectively delivering the curriculum (for majors and non-majors) while meeting contractual obligations of faculty workloads for teaching, research and service. The major challenges we face are owing to both the considerably large number of students majoring in Biology and the relatively large number of courses we have to offer for majors and non-majors. Ideally, a strategic plan to improve and strengthen the department would include a request for new faculty. However, we fully recognize (and we have been repeatedly reminded by the administration) that addition of new full time faculty is not a realistic goal given the present lack of space. There is simply no available lab or office facilities to house even one new faculty member, and no indication that the University will be re-evaluating departmental space allocations in the Harney Science Center in the near future. Therefore, we propose to adopt alternative strategies for relieving the current stress relative to demand for courses, faculty workload and limited facilities. Our plan incorporates better management of student numbers and the use of more part time faculty to teach the courses for which the department is responsible. It is expected that this approach will not only enhance faculty effectiveness and professional development, but will also have a positive impact on student success in our program.

*Note: Other science departments at USF provide courses for considerably fewer students than the Biology Department (see Appendix F) and we feel that it is important to indicate that compared to other science departments at USF, we have about the same number of faculty and amount of dedicated space.*

### Challenge 1: Insufficient Faculty to Deliver Curriculum

With increasing demand for Biology courses, we are unable to staff needed classes with existing faculty. In Fall 2006, we could have added at least three upper division courses and filled them. In addition, General Biology, the Core Biology course for non-majors and all three service courses for Nursing closed before all who wanted to enroll were able to register. A similar situation is occurring for Spring 2007 even though numbers of upper division classes and seats in lower division course were increased in anticipation of higher student demand. It should be noted that the lecture sections of lower division Biology courses range from 54-126 students, higher than the mean USF Core class size of 28 students.

#### **Proposed strategy:**

- *Hire more part time faculty*

USF has initiated a partnership with the University of California San Francisco (UCSF), which has a formal program (Preparing Future Faculty) for providing graduate students and post-doctoral researchers with resources and training for teaching. Associate Dean of Sciences, Brandon Brown, facilitated this relationship with UCSF. In Fall 2006 two graduate students and a post-doc served as lab instructors in General Biology. This pilot was extremely successful and in Spring 2006 ten people from UCSF will be lecturers and lab instructors. Increasing part time faculty will provide the means to maintain reasonable course sizes, sustain the needed diversity of courses (especially for upper division courses), and allow the Biology Department to perhaps offer more than one Core course for non-science majors each semester. Hiring PhD candidates to teach in laboratories will also improve the quality of the lab experience for our undergraduates. Moreover, the partnership with UCSF provides a valuable service by giving young scientists the opportunity to gain teaching experience in a university environment.

- *Offer intersession and summer courses*

Science departments at USF have not offered courses during intersession or summer session for over 20 years. Last summer the Chemistry Department very successfully ran the two General Chemistry courses that constitute the first year requirement for Biology students. We would like to consider offering courses outside of the traditional semester schedule to alleviate some of the high demand we have been experiencing. There is a plan to offer one of the Nursing service courses during summer 2007. Currently University policy allows supplemental income for teaching summer and intersession courses, but this teaching may not be credited towards the contractual workload. Therefore, faculty have little incentive to teach outside of the academic year. A change in workload accounting policy might make it more attractive to faculty to teach on a year-round basis.

## **Challenge 2: Academic Performance of Students**

Despite the increasing number of undergraduate applications received by USF, there has not been a perceptible increase in student preparedness or academic ability among Biology majors. We also have a continuing issue with students, especially undeclared majors, who do not do well in the freshman-level introductory courses for Biology and Chemistry. Too many of these students retake courses in an effort to progress through the Biology major and too few accept advice from faculty to change to non-science majors. As a result, there are always students with unacceptably low science grades staying in the sciences with GPAs so low (<2.0) that it is nearly impossible for them to qualify for graduation in any major within a reasonable time. Currently this issue has reached a critical stage as these students require an inordinate amount of faculty time and take up seats in courses, closing out more qualified students who are making good progress.

There is also an ethical issue: Accepting students whose preparedness we know is problematic, and implying to them that they will graduate in four years with a Biology degree, is disconcerting to our collective conscience. Yes, there are notable exceptions, but the casualties of the current process are the unprepared students.

### ***Proposed strategy:***

- *Increase pre-requisites for Biology courses and for change of major to Biology (this strategy has recently been implemented)*

Efforts to address the issue of poorly performing students who are enrolled at USF have included a gradual increase in grade pre-requisites in order to progress through the initial four courses of the Biology curriculum (General Biology I, General Biology II, Cell Physiology and Genetics). These new pre-requisites include minimum grades in the preceding Biology and Chemistry courses. We have also recently instituted a policy that identifies junior- and senior-level students with low science GPAs so that they can be appropriately advised about their options.

Students at USF are encouraged to have a declared major by the end of their sophomore year. In the past, we generally accepted any students wishing to change their major to Biology. However, we now require demonstrated success at completing at least one semester of the required courses in Biology and Chemistry. This added scrutiny of potential majors early in the student's academic career ensures that they can consider all options and still graduate within four years.

- *Apply more stringent qualifications during the University admissions process*

Faculty have no involvement with the University's admissions decisions, but we have been told that students accepted into specific science majors do need to have higher qualifications than those accepted into the Arts and Humanities, or as undeclared

majors. It may be useful to review the eligibility requirements being used by the Admission Office in order to adjust them accordingly.

- *Restrict the re-taking of Biology courses at other institutions*

In the past, the department has been quite accommodating in allowing students to re-take courses (for which they did not achieve the required grade at USF) at other institutions, in effect making an exception to the University policy that all courses for the major must be taken at USF. Our intent was to help these students “catch up” and graduate in four years. However, in too many cases this policy has not been effective: marginal students have been able to attain required grades in courses offered elsewhere (e.g., community colleges), and yet they continue to have insurmountable problems succeeding in subsequent science courses at USF. As a result, they have persisted, to their detriment, as Biology or undeclared science majors long past the point when they should have changed to a non-science major. Since all required Biology courses are now offered every semester (General Biology I and II, Cell Physiology, Genetics, and Evolution), the department has recently implemented a policy that will be much more restrictive in allowing students to take biology courses elsewhere.

- *Implement a five-year program to provide less qualified students with a preliminary first year preparation program for the Biology major*

Some students attempting the Biology major, particularly students accepted as undeclared science majors, do very poorly in their first year and then manage to show marked improvement in re-taking the introductory courses during summer or in their second year. A number of years ago, when the University was accepting “conditional” status students, the Biology Department proposed a pre-Biology program that would provide these marginal students with the necessary training in college-level science courses so that they had a better opportunity to succeed. The drawback of this program is that it would require a five-year commitment from the student, and the current financial aid system will only support a four-year college career.

### **Challenge 3: Limited Support Personnel**

#### ***Proposed strategy:***

- *Request additional staff*

We have accepted the reality that requesting new tenure-track faculty lines is not practical; however, adding technical staff might be more plausible. A dedicated science technician who is knowledgeable about a variety of laboratory instruments and also has expertise in the computer technology incorporated into science equipment is sorely needed for both our teaching and research activities.

### **Challenge 4: Lack of Space**

Based on recent increased demands for Biology classes, we are faced with a severe limitation on being able to offer courses because of lack of suitable lecture and lab space. And despite the obvious need for new faculty, it is very unlikely that the University will approve additional tenure-track positions for Biology, primarily because we have no space to accommodate a faculty member with a research program. Moreover, current space allocations will not be re-evaluated or re-assigned.

We have no proposed strategy for this problem, other than the use of summer session for teaching classes. The current construction of Kalmanovitz Hall will provide additional lecture rooms; but, the completion of a planned new wing to the Harney Science Center is at least several years away. We feel that the administration is fully aware of the space situation and we will be relying on them to ameliorate the problem to whatever extent possible.

## Appendix A. Research Space

Table A1. Amount of space available for faculty research. Dedicated space (I) and teaching labs (II) that are also used for research are indicated in square footage.

### *I. Dedicated research space*

<i>Name</i>	<i>Room</i>	<i>Area (ft<sup>2</sup>)</i>
Paul Chien		0
Jennifer Dever	338	300
Deneb Karentz	504/506	680
Mary Jane Niles	354	270
Scott Nunes		0
Pat Schulz		0
Juliet Spencer	309B	400
Gary Stevens		0
John Sullivan	309A	500
Christina Tzagarakis-Foster	321	270

### *II. Teaching space that is also used for research activities*

<i>Name</i>	<i>Room</i>	<i>Area (ft<sup>2</sup>)</i>
Paul Chien	302	814
Mary Jane Niles	349	800
Patricia Schulz	317/319	445

## Appendix B. Faculty Abbreviated *Curriculum Vitae*

### **TIMOTHY J. BRADY, Assistant Professor of Biology**

Telephone: (415) 422-5741

E-mail: brady@usfca.edu

### **EDUCATION**

- 1996 Ph.D., Biological Sciences, University of California (Berkeley, California)
- 1987 M.S., Botany, University of Washington (Seattle, Washington)
- 1984 B.S., Botany, University of Washington (Seattle, Washington)
- 1984 B.A., with Distinction in Anthropology, University of Washington (Seattle, Washington)

### **PROFESSIONAL EXPERIENCE**

- 1999 -present Assistant Professor, University of San Francisco, Department of Biology
- 1997-99 Lecturer, University of California, Berkeley  
Department of Integrative Biology
- 1997-99 Study Group Leader, Student Learning Center  
University of California, Berkeley
- 1991-96 Graduate Student Instructor, University of California, Berkeley  
Department of Integrative Biology
- 1989-90 Adjunct Instructor, Clark Community College, Vancouver, Washington  
Department of Biology,
- 1987 Graduate Student Instructor, University of Washington, Seattle  
Department of Biology

### **SELECTED PUBLICATIONS**

**Brady, T. J.** 2001. The significance of population successional status to the evolution of seedling morphology in *Pinus contorta* var. *latifolia* (Pinaceae). *Madroño* 48:138-151.

**Brady, T. J.** 1998. Japanese umbrella pine: when a leaf isn't a leaf. *American Conifer Society, Bulletin* 15:110-111.

**Brady, T. J.** 1998. New Caledonia's parasitic conifer. *American Conifer Society, Bulletin* 15:25-26.

**Brady, T. J.** 1997. The redwood: a relict's life in a foggy world. *American Conifer Society, Bulletin* 14:166-167.

Keyser, J. D., and T. J. **Brady**. 1993. A war shirt from the Schoch Collection: documenting individual artistic expression. *Plains Anthropologist* 38:5-20.

**Brady, T. J.** 1989. The influence of flotation on the rate of recovery of wood charcoal from archaeological sites. *Journal of Ethnobiology* 9:207-227.

**Brady, T. J.** 1988. The morphometry of pollen grains: extraction of landmark coordinates. *Pollen et Spores* 30:485-495.

### **SOCIETY MEMBERSHIPS**

- American Association for the Advancement of Science
- American Society of Naturalists
- Association for Biology Laboratory Education
- California Botanical Society
- Society of American Foresters

## **HONORS AND AWARDS**

- 1999 Faculty Development Fund Research Grant, University of San Francisco
- 1994-95 Teaching Effectiveness Award, University of California, Berkeley
- 1994-95 Phi Beta Kappa, Alpha of California, Scholarship
- 1994 Sigma Xi Grant-in-Aid of Research, Berkeley Chapter
- 1993-94 Outstanding Graduate Student Instructor Award, University of California, Berkeley
- 1993 Provost's Research Fund Grant, University of California, Berkeley
- 1991 Certificate of Merit, USDA Forest Service
- 1990 National Award for Excellence, USDA Forest Service
- 1986 Conservation and Research Foundation Grant
- 1984 Sigma Xi Grant-in-Aid of Research, National Office
- 1984 Mazamas Research Grant
- 1984 Elected to Phi Beta Kappa, University of Washington
- 1984 Departmental Honors in Anthropology, University of Washington

**Paul Chien, Professor**

Telephone: (415) 422-6345

E-mail: [chienp@usfca.edu](mailto:chienp@usfca.edu)

**EDUCATION**

- 1971-73 Post-Doctoral Fellow, Environmental Engineering  
Kerckhoff Marine Laboratory, California Institute of Technology
- 1971 Ph.D., Marine Biology, University of California (Irvine, California)
- 1964 B.S., Botany, The Chinese University of Hong Kong (Hong Kong)
- 1962 B.S., Chemistry, Chung Chi College (Hong Kong)

**PROFESSIONAL EXPERIENCE**

- 1973- 1978 Assistant Professor, University of San Francisco, Department of Biology
- 1973-1979 Consultant, Marine Food and Energy Farm Project  
Kerckhoff Marine Laboratory, California Institute of Technology
- 1978-1984 Associate Professor, University of San Francisco
- 1984-present Full Professor, University of San Francisco
- 1985-1987
- 1995-1997 Chairman, Department of Biology, USF
- 1992-1993 Radio Forum Professor, KUSF-FM 90.3
- 1999 Arthur Furst Research Award, USF

Named Visiting or Honorary Professor of:

1. North Sichuan Medical College; Nanchong, China
2. Suzhou Institute of Urban Construction & Environmental Protection
3. East China Normal University, Shanghai
4. Second Military Medical University, Shanghai
5. Liaoning Normal University, Dalian
6. Jinan University, Guangzhou
7. Ninbo University, Ninbo
8. Harbin Normal University, Harbin

**SELECTED RECENT PUBLICATIONS AND PRESENTATIONS:**

1. Paul **Chien**, Esther Chow and Chi-Hang Lee (Oct 2004)  
Translated: Three Views on Creation and Evolution  
By J. P. Moreland and John Mark Reynolds eds., into Chinese  
Campus Crusade Press, Hong Kong
2. Stephen C. Meyer, Marcus Ross, Paul Nelson, and Paul **Chien**, 2004  
"The Cambrian Explosion: Biology's Big Bang" pp. 323-418, in  
Darwinism, Design, and Public Education eds. John Angus Campbell and  
Stephen C. Meyer, Michigan State University Press
3. Paul **Chien** (Oct 2004 translated into Chinese)  
"The English and American Bible" Chapter 6 in  
The Bible Its Translators and Their Sacrifices  
World Knowledge Press, Beijing
4. Paul **Chien** (May 2005 in Chinese)  
"Creation and Evolution", Part 3, Chapter 14 in  
100 Lessons to Equip the 21<sup>st</sup> Century Christians,  
Judy Huang ed.  
Chinese Coordination Centre of World Evangelism, Hong Kong

5. Paul Chien (2005– 2006)

Invited Lectures given in China at:

Beijing Normal University

Harbin Normal University,

Harbin Institute of Technology

Harbin College

Hei Long Jiang University

Jilin University.

Nanjing University

Zhejiang University

Ninbo University

China Youth Political University

Wanzhou University

South China Normal University

**PROFESSIONAL ACTIVITIES**

1975- Director, Western District II, Beta Beta Beta Biological Honor Society

*Have served as a reviewer of grant proposals or manuscripts for the following agencies, organizations and journals:*

The Templeton Foundation

Zhejiang University Press

Faith Rock Press, Beijing



**Jennifer A. Dever, Assistant Professor**

***EDUCATION***

2000 Ph.D., Zoology, Texas Tech University (Lubbock, TX)  
1994 M. A., Biology, Ball State University (Muncie, IN)  
1992 B. S., Natural Resources, Ball State University (Muncie, IN)

***PROFESSIONAL EXPERIENCE***

2002 – present Assistant Professor, University of San Francisco, Department of Biology  
2006 – present Research Associate of the California Academy of the Sciences  
2000 – 2002 Assistant Professor, Lander University, Biology Department

***TEACHING RESPONSIBILITIES***

***Courses Taught***

Conservation Biology – Spring 2006, 2005, 2004 and 2003  
Herpetology – Fall, 2005, 2004 and 2003  
Female Biology – Fall, 2005  
Principles of Genetics – Spring 2005, 2004 and Fall 2002  
Principles of Biology I – Fall, 2004  
Introductory Biology – Fall, 2003 and 2002

***MAJOR SERVICE CONTRIBUTIONS TO THE UNIVERSITY***

***To the Department***

- Chair, Graduate Program, 2003 – Present
- Search Committee, Molecular Biology, 2004
- Search Committee, Microbiology, 2003

***To the University***

- Co-Creator, Organizer and Implementer, Teaching Assistantship Workshop, 2003 – Present: Assist in the development and presentation of an annual workshop for incoming graduate Teaching Assistants.
- Member, Policy Board Committee, 2003 – Present
- Science Grievance Representative, Policy Board, 2005 - Present
- Co-Chair, Working Group Three, WASC Task Force Educational Effectiveness Review, Theme I, 2005 - Present
- Member, University Life Committee of the Board of Trustees, 2004 – Present
- Mentor, New Faculty Member, 2005 – Present

**SELECTED PUBLICATIONS**

**Dever, J. A., T. Thin, and A. K. Shein.** (in prep) A new species of *Amolops* (Anura: Ranidae) from Myanmar (Burma). Proceedings of the California Academy of Sciences.

**Dever, J. A.** (in press) Fine-scale genetic structure in the threatened Foothill Yellow-legged Frog (*Rana boylii*). *Journal of Herpetology*.

Ray, D. A., J. A. **Dever**, S. G. Platt, T. R. Rainwater, A. G. Finger, S. T. McMurry, M. A., Batzer, B. Barr, P. J. Stafford, J. McKnight, and L. D. Densmore (2004). Low Levels of Nucleotide Diversity in *Crocodylus moreletii* and Evidence of Hybridization with *C. acutus*. *Conservation Genetics* 5(4):449-462.

**COURSES TAUGHT AT USF**

Principles of Biology, General Biology I, Genetics, Herpetology, Conservation Biology & Female Biology

## **Deneb Karentz, Professor**

### **EDUCATION**

- 1982 Ph.D., Biological Sciences, University of Rhode Island (Kingston, Rhode Island)
- 1976 M.S., Botany and Plant Pathology, Oregon State University (Corvallis, Oregon)
- 1973 B.S., Biology, University of Rhode Island (Kingston, Rhode Island)

### **PROFESSIONAL EXPERIENCE**

- 1997-present Professor, Department of Biology and Department of Environmental Science  
University of San Francisco
- 2006-present, 2003-2004, 1998-2001 Chair, Department of Biology, USF
- 2004-present Visiting Professor, Department of Dermatology  
Comprehensive Cancer Center, University of California San Francisco
- 2001-2003 Associate Program Manager, Antarctic Biology and Medicine  
Office of Polar Programs, U.S. National Science Foundation
- 1992-1997 Associate Professor, Departments of Biology and Environmental Science, USF
- 1987-1992 Research Biologist, Laboratory of Radiobiology and Environmental Health  
University of California San Francisco
- 1983-1986 National Research Service Award Post-Doctoral Fellow, Laboratory of  
Radiobiology and Environmental Health, University of California San Francisco
- 1982-1983 Research Biologist, School of Oceanography, University of Rhode Island

### **COURSES TAUGHT AT USF**

Biology and Writing, General Biology I, Cell Physiology, Oceanography, Biology Graduate Seminar, Environmental Science I, Environmental Monitoring, Climate Change: Global Processes and Ecological Perspectives, Master's Project in Environmental Management

### **EXAMPLES OF SERVICE AT USF**

*Committee membership:* Natural Science General Education Curriculum Committee, Writing Across the Curriculum Committee, Science Scholarship Committee, multiple Faculty Search Committees, Admissions Advisory Board, Strategic Enrollment Faculty Task Force, Strategic Enrollment Council for Undergraduate Admissions, Writing Retreat Selection Committee, College Council, College of Science Executive Committee, Task Force on the USF Student Information Systems

*Other service:* department chair, supervise directed research for Biology and Environmental Science undergraduates, student clubs (EnVision, Marine Biology) faculty advisor, guest lecturer for a variety of courses and student organizations, participant in Admissions events for prospective and admitted students, Phonathon to prospective students, presenter of Transfer Student Pre-Advising Workshop each semester, Panel member at the Research Opportunities in Science Luncheon, presentations at the Faculty Development Workshops, etc.

### **SELECTED PUBLICATIONS (total = 55)**

Cleaver, J.E, E. Hefner, R.R. Laposa, D. **Karentz**. In press. Cockayne syndrome exhibits dysregulation of p21 and other gene products that may be independent of transcription coupled repair. *Neuroscience* (Special issue on Genomic Instability and DNA Repair in Brain Ageing and Neurological Disease). doi:10.1016/j.neuroscience.2006.08.074

- Ruelas, D.S., D. **Karentz** and J.T. Sullivan. 2006. Lethal and sub-lethal effects of UVB on juvenile *Biomphalaria glabrata* (Mollusca: Pulmonata). *Journal of Invertebrate Pathology* 93:192-200.
- Karentz**, D., I. Bosch, D.M. Mitchell. 2004. Limited effects of Antarctic ozone depletion on sea urchin development. *Marine Biology* 145: 277-292.
- Karentz**, D. 2001. Chemical defenses of marine organisms against solar radiation exposure: UV-absorbing mycosporine-like amino acids and scytonemin. pp. 481-520. In J. McClintock and W. Baker, eds., *Marine Chemical Ecology*. CRC Press, Inc. Boca Raton, Florida.
- Carefoot, T.H., D. **Karentz**, S. C. Pennings and C.L. Young. 2000. Distribution of mycosporine-like amino acids in the sea hare *Aplysia dactylomela*: effect of diet on amounts and types sequestered over time in tissues and spawn. *Comparative Biochemistry and Physiology Part C* 126:91-104.
- Subramaniam, A., E.J. Carpenter, D. **Karentz**, P.G. Falkowski. 1999. Optical properties of the marine diazotrophic cyanobacteria *Trichodesmium* spp. I - absorption and spectral photosynthetic characteristics. *Limnology and Oceanography* 44:608-617.
- Karentz**, D., W.C. Dunlap and I. Bosch. 1997. Temporal and spatial occurrence of UV-absorbing mycosporine-like amino acids in tissues of the Antarctic sea urchin *Sterechnus neumayeri* during springtime ozone depletion. *Marine Biology* 129:343-354.
- Karentz**, D., M.L. Bothwell, R.B. Coffin, A. Hanson, G.J. Herndl, S.S. Kilham, M.P. Lesser, M. Lindell, R.E. Moeller, D.P. Morris, P.J. Neale, R.W. Sanders, C.S. Weiler and R.G. Wetzel. 1994. Impact of UVB radiation on pelagic freshwater ecosystems: report of working group on bacteria and phytoplankton. *Archiv für Hydrobiologie, Ergebnisse der Limnologie* 43:31-69.
- Smith, R.C., B.B. Prézelin, K.S. Baker, R.R. Bidigare, N.P. Boucher, T. Coley, D. **Karentz**, S. MacIntyre, H.A. Matlick, D. Menzies, M. Ondrusek, Z. Wan and K.J. Waters. 1992. Ozone depletion: ultraviolet radiation and phytoplankton biology in Antarctic waters. *Science* 255:952-959.
- Cleaver, J.E. and D. **Karentz**. 1987. DNA repair in man: regulation by a multi-gene family and relationship to human disease. *BioEssays* 6:122-127.
- Karentz**, D. and T.J. Smayda. 1984. Temperature and seasonal occurrence patterns of 30 dominant phytoplankton species in Narragansett Bay over a 22-year period (1959-1980). *Marine Ecology - Progress Series* 18:277-293.

## HONORS

- 1999 Distinguished Research Award, University of San Francisco
- 1993 Arthur Furst Award for Outstanding Research Advancing Science for the Betterment of Humanity, University of San Francisco
- 1992 Luigi Provasoli Award for Outstanding Paper in the Journal of Phycology (1991-1992) from the Phycological Society of America
- Karentz**, D., J.E. Cleaver and D.M. Mitchell. 1991. Cell survival characteristics and molecular responses of Antarctic phytoplankton to ultraviolet-B radiation exposure. *Journal of Phycology* 27:326-341.
- 1987 Research article selected for inclusion in the Yearbook of Cancer
- Karentz**, D. and J.E. Cleaver. 1986. Repair-deficient xeroderma pigmentosum cells made UV-resistant by fusion with X-ray-inactivated Chinese hamster cells. *Molecular and Cellular Biology* 6:3428-3432.

**Leslie A. King, Instructor**

415.422.5704

email: kingle@usfca.edu

**EDUCATION**

M.A., Biology, San Francisco State University; 1993.

B.S., Zoology, University of California, Davis; graduated *cum laude*, 1989.

**PROFESSIONAL EXPERIENCE****Biology Instructor and Laboratory Coordinator, University of San Francisco,****1992 - 2000; 2002 - present**

Bioinformatics Technician, University of California, San Francisco, 2001

SAT Preparation Course Instructor, Ivy West Educational Services/Foothill College, 1999

Instructor, California Academy of Sciences/Steinhart Aquarium, Golden Gate Park, 1992

Laboratory Instructor, Human Biology, San Francisco State University, 1990 - 1992

Graduate Teaching Assistant, Ichthyology, San Francisco State University, 1989 - 1990

**PUBLICATIONS**

Stryke D., Kawamoto M., Huang C.C., Johns S.J., **King** L.A., Harper C.A., Meng E.C., Lee R.E., Yee A., L'Italien L., Chuang P.T., Young S.G., Skarnes W.C., Babbitt P.C., Ferrin T.E. 2003. BayGenomics: a resource of insertional mutations in mouse embryonic stem cells. *Nucleic Acids Res.* Jan 1;31(1):278-281.

**Rat specimen preparation and dissection for:**

Marieb, E.N. 2001. Exercise 2, Organ Systems Overview. In *Human Anatomy Laboratory Manual with Cat Dissections, Third ed.* San Francisco: Benjamin Cummings, an imprint of Addison Wesley Longman, Inc.

**King**, L.A. 1994. Adult and fetal hemoglobins in the oviparous swell shark, *Cephaloscyllium ventriosum*. *Comp. Biochem. Physiol.* 109B(2-3): 237-243.

**King**, L.A. and A.J. Arp. 1992. Adult and fetal hemoglobins in the shark *Cephaloscyllium ventriosum*. *Amer. Zool.* 32: 55A.

**PROFESSIONAL ACTIVITIES****Service to the Biology Department**

Assistant Coordinator, USF Biology Department "Day of Discovery" (designed by Prof. Juliet Spencer), Fall 2004 and Spring 2005

Speaker, "Talks With Faculty" series sponsored by USF Chapter of Tri Beta National Biological Honor Society, 2000

Faculty Search Committee, Natural Science, 1999

Speaker, USF Biological Career Exposition sponsored by the USF Chapter of Tri Beta National Biological Honor Society, 1998

### **Service to the University**

Faculty Site Leader and Organizer, Service-Learning Project for New Student Orientation, 2006

USF Phonathon, 2005

Term Faculty Task Force, 2004

Co-Creator, Organizer and Implementer, Graduate Teaching Assistantship Workshop, 2003 – Present

Summer advising, 1998-2000; 2002-present

### **Service to the Community**

Active Member, San Francisco Road Runners Club; involved in shoe donation program for the homeless community, 2005-present

Volunteer, San Francisco School Volunteers; Raoul Wallenberg High School, San Francisco; tutored high school students in reading, 1999-2000

**Mary Jane Niles, Professor**

Telephone: (415) 422-2354

E-mail: [niles@usfca.edu](mailto:niles@usfca.edu)

**EDUCATION**

- |      |  |
|------|--|
| 1992 | Ph.D., Immunology<br>University of California at Berkeley (Berkeley, CA)               |
| 1985 | B.S., Cell and Molecular Biology<br>San Francisco State University (San Francisco, CA) |
| 1978 | Diploma, Nursing<br>Binghamton General Hospital School of Nursing (Binghamton, NY)     |

**PROFESSIONAL EXPERIENCE**

- |              |   |
|--------------|---|
| 2005-present | Professor, University of San Francisco<br>Department of Biology                                       |
| 1998 – 2005  | Associate Professor, University of San Francisco<br>Department of Biology                             |
| 1992 – 1998  | Assistant Professor, University of San Francisco<br>Department of Biology                             |
| 1978 – 1986  | Registered Nurse, Garden Sullivan Hospital of California Pacific Medical<br>Center, San Francisco, CA |

**PUBLICATIONS**

**Niles, M.J. L. Matsuuchi, and M. E. Koshland.** 1995. Polymer IgM Assembly and Secretion in Lymphoid and Nonlymphoid Cell Lines: Evidence that J Chain is Required for Pentamer IgM Synthesis. *Proceedings of the National Academy of Sciences*, 92: 2884-2888

*Textbook Authorships and Contributions*

"The Immune System" in Biology, 7th edition. 2005. N. Campbell and J. Reece, The Benjamin Cummings Publishing Co., Inc.

Alexander, S., D. Strete, and M.J. **Niles**. 2003. Laboratory Exercises in Organismal and Molecular Microbiology. McGraw-Hill Higher Education.

**Niles, M.J.** Instructor's Manual for Laboratory Exercises in Organismal and Molecular Microbiology. 2003. McGraw-Hill Higher Education. Available at [www.mhhe.com/alexander1e](http://www.mhhe.com/alexander1e)

"The Immune System" in Human Physiology. 2002. W. Germann and C. Stanfield. The Benjamin Cummings Publishing Co., Inc.

"The Body's Defenses" in Biology, 6th edition. 2002. N. Campbell and J. Reece, The Benjamin Cummings Publishing Co., Inc.

"Host Response to Infection" in Microbiology: A Photographic Atlas for the Laboratory. 2000. S. Alexander and D. Strete. Addison Wesley Publishing, Inc.

"The Body's Defenses" in Biology, 5th edition. 1999. N. Campbell, J. Reece, and L. Mitchell. The Benjamin Cummings Publishing Co., Inc.

"The Body's Defenses" in Biology, 4th edition (1996), N. Campbell. The Benjamin Cummings Publishing Co., Inc.

"Cellular Aspects of the Immune Response", in The World of the Cell, 3rd edition. 1996. W. Becker, J. Reece and M. Peonie. The Benjamin Cummings Publishing Co., Inc.

### **PROFESSIONAL ACTIVITIES**

2000 – present      Member, National Association of Advisors for the Health Professions

#### *Professional Manuscripts Reviewed Recently*

2004      Sample chapters in The Molecular Biology of Cancer Blackwell Publishing

2004      Prospectus and sample chapters in Virology by Leonard C. Norkin, ASM Press

2002      *Cells: The Living Units and the Immune System* in Human Anatomy and Physiology, 5e, the Benjamin Cummings Publishing Company, Inc.

### **INTRAMURAL GRANTS**

2001      Measuring the Activity of Sulfhydryl Oxidase Isolated from an Immunoglobulin (Ig)M-Secreting Mouse Hybridoma. Lily Drake Cancer Research Fund

2001      Measuring the Activity of Sulfhydryl Oxidase Isolated from an Immunoglobulin (Ig)M-Secreting Mouse Hybridoma. Faculty Development Fund

1997      Isolation and Identification of Sulfhydryl Oxidase Enzyme. Faculty Development Fund

1997      Cytosolic and Nuclear Localization of NF-AT by Immunoelectron Microscopy. Lily Drake Cancer Research Fund



## **SCOTT NUNES, Associate Professor**

### **EDUCATION**

1997      Ph.D., Zoology, Michigan State University, East Lansing, MI  
1986      B.A., Biology, University of California, Santa Cruz, CA

### **PROFESSIONAL EXPERIENCE**

2006 -present    Associate Professor, University of San Francisco, Department of Biology  
2000 – 2006    Assistant Professor, University of San Francisco, Department of Biology  
1999 – 2000    Research Associate, University of Nebraska at Omaha, Department of Psychology  
1998 – 1999    Research Associate, Michigan State University, Department of Zoology

### **TEACHING RESPONSIBILITIES**

*General Biology I*  
Biology of Human Aging with Laboratory  
Human Physiology with Laboratory  
Human Anatomy with Laboratory  
Neurobiology

### **MAJOR SERVICE CONTRIBUTIONS TO THE UNIVERSITY**

Faculty Development Committee (Co-Chair)  
Arts and Sciences Curriculum Committee (Co-Chair)  
Neuroscience Advisory Board  
Search Committees in Biology, Exercise and Sport Science, and Psychology  
Gerontology Minor Organizing Committee  
Biology Graduate Committee

### **KEY PUBLICATIONS (16 of 22)**

- Nunes, S.** Dispersal and philopatry. 2007. In *Rodent Societies: An Ecological and Evolutionary Perspective* (J.O. Wolff and P.W. Sherman, eds.). University of Chicago Press, Chicago. *In Press*.
- Nunes, S., K.M. Pelz, E.-M. Muecke, K.E. Holekamp, I. Zucker.** 2006. Plasma glucocorticoid concentrations and body mass in ground squirrels: Seasonal variation and circannual organization. *General and Comparative Endocrinology* 146: 136-143.
- Nunes, S., E.-M. Muecke, Z. Sanchez, R. R. Hoffmeier, L. T. Lancaster.** 2004. Play behavior and motor development in juvenile Belding's ground squirrels (*Spermophilus beldingi*). *Behavioral Ecology and Sociobiology* 56: 97-105.
- Nunes, S., E.-M. Muecke, L.T. Lancaster, N.A. Miller, M.A. Mueller, J. Muelhaus, L. Castro.** 2004. Functions and consequences of play behavior in juvenile Belding's ground squirrels. *Animal Behaviour* 68: 27-37.
- Nunes, S., E.-M. Muecke, K.E. Holekamp.** 2002. Seasonal effects of food provisioning on body fat, insulin, and corticosterone in free-living juvenile Belding's ground squirrels (*Spermophilus beldingi*). *Canadian Journal of Zoology* 80: 366-371.

- Nunes, S.,** T.L. McElhinny, M. M. Mahoney, L. Smale. 2002. Effects of photoperiod on the reproductive condition of Nile grass rats (*Arvicanthis niloticus*) from an equatorial population. *African Journal of Ecology* 40: 295-302.
- Nunes, S.,** C. Brown, J.A. French. 2002. Variation in circulating and excreted estradiol associated with testicular activity in male marmosets. *American Journal of Primatology* 56: 27-42.
- Nunes, S.,** J. E. Fite, K.J. Patera, J.A. French. 2001. Interactions among paternal behavior, steroid hormones, and paternal experience in male marmosets (*Callithrix kuhlii*). *Hormones and Behavior* 39: 70-82.
- Nunes, S.,** J.E. Fite, J.A. French. 2000. Variation in steroid hormones associated with infant care behavior and experience in male marmosets (*Callithrix Kuhlii*). *Animal Behaviour* 60: 857-865.
- Nunes, S.,** E.-M. Muecke, H.E. Ross, P.A. Bartholomew, K.E. Holekamp. 2000. Food availability affects behavior but not circulating gonadal hormones in maternal Belding's ground squirrels. *Physiology and Behavior* 71: 447-455.
- Nunes, S.,** E.-M. Muecke, J.A. Anthony, A.S. Batterbee. 1999. Endocrine and energetic mediation of play behavior in free-living Belding's ground squirrels. *Hormones and Behavior* 36: 153-165.
- Nunes, S.,** T.R. Duniec, S.A. Schweppe, K.E. Holekamp. 1999. Energetic and endocrine mediation of natal dispersal behavior in Belding's ground squirrels. *Hormones and Behavior* 35: 113-124.
- Nunes, S.,** C.-D.T. Ha, P.J. Garrett, E.-M. Muecke, L. Smale, K.E. Holekamp. 1998. Body fat and time of year interact to mediate dispersal behavior in ground squirrels. *Animal Behaviour* 55: 605-614.
- Nunes, S.,** P.A. Zugger, A.L. Engh, K.O. Reinhart, K.E. Holekamp. 1997. Why do female Belding's ground squirrels disperse away from food resources? *Behavioral Ecology and Sociobiology* 40: 199-207.
- Smale, L., S. **Nunes, S.,** K.E. Holekamp. 1997. Sexually dimorphic dispersal in mammals: Patterns, causes, and consequences. *Advances in the Study of Behavior* 26: 181-250.
- Nunes, S.,** K.E. Holekamp. 1996. Mass and fat influence the timing of dispersal in Belding's ground squirrels. *Journal of Mammalogy* 77: 807-817.

## KEY PRESENTATIONS

- American Society of Mammalogists, June 2006:  
Influence of Prior Play Behavior and Maternal Experience on the Behavior of Female Belding's Ground Squirrels during the Breeding Period.
- University of California at Davis, April 2003:  
Play Behavior and Motor Development in Juvenile Belding's Ground Squirrels.
- Michigan State University, October 2001:  
Benefits and Consequences of Play Behavior in Juvenile Belding's Ground Squirrels.
- Michigan State University, April 2001:  
Physiological Foundations of Behavior in Ground Squirrels and Marmosets.

**Patricia J. Schulz, Professor**

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### **EDUCATION**

- 1966 Ph.D., Botany  
University of California, Berkeley, California
- 1962 M.S., Biological Sciences  
Fordham University, New York City
- 1959 B.A., Biological Sciences  
Dominican University, River Forest, Illinois

### **PROFESSIONAL EXPERIENCE**

- 1989–present Professor, University of San Francisco  
Department of Biology
- 1982–1989 Associate Professor, University of San Francisco  
Department of Biology
- 1978–1982 Assistant Professor, University of San Francisco  
Department of Biology
- 1974–1978 Visiting Associate Professor of Botany, University of California, Berkeley, CA,  
Department of Botany
- 1972–1974 Associate Professor, Dominican University, River Forest, IL  
Department of Biology
- 1966–1971 Assistant Professor, Dominican University, River Forest, IL  
Department of Biology

### **MAJOR PUBLICATIONS**

- Cross, J. W. and P. J. **Schulz**. 1997. Chemical induction of male sterility. In: *Pollen Biotechnology for Crop Production and Improvement*. K. R. Shivanna and V. K. Sawhney, Editors. Cambridge University Press, Cambridge, The United Kingdom.
- Schulz**, P.J., J.W. Cross and E. Almeida. 1993. Chemical agents that inhibit pollen development: effects of the phenylcinnoline carboxylates SC-1058 and SC-1271 on the ultrastructure of developing wheat anthers (*Triticum aestivum* L. var. Yecora rojo) Sex. Plant Reprod. 6:108-121.
- Schulz**, P. and W.A. Jensen. 1986. Prefertilization ovule development in *Capsella*: the dyad, tetrad, developing megaspore and two-nucleate gametophyte. Can. J. Bot. 64:875-884.
- Schulz**, P. and W.A. Jensen. 1981. Prefertilization ovule development in *Capsella*: ultrastructure and ultracytochemical localization of acid phosphatase in the meiocyte. Protoplasma 107: 27-45.
- Jensen, W.A., P. **Schulz** and M.A. Ashton. 1977. An ultrastructural study of early endosperm development and synergid changes in unfertilized cotton ovules. Planta (Berl.) 133: 179-189
- Schulz**, P. and W.A. Jensen. 1977. Cotton embryogenesis: the early development of the free nuclear endosperm. Amer. J. Bot. 64:384-394.

- Schulz**, P. and W.A.Jensen. 1974. *Capsella* embryogenesis: the development of the free nuclear endosperm. Protoplasma 80:183-205.
- Schulz**, P. and W.A. Jensen. 1973. *Capsella* embryogenesis: the central cell. J. Cell Sci. 12: 741-763.
- Schulz**, P. and W.A. Jensen. 1971. *Capsella* embryogenesis: the chalazal proliferating tissue. J. Cell Sci. 8: 201-227.
- Schulz**, P. and W.A. Jensen. 1969. *Capsella* embryogenesis: the suspensor and the basal cell. Protoplasma 67: 139-163.
- Schulz**, P. and W.A. Jensen. 1968. *Capsella* embryogenesis: the early embryo. J. Ultrastruc. Res. 22: 376-392.
- Schulz**, P. and W.A. Jensen. 1968. *Capsella* embryogenesis: the egg, zygote and young embryo. Amer. J. Bot. 55: 807-819.
- Schulz**, P. and W.A. Jensen. 1968. *Capsella* embryogenesis: the synergids before and after fertilization. Amer. J. Bot. 55: 541-552.

## **PROFESSIONAL ACTIVITIES**

### **University Committee Memberships and Advisorships**

Davies Committee, University of San Francisco Peer Review Committee for the Sciences, Pre-Professional Health Committee, Faculty Advisory Committee to the Lane Center for Catholic Studies and Catholic Social Thought, Dean's Medal Committee; Faculty Advisor to Alpha Sigma Nu (National Jesuit Honor Society) and Omicron Theta Chi Pre-Professional Sorority.

### **Manuscript and Grant Reviewer**

American Journal of Botany  
Canadian Journal of Botany  
National Science Foundation

## **SOCIETY MEMBERSHIPS**

Microscopy Society of America  
American Association for the Advancement of Science  
American Institute for Biological Sciences  
Northern California Society for Microscopy  
Center for Theology and the Natural Sciences

## **HONORS AND AWARDS**

1961-1966 National Science Foundation Pre-Doctoral Fellowship  
1981-1982 National Science Foundation Grant PCM-8018484 (\$10,000)  
2003 Sarlo Prize for Teaching and Service

## **JULIET V. SPENCER, Assistant Professor**

### ***Education***

1998      Ph.D., Microbiology, University of Virginia (Charlottesville, VA)  
1993      B.S., Biotechnology, Worcester Polytechnic Institute (Worcester, MA)

### ***Professional Experience***

2003 - present    Assistant Professor, University of San Francisco  
                         Department of Biology  
2002 – 2004      Adjunct Professor, Department of Natural Sciences, University of California  
                         at Santa Cruz-Extension, Cupertino, CA  
2002 - 2003      Senior Scientist, Ceretek, LLC, South San Francisco, CA  
2001 - 2002      Scientist, Ceretek, LLC, South San Francisco, CA  
2000 – 2001      Senior Postdoctoral Fellow, ChemoCentryx, Inc., MountainView, CA  
1998 – 2000      Research Associate Professor, University of Virginia, Department of  
                         Microbiology  
1995 – 1997      Instructor, Piedmont Virginia Community College, Department of Natural  
                         Sciences, Charlottesville, VA

### ***Teaching Responsibilities***

BIOL 105 General Biology  
BIOL 212 Cell Physiology  
BIOL 341 Medical Microbiology  
BIOL 342 Medical Microbiology Lab  
BIOL 346 General Microbiology  
BIOL 347 General Microbiology Lab  
BIOL 370 Biology of Cancer

### ***Major Service Contributions to the University***

Faculty Advisor, USF Women in Science  
Academic Advisor to 43 students  
Dean's Medal Committee  
New Science Building Committee  
Chemistry Faculty Search Committee (2005-2006)  
Graduate Thesis Committees (7 students in Biology and Chemistry)

### ***Key Publications***

**Spencer, J.V.** 2006. cmvIL-10 requires Phosphatidylinositol 3-Kinase Activity for Inhibition of Cytokine Synthesis in Monocytes. *J. Virol.*, *in press*.

**Spencer, J.V.** and S.K. Wong. 2006. Animation of Peptidoglycan Synthesis in Gram-positive Bacteria and Inhibition by Antibiotics. ASM MicrobeLibrary, in press.

**Spencer, J. V.** 2006. Deadly Diseases and Epidemics: Cervical Cancer. Chelsea House Publishers: New York, NY.

**Spencer, J.V.** 2005. Deadly Diseases and Epidemics: Herpes. Chelsea House Publishers: Philadelphia, PA.

Huang, M-C., M. Graeler, G. Shankar, J.V. **Spencer**, and E.J. Goetzl. 2002. Lysophospholipid mediators of immunity and neoplasia. *Biochim. Biophys. Acta* **1582**:161-7.

**Spencer, J. V.,** K.M. Lockridge, P.A. Barry, G. Lin, M. Tsang, M.E.T. Penfold, and T.J. Schall. 2002. Potent immunosuppressive activities of cytomegalovirus encoded interleukin-10. *J. Virol.* **76**:1285-1292.

**Spencer J.V.** and Braciale T.J. 2000. Incomplete CD8<sup>+</sup> T Lymphocyte Differentiation as a Mechanism for Subdominant CTL Responses to a Viral Antigen. *J. Exp. Med.* **191**:1687-1698.

**Spencer, J.V.** 1998. Structure and Assembly of the Herpes Simplex Virus Capsid. Ph.D. thesis, published by the University of Virginia, Charlottesville, VA.

**Spencer, J.V.,** W.W. Newcomb, D. R. Thomsen, F.L. Homa, and J.C. Brown. 1998. Assembly of the Herpes Simplex Virus Capsid: Preformed Triplexes Bind to the Nascent Capsid. *J. Virol.* **72**:3944-3951.

**Spencer, J.V.,** F.P. Booy, B.L. Trus, A.C. Steven, W.W. Newcomb, and J.C. Brown. 1997. Structure of the Herpes Simplex Virus Capsid: Peptide A862-H880 is Displayed on the Rim of the Capsomer Protrusions. *Virology* **228**: 229-235.

Newcomb, W.W., F.L. Homa, D.R. Thomsen, F.P. Booy, B.L. Trus, A.C. Steven, J.V. **Spencer**, and J.C. Brown. 1996. Assembly of the Herpes Simplex Virus Capsid: Characterization of Intermediates Observed During Cell-Free Capsid Formation. *J. Mol. Biol.* **263**:432-446.

## Key Presentations

- |       |   |
|-------|---|
| 2006  | Role of Phosphatidylinositol-3 Kinase in cmvIL-10 Mediated Immune Suppression. 31 <sup>st</sup> International Herpesvirus Workshop, Seattle, WA.  |
| 2004  | Effect of Cytomegalovirus IL-10 on B Lymphocyte Function. 29 <sup>th</sup> International Herpesvirus Workshop, Reno, NV.  |
| 2000. | Potent immunosuppressive properties of cytomegalovirus encoded IL-10. 25 <sup>th</sup> International Herpesvirus Workshop, Portland, OR.  |
| 1999  | Activation and Differentiation of Cytotoxic T Lymphocytes Directed to a Subdominant Epitope. Experimental Biology 99, Washington, D.C.  |
| 1997  | <i>In vitro</i> Formation of Triplexes: Structural Subunits that Stabilize the Herpes Simplex Virus Capsid during Morphogenesis. 15 <sup>th</sup> Biennial Phage/Virus Assembly Meeting, Pacific Grove, CA. |

## **Gary L. Stevens, Professor**

### **PERSONAL**

Born: 8/24/40

Home address: 2486 Pebble Beach Loop, Lafayette, CA 94549.

Business address: Dept. of Biology, 2130 Fulton St. Univ. of San Francisco, CA 94117-

Telephone: (415) 422-6276

### **DEGREES**

1961. Associate in Arts; Cerritos College, Cerritos, CA

1964. Bachelor of Science in Biology; Calif. State University at Long Beach

1966. Master of Science, Dept. of Zoology, University of California, Davis

1970. Ph.D. Dept. of Zoology, University of California, Davis

### **ACADEMIC AND ADMINISTRATIVE POSITIONS**

1990-present: Professor, University of San Francisco

1997-1998: Professor and Chair, Biology Department.

1990-1997: Professor and Editor of the Wasmann Journal of Biology.

1988-1989: Associate Professor and Chair, Biology Department.

1987-1988: Associate Dean, College of Arts and Sciences.

1984-1987: Associate Professor, Biology Department.

1983-1984: Sabbatical leave, Visiting Associate Professor, U.C. Davis;  
Research Associate, Wau Ecology Institute, Papua New Guinea.

1979-1980: Acting Dean, College of Liberal Arts and Sciences.

1977-1983: Associate Dean, College of Liberal Arts and Sciences

1971-1977: Assistant Professor and Chair, Biology Department.

1970-1971: Assistant Professor, Biology Department.

### **TEACHING FIELDS**

Ecology, vertebrate zoology, environmental science, human anatomy, general biology, natural science, comparative anatomy, mammalogy

### **RESEARCH OR OTHER SCHOLARLY WORK**

#### **Publications**

Density and biomass comparisons of small mammal populations in Papua New Guinean and Malaysian montane wet forests. (With R.L. Rudd). Wasmann Journal of Biology, 51:1,2: 1-8. 1994.

A capture-mark-release (CMR) and removal study of a small mammal population in montane rain-forests in Papua New Guinea (With R.L. Rudd). Wasmann Journal of Biology, 50:1,2: 39-51. 1992.

A long-term capture-mark-release (CMR) and removal study of small mammals in Malaysian sub-montane rain-forests (With R.L. Rudd). Wasmann Journal of Biology, 50:1,2: 96-150. 1992.

Element content in tissues of four rodent species sampled in the Geysers geothermal steam field. (With E.A. Fendick, R.J. Brown and W.P. Jordan). Environmental Pollution 58:155-178. 1989.

An analysis of a small mammal community in a Papua New Guinea mid-montane rain forest. (With M.S. Willett and R.L. Rudd). Wasmann Journal of Biology, Vol. 47, 1-67, 1989.

A parasite survey of black-tailed deer at the Geysers Geothermal Steam Field. (With J.M. Boss, W.P. Jordan and R.J. Brown). Institute of Chemical Biology, 1987. Report to Sonoma County and the California Energy Commission.

Element content of the Western Fence Lizard (*Sceloporous occidentalis*) in the Geysers, California. (With K.D. Jennings, R.J. Brown and W.P. Jordan). Institute of Chemical Biology, 1987. Report to Sonoma County and the California Energy Commission.

Element content in seven tissues from black-tailed deer and black-tailed jackrabbits collected from the Geysers Geothermal Steam Fields and Hopland Field Station, California. (With R.J. Brown, W.P. Jordan, K.D. Ward, and R.L. Banks). Institute of Chemical Biology, 1987. Report to Sonoma County and the California Energy Commission.

The following three articles are cited in S.J. Sharpe (ed.), Investigations on Chemical Elements in the Geysers, California, Sonoma County, California Energy Commission, 1985.

A comparative study of the element content of trout and suckers in Big Sulphur Creek, California, a geothermally altered stream. (With R.J. Brown and W.P. Jordan).

Element content of California roach in Big Sulphur Creek, California, a geothermally influenced stream. (With W.P. Jordan and R.J. Brown).

Element content of small mammals in the vicinity of the Geysers, California. (With R.J. Brown, W.P. Jordan and E.A. Fendick).

A population study of the harvest mouse (*Reithrodontomys raviventris* Dixon) in the Palo Alto Baylands Salt Marsh. (With J.T. Wondolleck and W. Zolan). The Wasmann Journal of Biology, 34:1, 1976.

#### Presented Papers

Density and biomass comparisons of small mammal populations in Papua New Guinean and Malaysian wet forests. (With R.L. Rudd). Fourth International and Theriological Congress, August 13-20, 1985, Edmonton, Canada.

#### Grants

Lily Drake Cancer Research Fund, \$5,000, Carcinogenic metal loads in lizards, 1986.

Faculty Development Grant, USF. \$1200. Habitat restoration in Cleary Reserve 1995.

#### PROFESSIONAL RECOGNITION

1979- University Merit Award

1988- Elected to Alpha Sigma Nu Honorary Society

1989- College Merit Award

1998- College Outstanding Leadership award

#### SERVICE TO THE UNIVERSITY AND COMMUNITY

##### University Service

1971-1975: University Senate

1972-1993: Chief Health Professions Advisor

1976-1993: Chair, Pre-professional Health Committee

1977-1979: Chair, University Disciplinary Hearing Committee

1987-1988: Steering Committee, United Way Campaign

1987-1995- Faculty liaison to the Health Professions Society

1987-1988: WASC Standard VII Self-Study Committee; Authored the Standard IV, graduate program; University Space and Facilities Committee

1989-1993: Joint University General Education Committee

1993-present: Co-chair of Joint University Curriculum Committee



1998-present: University Steering Committee for the 2005 Plan College Service  
1986: Co-Chaired the Science Open House Committee  
1988: General Education Task Force, secretary.  
1988-1989: Chair of the Science Council  
1991-1992: Member to the School of Nursing assoc. dean search committee.

#### Department Service

1974-1990: Associate Editor, Wasmann Journal of Biology  
1988: Facilitated and directed the budget for the first NSF-sponsored Biotechnology workshop for high school teachers  
1988: Co-authored a successful proposal to the Fletcher Jones Foundation for a biotechnology lab (\$150,000)  
1990-present: I have not kept a chronological list of committee service but they include: Departmental search committees for two faculty, as a member of the Environmental Science Dept search committee, two terms as a Science Peer Review Committee [Chair twice] which continues, current faculty representation to the University Budget Committee and a continuing member of the Pre-professional Health Committee.

#### Community Service

1980: Member of Mt. Diablo Montessori School Board  
1983-present: "President of our homeowners' association"  
1987-1990: Charter member of the Northern California Homeschoolers Association  
1989-1993: 4H leader  
1994-present: Lots of things that need not be itemized, let alone noticed.

## **JOHN T. SULLIVAN, Fletcher Jones Professor**

### **EDUCATION**

1976 Ph.D., Biology, Lehigh University, Bethlehem, PA  
1974 M.S., Biology, Lehigh University, Bethlehem, PA  
1968 A.B., Biology, Dartmouth College, Hanover, NH

### **PROFESSIONAL EXPERIENCE**

2000-present Professor and Fletcher Jones Chair, University of San Francisco, Department of Biology  
1995-2000 Professor and Sr. Joseph Marie Armer Chair, Biology Department, University of the Incarnate Word, San Antonio, TX  
1984-1995 Assistant Professor to Professor, Department of Biology, Lamar University, Beaumont, TX  
1980-1984 Assistant Professor, Department of Anatomy (Cell Biology), and Assistant Director, Marine Biomedical Research Program, Medical University of South Carolina, Charleston, SC  
1978-1980 Guest Worker, Laboratory of Parasitic Diseases, NIAID, National Institutes of Health, Bethesda, MD  
1977-1978 Research Associate, Department of Surgery, Downstate Medical Center, Brooklyn, NY  
1975-1977 Assistant Research Parasitologist, University of California San Francisco, International Center for Medical Research, Kuala Lumpur

### **MAJOR SERVICE CONTRIBUTIONS TO THE DEPARTMENT, COLLEGE, AND UNIVERSITY**

Department Chair, 2001-2003, 2004-2006  
Chair, Biology Search Committee (3)  
Member, College Science Executive Committee (while chair)  
Core Curriculum Committee 2001  
Biology Graduate Committee

### **TEACHING RESPONSIBILITIES**

General Biology I  
General Biology II  
General Parasitology with Laboratory  
Animal Toxicology  
Graduate seminar

### **KEY PUBLICATIONS** (most recent, out of 72 )

Ruelas, D. S., Karentz, D., and **Sullivan** J. T. 2006. Lethal and sub-lethal effects of UVB on juvenile *Biomphalaria glabrata* (Mollusca: Pulmonata). *Journal of Invertebrate Pathology* 93: 192-200.  
**Sullivan**, J. T. 2006. Mitotic responses to injected extracts of larval and adult *Schistosoma mansoni* in *Biomphalaria glabrata*: Effects of dose and colchicine treatment. *Journal of Parasitology*. In press.

- Sullivan**, J. T., and Castro, L. 2005. Mitotic arrest and toxicity in *Biomphalaria glabrata* (Mollusca: Pulmonata) exposed to colchicine. *Journal of Invertebrate Pathology* 90: 32-38.
- Sullivan**, J. T., Pikios, S. S., and Alonzo, A. Q. 2003. Mitotic responses to extracts of miracidia and cercariae of *Schistosoma mansoni* in the amebocyte-producing organ of the snail intermediate host, *Biomphalaria glabrata*. *Journal of Parasitology* 90: 92-96.
- Sullivan**, J. T. and Farengo, D. A. 2002. Survival of heterotopic heart xenografts from *Helisoma duryi*, *Planorbula armigera*, and *Planorbarius corneus* in *Biomphalaria glabrata* (Pulmonata, Basommatophora, Planorbidae): Evidence for phylogenetic relatedness? *Invertebrate Biology* 121: 38-46.
- Vasquez, R. E. and **Sullivan**, J. T. 2001. Further characterization of passively transferred resistance to *Schistosoma mansoni* in the snail intermediate host *Biomphalaria glabrata*. *Journal of Parasitology* 87: 1360-1365.
- Vasquez, R. E. and **Sullivan**, J. T. 2001. Hematopoietic tissue allografts in *Biomphalaria glabrata* (Mollusca: Pulmonata) induce humoral immunity to *Schistosoma mansoni*. *Developmental and Comparative Immunology* 25: 561-564.
- Vasquez, R. E. and **Sullivan**, J. T. 2001. Effect of miracidial dose on adoptively transferred resistance to *Schistosoma mansoni* in the snail intermediate host, *Biomphalaria glabrata*. *Journal of Parasitology*. 87: 460-462.
- Orta, A. J. and **Sullivan**, J. T. 2000. Short-term immunoisolation of incompatible xenografts in a snail, *Biomphalaria glabrata*. *Developmental and Comparative Immunology* 24: 543-551.
- Galvan, A. G. Paugam, M., and **Sullivan**, J. T. 2000. Rescue of sporocysts of *Schistosoma mansoni* in nonsusceptible *Biomphalaria* by head-foot transplantation into susceptible snails. *Journal of Parasitology* 86: 308-311.
- Sullivan**, J. T. and Spence, J. V. 1999. Factors affecting adoptive transfer of resistance to *Schistosoma mansoni* in the snail intermediate host, *Biomphalaria glabrata*. *Journal of Parasitology* 85: 1065-1071.
- Sullivan**, J. T., Galvan, A. G., and Lares, R. R. 1999. Survival of heterotopic headfoot transplants in *Biomphalaria glabrata* (Mollusca: Pulmonata). *Invertebrate Biology* 118: 63-67.
- Sullivan**, J. T., Lares, R. R., and Galvan, A. G. 1998. *Schistosoma mansoni* infection inhibits maturation of ovotestis allografts in *Biomphalaria glabrata* (Mollusca: Pulmonata). *Journal of Parasitology* 84: 82-87.
- Sullivan**, J. T., Galvan, A. G., and Lares, R. R. 1998. Comparison of several types of allografts in *Biomphalaria glabrata* (Mollusca: Pulmonata). *Journal of Invertebrate Pathology* 71: 1-8.
- Sullivan**, J. T. and Hu, P. C. 1996. Fate of *Schistosoma mansoni* in *Biomphalaria obstructa*. *Journal of Parasitology* 82: 743-747.
- Sullivan**, J. T. and Hu, P. C. 1995. A method for immunoisolation of sporocysts of *Schistosoma mansoni* in nonsusceptible snails. *Journal of Parasitology* 81: 1029-1031.
- Sullivan**, J. T., Spence, J. V., and Nunez, J. K. 1995. Killing of *Schistosoma mansoni* sporocysts in *Biomphalaria glabrata* implanted with amoebocyte-producing organ allografts from resistant snails. *Journal of Parasitology* 81: 829-833.
- Sullivan**, J. T., Brammer, S. R., Hargraves, C. D., and Owens, B.S. 1995. Heterotopic heart transplants in *Biomphalaria glabrata* (Mollusca: Pulmonata): Fate of xenografts from seven pulmonate genera. *Invertebrate Biology* 114: 151-160.
- Sullivan**, J. T. and Spence, J. V. 1994. Transfer of resistance to *Schistosoma mansoni* in *Biomphalaria glabrata* by allografts of amoebocyte-producing organ. *Journal of Parasitology* 80: 449-453.
- Sullivan**, J. T., Weir, G. O., and Brammer, S. 1993. Heterotopic heart transplants in *Biomphalaria glabrata* (Mollusca: Pulmonata). Fate of congeneric xenografts. *Developmental and Comparative Immunology* 17: 467-474.

## **Christina Tzagarakis-Foster, Assistant Professor**

### **EDUCATION**

- 1999 Ph.D., Microbiology, University of California, Davis (Davis, California)  
1990 B.S., Biology, University of San Francisco (San Francisco, California)

### **PROFESSIONAL EXPERIENCE**

- 2005 -present Assistant Professor, Department of Biology, University of San Francisco, San Francisco, California  
2003 – 2005 Adjunct Professor, Department of Natural Sciences and Mathematics, Dominican University of California, San Rafael, California  
1999 – 2005 Post-doctoral Fellow, Laboratory of Dr. Dale Leitman, Department of OB/Gyn/Reproductive Endocrinology, University of California, San Francisco, San Francisco, California  
1993 – 1999 Graduate student, Laboratory of Dr. Martin Privalsky, Department of Microbiology, University of California, Davis, Davis, California  
1991 – 1993 Staff Research Assistant, Rice Liver Center, Laboratory of Dr. Jacquelyn Maher, University of California, San Francisco, San Francisco, California

### **TEACHING RESPONSIBILITIES**

- (0201-106) General Biology II (lecture and laboratory)  
(0201-354) Endocrinology (lecture and laboratory)  
(0201-395) Bio Special Topics: Molecular Medicine (lecture only)

### **SERVICE CONTRIBUTIONS TO THE UNIVERSITY**

- 2005 – present Member of Joint University Library Advisory Committee (JULAC)  
2005 – present Member of Biology Department Graduate Student Thesis Committees (Lance Stapleton, James Nachtwey, Debbie Ruelas, Jason Higa)

### **PUBLICATIONS**

1. Cvorc A, **Tzagarakis-Foster C**, Tatomer, D, Paruthiyil S, Fox MS, Leitman, DC. Distinct Roles of Unliganded and Liganded Estrogen Receptors in Transcriptional Repression. *Mol Cell* 2006;21:555-564.
2. Kian Tee M, Rogatsky I, **Tzagarakis-Foster C**, Cvorc A, An JP, Christy R, Yamamoto KR, Leitman DC. Estradiol and Selective Estrogen Receptor Modulators Differentially Regulate Target Genes with Estrogen Receptors alpha and beta. *Mol Biol Cell* 2004;15:1262-1272.
3. **Tzagarakis-Foster C**, Geleziunas R, Lomri A, An J, Leitman DC. Estradiol Represses Human T-cell Leukemia Virus Type 1 Tax Activation of Tumor Necrosis Factor-alpha Gene Transcription. *J Biol Chem* 2002;277:44772-44777.
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5. **Tzagarakis-Foster** C and Privalsky ML. Phosphorylation of thyroid hormone receptors by protein kinase A regulates DNA recognition by specific inhibition of receptor monomer binding. *J Biol Chem* 1998;273:10926-10932.

#### **KEY PRESENTATIONS**

June 2006, Invited speaker at the Susan G. Komen "Rally for the Cure" Fundraising Event, Peninsula Gold and Country Club, San Mateo, California.

April 2005, "Influence of Dax-1 on Co-Activator and Co-Repressor Expression in Various Cell Types". Poster submitted for the 2005 NCUR (National Conference for Undergraduate Research) meeting, Virginia Military Institute and Washington & Lee University, Lexington, Virginia.

April 2004, "Dax-1 Blocks Proliferation of Breast Cancer Cells Through Repression of ER Activated Cell Cycle Genes". Poster presented at the 2004 Keystone Meeting: Nuclear Receptors – Steroid Sisters, Keystone, Colorado.

June 2002, "Dax-1 Inhibits Estrogen Receptor Regulated Transcription of Cyclin D1". Poster presented at the 2002 Endocrine Society Meeting, San Francisco, California.

April 2002, "Dax-1 Represses Estrogen Receptor Regulated Gene Expression and Cell Proliferation". Poster presented at the 2002 Keystone Meeting: Nuclear Receptor Superfamily, Snowbird, Utah.

August 2001, "Selective Estrogen Receptor Binding Affinity of Chinese Herbs". Oral presentation at the California State Oriental Medicinal Association International Expo and Convention, San Francisco Airport Clarion Hotel, Millbrae, California.

May 2001, "Dax-1 and Estrogen Receptor: A Match Made for Repression". Poster presented at the 2001 EMBO Workshop: Nuclear Receptor Structure and Function Meeting, Erice, Sicily, Italy

## Appendix C. Summary of Biology Curriculum\*

### Biology – The Science of Life

Our program is designed to prepare students for a broad spectrum of careers in the life sciences, including completion of all requirements for admission to professional schools (e.g., medical, dental, pharmacy and veterinary schools) and graduate programs.

#### Biology Major Requirements (67 units):

- General Biology I and II
- Cell Physiology
- Genetics
- Evolution
- One field/ecology course (e.g., California Wildlife, Marine Biology, Oceanography, Conservation Biology, Herpetology, etc.)
- Four biology electives (e.g., Human Anatomy, Human Physiology, Microbiology, Parasitology, Immunology, Light/Electron Microscopy, Animal Toxicology, Histology, Environmental Physiology, Molecular Biology, Plant Physiology, Virology, Endocrinology, Neurobiology, etc.; can include additional field/ecology courses or Biochemistry)

#### Supporting Courses:

- Chemistry I and II
- Organic Chemistry (1 or 2 semester option)
- Biostatistics
- Physics I and II

#### *Sample Curriculum (depends on writing and language placement)*

	<b>Fall</b>	<b>Spring</b>
<b>Freshman Year</b>	General Biology I General Chemistry I Core Writing Requirement Core Public Speaking	General Biology II General Chemistry II Biostatistics Core Writing Requirement
<b>Sophomore Year</b>	Cell Physiology Organic Chemistry I Core Core or Language Requirement	Genetics Organic Chemistry II Upper-Division Biology Elective Core or Language Requirement
<b>Junior Year</b>	Upper-Division Biology Elective Physics I Core General Elective/Minor	Upper-Division Biology Elective Physics II Core General Elective/Minor
<b>Senior Year</b>	Evolution Upper-Division Biology Elective Core General Elective/Minor	Upper-Division Biology Elective Core General Elective/Minor General Elective/Minor

**Undergraduate Research:** Students have the opportunity to undertake research projects under faculty direction for upper-division Biology elective credit.

**Biology Honors Program:** Designed to provide superior undergraduate students with advanced opportunities to carry out original research.

**Molecular Biology Emphasis:** Prepares students for positions in academic, medical or industrial biotechnology laboratories; or for graduate study in genetics or molecular and cell biology.

**Neuroscience Minor:** An interdisciplinary program consisting of courses in Biology, Physics, Psychology, and Exercise and Sports Science.

**Biology Minor:** General Biology I and II, Cell Physiology, Genetics and one upper-division Biology course; plus General Chemistry I and II and one semester of Organic Chemistry.

## Appendix D. Undergraduate Learning Outcomes

### The Biology Program Goals and Undergraduate Student Learning Outcomes:

At the completion of the Bachelor of Science degree in the Department of Biology, a graduate will have acquired:

- An understanding of major biological concepts and awareness of how these are connected within various areas of the biological and physical sciences.
- The problem solving, analytical, and communication skills that will provide the foundation for lifelong learning and career development.
- An appreciation of science as an integral part of society and everyday life.
- The ability to evaluate and discuss contemporary social and ethical issues related to biology and medicine.

Table D1. Biology majors will gain specific skills and knowledge and demonstrate achievement in the following areas:

<i>Learning Outcomes</i>	<i>Assessment</i>
Apply the scientific process, including designing and conducting experiments and testing hypotheses.	Students write research proposals and conduct research projects.
Develop laboratory techniques (such as light microscopy, gel electrophoresis and keeping a laboratory notebook and understanding of principles of laboratory safety).	Students make use of various instruments to perform laboratory and field exercises and complete lab practica.
Demonstrate the ability to read, understand, and critically review scientific papers.	Students present a critical analysis of the primary literature in oral or written format.
Prepare oral and written reports in a standard scientific format.	Students produce oral, written, and poster presentations.
Recognize the relationship between structure and function at all levels: molecular, cellular, and organismal.	Students complete quizzes, written examinations and give oral presentations.
Diagram and explain the major cellular processes in eukaryotes and prokaryotes.	Students complete group projects, take written examinations, and produce oral or poster presentations.
Describe the flow of genetic information, the chromosome theory of heredity and the relationship between genetics and evolutionary theory.	Students participate in class discussions, complete problem sets, and take written examinations.
Evaluate the principles of evolutionary biology and identify the taxonomy and phylogenetic relationships of the major groups of organisms.	Students complete written examinations, research projects, and lab practica.
Recognize the ecological relationships between organisms and their environment.	Students maintain journals, prepare research papers, and complete written examinations.
Develop an awareness of the careers and professions available in the biological sciences.	Students have ongoing interactions with their professors and academic advisor.

Table D2. Program matrix of required coursework in Biology and associated learning outcomes.

<i>Learning Outcomes</i>	<i>BIOL 105 General Biology I</i>	<i>BIOL 106 General Biology II</i>	<i>BIOL 212 Cell Physiology</i>	<i>BIOL 310 Genetics</i>	<i>Five Required Upper Division Courses</i>	<i>BIOL 414 Evolution</i>
Apply the scientific process, including designing and conducting experiments and testing hypotheses.	I	I			R, EC	
Develop laboratory techniques (including keeping a laboratory notebook and understanding of principles of laboratory safety).	I	I			R, EC	
Demonstrate the ability to read, understand, and critically review scientific papers.		I	I	R	R, EC	EC
Prepare oral and written reports in a standard scientific format.	I	I	R	R	R, EC	EC
Recognize the relationship between structure and function at all levels: molecular, cellular, and organismal.	I	I	R	R	EC	EC
Diagram and explain the major cellular processes in eukaryotes and prokaryotes.	I	I	EC		R, EC	
Describe the flow of genetic information, the chromosome theory of heredity and the relationship between genetics and evolutionary theory.	I	I		EC	R, EC	EC
Evaluate the principles of evolutionary biology and identify the taxonomy and phylogenetic relationships of the major groups of organisms.		I		R	R, EC	EC
Recognize the ecological relationships between organisms and their environment.	I				R, EC	EC
Develop an awareness of the careers and professions available in the biological sciences.*			I		R	

I = Introduced, R = Reinforced, EC = Extended Coverage

\* Other resources available to students include academic advisors, course professors, the USF Career Center, and special-interest clubs.



## Appendix E. Graduate Program Expected Outcomes

Table E1. Learning outcomes and assessment for the Biology Masters program.

<i>Learning Outcomes</i>	<i>Assessment</i>
Demonstrate knowledge in areas of biology relevant to selected research interests.	Students complete written examinations, research projects, and lab practica.
Identify research questions on a contemporary issue in biology, critically analyze the relevant literature, and prepare a comprehensive written review.	Preparation of a thesis research proposal, and approval of the proposal by the Thesis Committee.
Develop specific hypotheses pertaining to a research problem.	Preparation and oral defense of a written thesis.
Devise and conduct experiments to test hypotheses.	Preparation and oral defense of a written thesis.
Statistically analyze and interpret research data.	Preparation and oral defense of a written thesis.
Discuss, both orally and in writing, the relevance of their research data to the original hypotheses and to the general field of interest.	Preparation and oral defense of a written thesis.

## Appendix F. Comparison to Other Science Departments

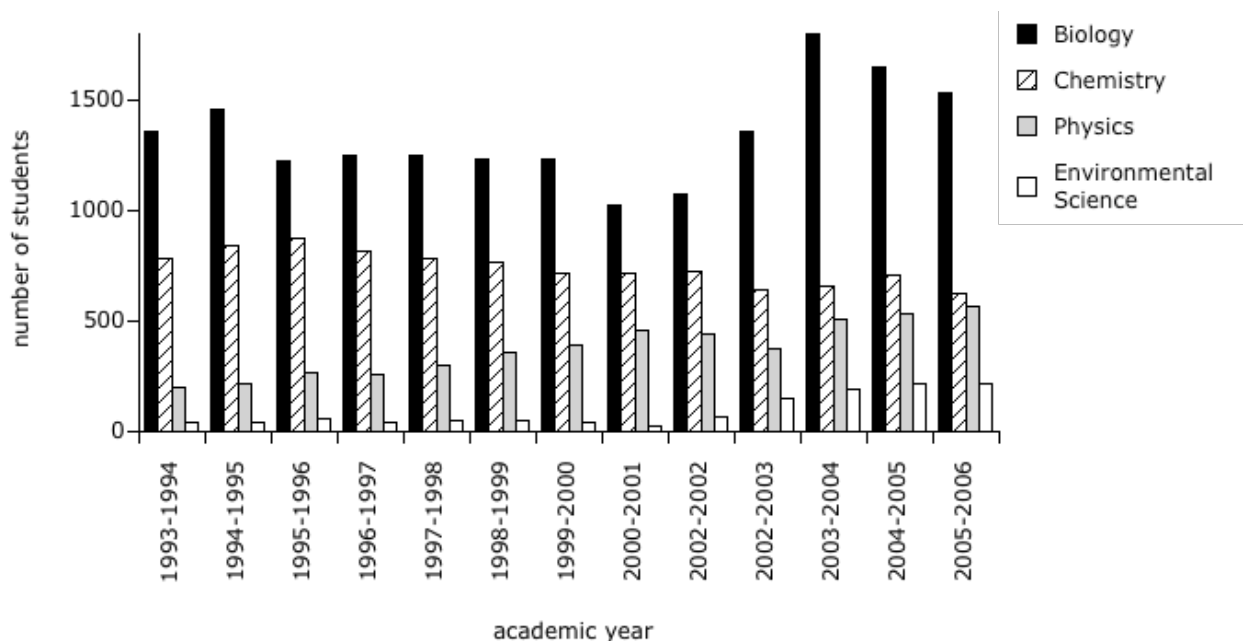


Figure F1. Number of students registered in courses over each academic year for Biology, Chemistry, Physics and Environmental Science Departments. Data are not student credit hours, but actual class enrollments for lecture sections (students numbers in lab sections accompanying lectures were not counted).

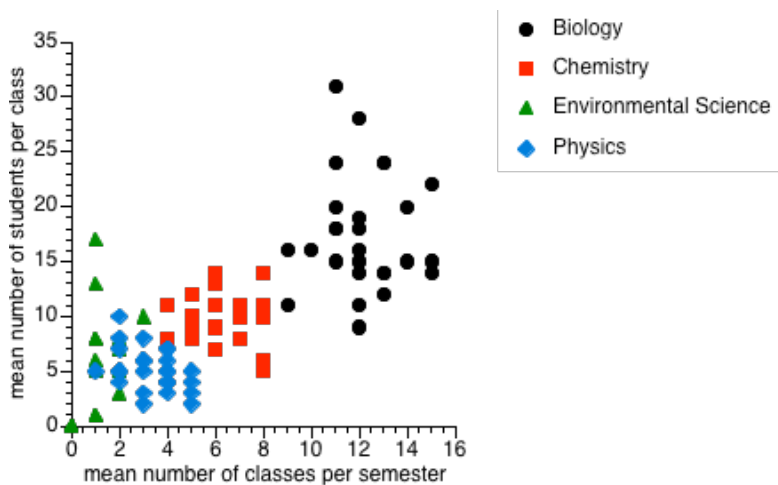


Figure F2. Mean class size for upper-division (UD) undergraduate courses (300-level and above) in natural science departments relative to number of UD courses offered on a semester basis. Data plotted for each semester from Fall 1996 to Fall 2006.

## **Appendix G. Departmental Advising**

Because of the large number of incoming students, the first academic advising experienced by a new freshman Biology major is typically in a group setting during the summer or at the start of the semester. Students receive a detailed handout, and several faculty members are present at these sessions to see each student through the registration process. This system has some inherent problems because of the large number of students and limited number of faculty. New transfer students are also advised at this time; these students require additional personal attention in order to consider his or her individual circumstances.

Each new student is assigned to an individual advisor in the Department. Freshmen, sophomores, new transfer students, students with undeclared majors, junior and senior Biology majors with science GPAs of less than 2.0, and students on probation must meet with an advisor in order to register for classes. While juniors and seniors are not required to see an advisor to register, most do because our majors are accustomed to seeking faculty input and advice. As a result, during pre-registration the Biology faculty have substantial advising responsibilities.

Since the student is ultimately responsible to see that degree requirements are met, each advisor is encouraged to review the curriculum, pre-requisites, and degree requirements with new students, and prepare a four-year plan with the student. In addition, the Department extensively publicizes the advising and registration period, which is held each mid-semester. Each advisee receives a personal hand-delivered letter that identifies their advisor and describes how to sign up and prepare for an advising appointment.

Ideally, the student-advisor relationship continues throughout the course of the program, and includes not only academic advising but counseling in matters of personal and professional growth and development (e.g., internships, post-graduate programs, and career counseling) and appropriate referrals (e.g., to the Counseling Center and the Priscilla A. Scotlan Career Services Center).

## Appendix H. Student Success in Admissions to Post-graduate Health Programs

Table H1. Health Professions Program Admissions 1996-2006. These numbers reflect USF Biology majors who used the services of the Pre-professional Health Committee, including some who applied one to three years after graduating. The types of health professions programs included in these numbers are medical, dental, pharmacy, podiatry, dental hygiene, and optometry.

<i>Year</i>	<i>Number of Biology majors applying to health professions programs</i>	<i>Number of Biology majors accepted to health professions programs</i>	<i>Health professions programs acceptance rate for Biology majors</i>
1996	11	4	36%
1997	10	5	50%
1998	14	9	64%
1999	15	9	60%
2000	20	15	75%
2001	17	15	88%
2002	20	15	75%
2003	10	7	70%
2004	12	8	67%
2005	10	7	70%
2006	15	11	73%

Table H2. Medical School Admissions 1996-2006. The numbers reflect USF Biology majors who used the services of the Pre-professional Health Committee to apply to medical school, including some who applied one to three years after graduating.

<i>Year</i>	<i>Number applying to medical school</i>	<i>Number accepted to medical school</i>	<i>Medical school acceptance rate</i>
1996	7	3	43%
1997	9	5	55%
1998	11	7	64%
1999	7	5	71%
2000	15	11	73%
2001	15	13	87%
2002	10	7	70%
2003	5	3	60%
2004	7	5	71%
2005	10	7	70%
2006	11	9	82%

Table H3. Health Professions Programs Attended by Biology Graduates, 1996-2006.

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Arizona College of Osteopathic Medicine
Ben Gurion University of the Negev Medical School/Columbia
California College of Podiatric Medicine
Cornell University, Weill Medical College
Creighton University School of Medicine
Drexel University College of Medicine
Finch University of Health Sciences, The Chicago Medical School
Johns Hopkins University School of Medicine
Loma Linda University School of Pharmacy
Loma Linda University School of Medicine
Loyola University of Chicago, Stritch School of Medicine
Oregon Health and Science University School of Medicine
Pacific University College of Optometry
Saint Louis University School of Medicine
St. George's University School of Medicine
Temple University School of Medicine
Touro College of Osteopathic Medicine
Uniformed Services University of Health Science School of Medicine
University of Arkansas School of Medicine
UC Berkeley School of Optometry
UC Davis School of Medicine
UC Irvine School of Medicine
UC San Diego School of Medicine
UCLA Geffen School of Medicine
UCLA School of Dentistry
UCSF School of Dental Hygiene
UCSF School of Dentistry
UCSF School of Medicine
UCSF School of Pharmacy
USC Keck School of Medicine
University of Hawaii School of Medicine
University of Houston College of Optometry
University of Nevada, Reno School of Medicine
University of Texas at Houston Medical School
University of the Pacific School of Dentistry
University of the Pacific School of Pharmacy
Wake Forest University Medical School
Western College of Osteopathic Medicine

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## Appendix I. Equipment and Instruments

Table IA. Instruments available for teaching and research.

<i>Item</i>	<i>Location</i>
BD FACSCalibur flow cytometer	HR504
Nikon Eclipse E400 Fluorescence Microscope with SPOT digital camera	HR504
Nikon Eclipse E600 Microscope with digital camera	HR361
Bio-Rad ChemiDoc XRS Documentation System	HR321
Bio-Rad MyiQ single color real-time PCR Detection System	HR321
Bio-Rad iCycler thermal cycler	HR338
Bio Rad Gel Documentation System	HR338
Nanodrop spectrophotometer	HR338
Amersham GeneQuant Pro spectrophotometer	HR338
Labconco Biosafety cabinet	HR309B
VWR Tissue Culture Incubator w/ CO <sub>2</sub>	HR309B
Zeiss Invertoskop	HR309B
Dynex OpsysMR plate reader	HR309B
Glomax Microplate Luminometer	HR309B
Eppendorf 5804R Refrigerated Tabletop Centrifuge: with swinging bucket, fixed angle and microcentrifuge.tube rotors	HR309A
Zeiss EM900 Transmission Electron Microscope	HR317
Nikon Labophot2 Phase Contrast/Fluorescent Microscope	HR319
Zeiss Universal Phase Contrast Microscope	HR319
Zeiss Phase contrast Photomicroscope	HR504
Durst EMS-45 Photographic Enlarger	HR305
Ultramicrotomes (two)	HR319
37°C shaker incubator	HR322
-70C freezers (three)	various locations
Beckman LS6500 Scintillation Counter	HR310
Dark Room (with photography processing equipment)	HR304
Waters HPLC system	HR504
UV light exposure system	HR506
Biosafety cabinet	HR354
Tissue culture incubator	HR354
Cold room (walk-in)	HR305

*Microbiology Lab (Harney 322):*

Barnstead autoclave (manual)  
Getinge autoclave (automatic)  
37°C incubators for bacterial cultures (two)

*Anatomy Lab (Harney 314):*

EKG  
Various anatomical models  
Hematocrit centrifuges

*Biotechnology Lab (Harney 349):*

- Bio-Rad DNA gel electrophoresis chambers
- Bio-Rad SDS PAGE gel electrophoresis chambers
- Bio-Rad and EC Apparatus Corp. power sources
- Bio-Rad DNA sequencing plates/combs
- Eppendorf centrifuge model 5402
- Savant SpeedVac concentrator
- VWR heat blocks
- ELISA plate reader
- Fisher Hybridization oven
- Fisher Isotemp Vacuum Oven Model 282
- Beckman microcentrifuges (x3)
- Nikon Alphaphot Compound Microscopes

*General Biology Lab (Harney 346):*

- 50-gallon salt water aquarium
- animal and plant models
- Imperial II lab-line incubator
- Beckman Coulter J2-HS centrifuge
- Beckman Ultra-Centrifuge L7-65
- Thermospectronic Spectronic 20 spectrophotometers (eight)
- Nikon Alphaphot Compound Microscopes (25)
- Bausch and Lomb dissection scopes (18) and lamps