Strategic Plan
College of Biological Sciences
Version of October 3, 2008

I. Introduction

The 21st century has been widely characterized as the Century of Biology. Many of the largest challenges facing the world in the next fifty years will require fundamental research and education in biology. The College of Biological Sciences (CBS) is the focal point for basic research and graduate and undergraduate education in the life sciences at OSU. Its faculty are well-equipped to conduct basic research and to train the next generation of scientists that will be called upon to develop solutions to problems such as: effects of climate change, conservation of biodiversity, food shortages, overpopulation, infectious diseases and cancer, alternative energy, pollution and pollutant-associated diseases. In response to the central importance of biology, other colleges and departments have sought to complement their teaching and research missions by adding biologists to their faculty. However, only CBS has basic biological research as its core mission combined with the responsibility for comprehensive undergraduate and graduate programs in the life sciences. The College of Biological Sciences is a cohesive collection of faculty, staff and students whose efforts and interests are centered on some of the most exciting and important facets of modern science. The quality of its people and importance of its contributions are evident in that CBS departments and programs are significant participants in three of the TIE initiatives selected for funding by OSU in 2006.

The College of Biological Sciences has approximately 78 faculty FTEs in six departments. This represents a decline in faculty size of 14% over the last 5 years. Over the same period of time the number of CBS majors increased by 42%. **For this reason strategic hiring of new faculty around clearly identified thrust areas is the top priority of the college. A second priority is to find innovative new ways to deliver high quality instruction to large numbers of undergraduates.**

The six departments in CBS are: Biochemistry; Entomology; Evolution, Ecology and Organismal Biology (EEOB); Microbiology; Molecular Genetics (MG); and Plant Cellular and Molecular Biology (PCMB). There are over 3100 undergraduates in the eight majors in the college: biochemistry; biology; entomology; evolution and ecology; microbiology; molecular genetics; plant, cellular and molecular biology; and zoology. The biology major and biology courses (mostly 100-level courses) are coordinated in the Center for Life Sciences Education (CLSE). The college has 279 graduate students in eleven departmental and interdisciplinary graduate programs (IGPs.) Approximately 27% of the graduate students are in the interdisciplinary graduate programs. In FY08, the CBS faculty taught almost 107,000 credit hours and had sponsored research expenditures of more than $19,400,000.

CBS welcomes the creation of the University-wide task force charged with optimizing the organization of the life sciences and the task force charged with optimizing the organization of the environmental sciences. In parallel with the work of the life sciences task force, the faculty in Molecular Genetics and in Plant, Cellular and Molecular Biology have voted to merge departments and doctoral programs. The faculty in Biochemistry are considering new strategic relationships with the Department of Chemistry in the College of Mathematical and Physical Sciences and with the Department of Molecular and Cellular Biochemistry in the College of

Medicine. In addition, these three departments will seek to assume greater stewardship of the Ohio State Biochemistry Program (OSBP), an Interdisciplinary Graduate Program (IGP).

The Department of Entomology (TIU) is now located both in CBS and the College of Food, Agricultural and Environmental Sciences (FAES). The Entomology faculty have voted to move the department entirely to FAES. As part of this reorganization about one third of the Entomology faculty will request a change in their TIU to EEOB, thereby enlarging and strengthening EEOB. The entomology faculty have concluded the following: that the need for basic research and applied research has diluted both thrusts, thus, aligning faculty with their distinct college mission is desired. It is anticipated that a small number of faculty will maintain salaried or non-salaried appointments in both EEOB and Entomology to maintain continuity in undergraduate and graduate education and to further the mission of the Department of Entomology in FAES.

The college seeks to devolve more fiscal authority and responsibility to the units. It may make sense to create organismal- and molecular-centric budget and service centers in the college, independent of any other reorganizations.

CBS will also take a leading role in reorganizing the four Life Science IGPs (Neuroscience, Biophysics, Molecular Cellular Developmental Biology-MCDB, OSBP) with the goal of improving academic excellence, administrative efficiency and faculty commitment in some programs. We will argue that strongly associating each program administratively with the 2 or 3 units most invested in their success and with the use of unit based administrative support makes greater academic sense and will afford greater efficiencies than oversight of four programs by eight deans and fiscal officers and program based staff.

The College of Biological Sciences (CBS) intends to use the challenges and opportunities of the next five years to build on its prior successes. Among our recent and on-going successes:

- Professor David Denlinger is an accomplished researcher, member of the National Academy of Sciences, Distinguished University Professor and summer 2008 commencement speaker.
- CBS already embraces a trans-institutional model for its departments and programs. Over a third of the faculty hold salaried positions that cross college or department lines. Over a quarter of its graduate students are from Life Sciences Interdisciplinary Graduate Programs. (The CBS challenge is branding: how does an interdisciplinary college compete in silo-based ranking systems?)
- Since FY03, annual OSURF expenditures have increased from $13.8M to $19.4M (41%). F&A recovery has increased from $3.5M to $4.5M (28%)
- CBS was awarded TIE funding for the Translational Plan Sciences Initiative. Most CBS faculty hiring under this initiative is anticipated in the Department of Plant Cellular and Molecular Biology (after merger with Molecular genetics).
- CBS was awarded TIE funding for the Public Health Preparedness Initiative. Most CBS faculty hiring under this initiative is anticipated in the Department of Microbiology.

- CBS was awarded TIE funding for the Mathematical Biosciences Initiative. Two new CBS faculty hired under this initiative are in EEOB although all 6 departments and the CLSE are expected to benefit from and collaborate with Mathematical Biosciences Institute.

CBS is a destination college for large numbers undergraduates that are among the best in the University.

- New freshmen choose CBS as a destination. In Autumn Quarter 2008, CBS had the largest number of new freshmen in the Arts and Sciences (235 in ART, 139 in ASC interdisciplinary majors, **891 in CBS**, 230 in HUM, 301 in MAPS, and 627 in SBS).
- For new freshmen in Autumn Quarter 2008, CBS had the highest number of honors students in the Arts and Sciences (29 in ASC interdisciplinary majors, **218 in CBS**, 70 in HUM, 93 in MAPS, and 127 in SBS).
- The College of Biological Sciences does an outstanding job of recruiting Honors students, bringing in more Honors students than any other college in the Arts and Sciences. In the AU08 freshman class, the top two majors among Honors students are the Biology major (with 132 students – more than any other college in the Arts and Sciences) and the Biochemistry major (with 47 students)
- CBS majors contribute significantly to the increase in quality of entering classes. The average ACT score for new freshmen CBS majors in Autumn Quarter 2008 was 27.83. The average for the entire university was 27.35.
- The CBS undergraduate population is talented and diverse. Among our majors, 51.7% are women vs. 47.6% at OSU; 3.1% are Hispanic vs. 2.5% at OSU; 12.3% are Asian American vs. 4.7% at OSU; 0.5% are Native American vs. 0.4% at OSU; 7.5% are African-American vs. 6.8% at OSU and 2.9% are non-resident aliens vs. 2.3% for OSU. (This is no time to be complacent, however. The challenge will be to extend this success to the demographics of our graduate program and faculty.)
- In 2004, the biology major took over the top spot on the list of the largest majors at Ohio State – almost 4.5% of OSU undergrads are biology majors. It is now is the largest major at the nation's largest university with over 1800 students.
- In Autumn 2007, 785 Biological Sciences students were enrolled in the Honors Program. These students are 14% of all honors students at OSU, and 25.45% of all students enrolled in CBS. The proportion of honors students is the largest in the Arts and Sciences.
- In Autumn Quarter 2008, the Biological Sciences Scholars program was the largest scholars program on campus. The program had 435 participants.
- In Autumn Quarter 2008, 527 CBS majors were enrolled in a scholars program. This is the largest number on campus.
- In each of the past two years, a CBS student has been named to the USA Today All-USA College Academic First Team, comprised of 20 outstanding students nationwide. In 2007, Yoonhee Ha, a Microbiology and Finance double major, won this award, and in 2008, Joshua Lotz, a Biochemistry and Chinese double major won this award
- The Biological Sciences category at the Denman Undergraduate Research Forum is the largest single research category every year; furthermore, CBS students win a large share of the Denman awards, and they win awards in many different categories.

- Biochemistry and Molecular Genetics collaborate on an NSF REU project that brings talented minority students to OSU for a summer research experience.

This Strategic Plan will assume only modest, historic growth in student credit hour (SCR) based revenue, indirect cost recovery and development dollars to err on the side of fiscal conservatism, yet we will set lofty goals. A development based goal will be to make the three TIEs in which CBS participates self-sustaining by the time central cash support is discontinued in FY2013. The TIE's are the source of CBS "big ideas" to excite donors. We will use TIE funds as cost sharing on training grants. Our development opportunities include naming rights to departments, programs, laboratories, and buildings, and our goal will be to raise endowments for chairs and professorships, technical staff, and graduate fellowships. Increased development activity is central to completing the fundraising for the Jennings Hall project, for renovations of the Biological Sciences Building and transformation of the Aquatic Ecology Laboratory. Other specific development goals include:

Endowed Chairs and Associated Graduate Fellowships in Biological Science ($2m/chair)

1. RNA Center (this is aligned with the micro RNA TIE)
2. Translational Plant Science (aligned with a TIE)
3. Protein Center (to study the shape, folding and functions of proteins; a locally funded TIE)
4. Center for Biodiversity Research and Analysis (CEBRA)
    - the response of species to climate change
    - the impact of invasive species
    - paleontology (joint with MAPS-School of Earth Sciences)

This Strategic Plan has rather modest baseline assumptions about fiscal growth and expenditures. Specifically, it assumes:

- 5% annual growth in net Indirect Cost (IDC) recovery, although we will challenge ourselves to dramatically increase federal, state and Third Frontier funding
- Annual 3.5% increases in undergraduate SSI revenue and 0% increase in graduate SSI revenues for two years
- New undergraduate laboratory fee revenue and increased revenue resulting from the new post candidacy tuition policy which frees the college from large reimbursements to principal investigators who support post candidacy students on grants
- 4.0% annual salary increases for faculty, and 3.5% increases for staff, and graduate teaching assistants
- Three announced retirement plans and no resignations
- Scaling commitments for faculty hiring and major capital commitments to new resources (UG laboratory fees, Arts and Sciences support of start-up expenses)
- Continuation of the current funding (scenarios 1 and 2) and another scenario (3) in which Arts and Sciences assists with start-up expenses of new faculty.

A key fiscal tactic is to shift research fee authorizations to grants and to eliminate the $60 per quarter program fee in FY10 and replace it with a $100 laboratory fee in that same year. Institution of a laboratory fee brings CBS fee policies into alignment with those in MAPS. One effect of this change will be that majors and non-majors enrolled in the same course will both pay the same fees; in FY09 fees are paid only by rank 3 and 4 CBS majors. We anticipate raising the laboratory fee to $150 in FY11 and to $200 in FY12.

II. Mission

The College of Biological Sciences conducts fundamental research to expand and deepen our understanding of life, and provides world-class undergraduate and graduate instruction informed by that research.

III. Goals and Actions

The college faces a challenging era ripe with opportunities. We have great aspirations in the midst of a difficult fiscal climate. We have identified five major overarching goals for the next five years that will simultaneously advance the missions of our units and maintain fiscal solvency. Associated with each goal are the steps we will take to reach it.

A. Enhance the Reputational Ranking of Disciplinary and Interdisciplinary Research Programs by Hiring and Retaining Faculty

Actions:

1. Hire 11 faculty FTE over the next six years (FY09-FY14), assuming no laboratory fees or no rebasing of the college to help with start-up expenses (Scenario 1), 16 faculty FTE with replacement of program fees with laboratory fees (Scenario 2), or 26 faculty FTE assuming an increase in laboratory fees and an additional $15M is provided by the Arts and Sciences for new faculty startup (Scenario 3). The actual headcount may be higher if these positions involve joint appointments with other units (Table 1). The number of faculty hired may increase further as a result of targeted hires which will receive support from the Comprehensive Cancer Center the Mathematical Biology Institute and the Institute for Energy and the Environment.

TABLE 1. COLLEGE OF BIOLOGICAL SCIENCES FACULTY HIRING SCENARIOS

SCENARIO 1 - FEE AUTHORIZATION SAVINGS, SHIFT FEE AUTHORIZATIONS TO OSURF

Source of Funding	PROJECTED FACULTY HIRING OPPORTUNITIES (FTE)						
	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4				**4.20**
New Hires							**0.00**
TOTAL	**1.25**	**6.3**	**2.4**	**0**	**0**	**0**	**9.95**

SCENARIO 2 - ALL OF SCENARIO 1 PLUS ELIMINATE PROGRAM FEES, INSTITUTE LAB FEES

Source of Funding	PROJECTED FACULTY HIRING OPPORTUNITIES (FTE)						
	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4				**4.20**
New Hires				2	2	2	**6.00**
TOTAL	**1.25**	**6.3**	**2.4**	**2**	**2**	**2**	**15.95**

SCENARIO 3 - ALL OF SCENARIO 2 PLUS $2.5M CASH PER YEAR FOR FACULTY SETUP FY10-FY14

Source of Funding	PROJECTED FACULTY HIRING OPPORTUNITIES (FTE)						
	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4	0			**4.20**
New Hires		2	3	4	4	3	**16.00**
TOTAL	**1.25**	**8.3**	**5.4**	**4**	**4**	**3**	**25.95**

2. Increase retention of outstanding junior faculty through aggressive promotion policies along with active and effective mentoring and provision of the support they need to succeed. Young faculty will be brought up for promotion as soon as they have met the standard rather than waiting a proscribed or historic number of years. Improving junior faculty salaries is another important tactic. This includes increasing the average CBS faculty salaries to the level of those of MAPS faculty (Table 2) as there is some overlap of the two markets (chemistry, physics, and biochemistry often recruit from the same pool).

Table 2. Average Faculty Salaries by College and Rank (FY08)

	College	
Rank	CBS	MAPS
Assistant Professor	$67,868	$74,222
Associate Professor	$75,741	$80,169
Professor	$115,178	$118,221

3. Aggressively promote faculty for awards and honors.

4. Increase the diversity of our faculty through cultivation of Ohio State students and post-docs from underrepresented groups for our own faculty positions. In addition, all departments will emulate EEOB's proven tactics to aggressively recruit underrepresented minority targets of opportunity. This involves identifying and recruiting underrepresented minority scientists *before* they would typically enter the faculty job market.

B. Provide Outstanding, Innovative Academic Programs

Actions:

1. Redesign instructional delivery methods across the college to improve learning outcomes and efficiency.
2. Experiment with the use of technology for the delivery of lecture material to large numbers of students. Molecular Genetics is pioneering this approach in Spring 2009 in MG500.
3. Create undergraduate majors in high school science teacher preparation in collaboration with MPS and the College of Education and Human Ecology, and revise existing major programs to respond to changing demands and opportunities.
4. Diversify GEC offerings by offering existing courses in multiple versions and by developing new courses to target the interests of specific student subgroups.
5. Use research to inform our pedagogical approaches, implement and assess instructional strategies in CBS classes, and identify bottlenecks to student learning
6. Provide professional development opportunities for faculty, graduate students, and advanced undergraduate students through seminars, courses, workshops and specific training on innovative pedagogy.
7. Continue strong undergraduate recruitment efforts, with a focus on high ability students, especially underrepresented minority students.
8. Intensify graduate student recruiting with a particular emphasis on recruiting students from underrepresented groups.

9. Increase the numbers of honors offerings, by offering existing courses more often, developing new honors courses, and taking full advantage of the honors-embedded option.
10. Metrics for the undergraduate program will include the number of majors, the number of underrepresented minority student majors, the number of students doing undergraduate research and the four-year retention rate of CBS majors in departments and programs.
11. Metrics to be used in every doctoral program will include: GPA and GRE scores of applicants and admitted students, yield rate, six-year completion rate, the ratio of RAs to TAs, the average time to graduation, the number of underrepresented minority students, student placements, scholarly productivity of doctoral students (number and journal quality of refereed publications, publications in high impact journals) and research expenditures per faculty member. We will benchmark against appropriate peers, which will vary from unit to unit.

C. Provide State-of-the-Art Facilities and Support for Research and Instruction

Actions:

1. Renovate instructional space in the Biological Sciences Building to provide state-of the-art learning environments. Much of the instructional space will be renovated with capital dollars allocated for the third floor renovation in the FY09-10 Biennium. The required college match is $800,000.
2. Manage existing office and laboratory space assigned to the college to accommodate at least 26 additional faculty FTE over the next five years. This will require careful management of all CBS laboratory space. Much of the growth will be accommodated in the Biological Sciences Building.

D. Maintain Fiscal Equilibrium

For at least 20 years, the college has never ended a fiscal year with a deficit. CBS carefully tracks commitments so that anticipated uses do not exceed anticipated sources. For the last several years our aspirations (and our marginal expenses) have exceeded our marginal revenues. Our main fiscal challenge is the skyrocketing cost of setup for new faculty. These costs are market driven and show no signs of abating. Therefore CBS has historically delayed hiring, as faculty depart, to build up cash to fund new faculty setup expenditures to keep the budget in balance.

CBS ended FY08 with a positive balance in all of its fund types including:

- $6.04M in General Funds
- $484k in Endowment Income*
- $78k net cash in Designated, Earnings, Development, Grants and Contracts, Plant and Agency Funds

(* the faculty that control these funds need to be encouraged to spend them on worthy uses!)

Budget scenarios outlined in this plan represent *uncommitted* college-level resources that can be allocated to faculty hiring. In all scenarios we assume that departments and units will continue to operate responsibly and that their expenses will not exceed their income.

The population of CBS majors is large and very talented. The number of majors and their quality has increased consistently since 2002. Our success in recruiting raises the quality of the undergraduate student profile of both the ASC and the University. Even though numbers of undergraduate majors have skyrocketed, CBS has not achieved the fiscal gains that might accrue in other colleges (see the next paragraph.) However the Arts and Sciences as a collective entity has benefitted both academically and financially from CBS recruiting efforts and the surge in high quality biology majors.

In contrast to other Arts and Sciences students, CBS majors are both liberally and scientifically educated. In calendar year 2007, CBS majors took over 90% of their credit hours in ASC courses—they are truly liberal arts students. They are also well-rounded. CBS majors actually take more hours in MAPS courses than in CBS courses and nearly as many hours in the humanities (Table 3). CBS majors took a smaller portion of their hours in their home college than other ASC majors (Table 4). CBS faculty believe that well-trained students need the breadth of science and non-science courses to succeed. Therefore, they have resisted the temptation to reduce requirements outside of CBS while increasing CBS course requirements to capture additional income. Similarly we have resisted the temptation to offer CBS versions of required supportive courses in math, chemistry and physics.

The relatively low proportion of credit hours taken by majors in CBS does not mean that there is no room for enrollment growth in the college. CBS departments can and must increase enrollments in existing courses and create new courses for CBS majors. Not only does this provide a source of revenues to meet goals and objectives, it is necessary on pedagogical grounds to well serve our majors.

Table 3. Credit hours taken by CBS majors by college of instruction for calendar year 2007

Instructional Academic College	Credit Hours	Percent of Total
ASC	1,965	1.4%
ARTS	4,986	3.5%
NON-ASC	12,197	8.7%
SBS	14,867	10.6%
HUM	31,638	22.6%
CBS	**32,400**	**23.1%**
MPS	42,001	30.0%
Total	**140,196**	**100%**

Table 4. Total credit hours taken by undergraduate majors and percentage of the total taken within their college of enrollment in calendar year 2007.

Student Enrollment College	Hours in All Colleges	% in College of Enrollment
ARTS	62,662	59.2%
CBS	**140,196**	**23.1%**
HUM	132,242	62.0%
MPS	54,043	41.7%
School of Music	17,633	71.9%
SBS	322,007	47.4%

Actions:

1. Eliminate program fees and establish laboratory fees for CBS courses. In FY10, the proposed fee is $100 per laboratory course.
2. Incent increases in indirect cost recovery (IDC) from sponsored research by increasing the percentage of post tax IDC (above the base line year) to the generating unit from the current 33% to 100%.
3. Reduce instructional expenses in large courses by decreasing reliance on graduate teaching assistants (GTAs) by hiring more undergraduate teaching assistants and permanent A&P teaching staff.
4. Replace short-term lecturers with individuals that have a long-term commitment to undergraduate education. In the coming year, CBS will develop a proposal for an auxiliary faculty model such as that used in the Department of Mathematics.
5. Create incentives for departments to increase credit hours by returning a significant portion of marginal credit hour instructional revenues to them.
6. Stabilize the size of the faculty through reduced attrition and aggressive recruiting.
7. Increase development activity and establish aggressive goals for major gifts to benefit all units but with an emphasis on supporting TIEs, retiring the Jennings Hall debt and funding renovation of the Biological Sciences Building.
8. Maintain enrollments in existing GEC courses, identify opportunities to attract students with new GEC courses and strategically schedule existing courses to attract non-majors.
9. Increase enrollments in service courses and courses for CBS majors by increasing the number of offerings.
10. Develop new courses to appeal to majors.

E. Increase the Resources and Authority of Department Chairs; Align Unit Budgets with Performance

Actions:

1. Establish sound and understandable budget distribution principles, including the development and use of a formula for such distribution that is based on optimization of the following principles; (a) transparency, simplicity and predictability, (b) identifying and funding of college-centric priorities (c) correlating the quantity and cost of teaching with department budgets (d) delegating additional authority and responsibility to the department chairs to meet performance goals and manage budgets and (e) rewarding high unit performance as defined by objective measures.
2. Transfer funds for support of the Life Sciences Interdisciplinary Graduate Programs to the departments and transfer funding responsibility and management for the Life Sciences Interdisciplinary Graduate Programs to the participating departments.
3. Return all post-tax IDC funds above the baseline year to the generating units to support research infrastructure and faculty startup and retention costs.
4. Retain annual rate from faculty retirements or resignations in the college for strategic uses, let units keep the annual rate generated from negative tenure decisions and from staff and GTA reallocations.
5. Centrally support priorities of the college that are not accommodated by the college internal distribution formula, such as undergraduate research, diversity initiatives, spousal hiring, and new interdisciplinary research and instructional programs.
6. Require units to align the size and cost of their programs with their revenues to defined values.
7. Increase the size of units by mergers (EEOB and part of Entomology; PCMB and MG, reorganization of biochemistry, possible molecular or organismal budget centers, reorganized IGPs that are unit-centric)

IV. Process

The new college leadership team is not prepared to define the optimal investment of new faculty hires at this time but will use a process of consultation to arrive at these decisions by the middle of Winter Quarter 2009.

Step 1 The six CBS department chairs have been charged to work with their faculty and each other to submit five-page unit-based page proposals to the Interim Dean by December 1, 2008, justifying the hiring of new faculty. The departments will be asked to identify areas of strengths within their units and will be expected to build on their strengths. Department proposals must be justified on the basis of external metrics such as those shown below for a sample department outside of the college (Table 5). Departments will be allowed some discretion in choosing metrics and will be asked to predict how their proposed faculty hiring plan will change the metrics over a four year period and to make the case that this will bring their doctoral program to within the top quartile of their field and attract new funding (federal, third frontier, training grants). Cluster hires around a theme or program in collaboration with other units will be looked upon favorably. A two page NIH or NSF style CV for each current faculty member in each unit will be appended to the proposal. Research centers (RNA, Protein, CEBRA, etc.) and the CLSE are invited to submit proposals as well. There is a sense that too many CBS faculty with common research interests are geographically separated. Thus,

proposals will be asked for a specific space utilization plan to maximize desired faculty adjacencies.

Step 2 CBS will commission external and internal reviews of the unit- and center-based proposals. These reviews will be shared with the University Task Force charged with the organization of the life sciences and will hopefully be further informed by the anticipated release of NRC rankings of doctoral programs.

In consultation with Interim Executive Dean Leitzel and Dean of the Graduate School Osmer specific cluster areas of faculty hiring will be identified with the goal of bringing multiple doctoral programs into the top quartile in their field in five years.

This process was discussed with the six department chairs on August 27, 2008. The Interim Dean will hold a town meeting with the CBS faculty and staff in October 2008 to explain the process.

We recognize that as part of the work of the University Task Force that there will likely be reorganization of life sciences doctoral programs. We believe that areas of faculty strength are independent of our organizational structure and that these strengths, when properly inventoried, will inform the development of the optimal configuration of Ohio State life science doctoral programs.

Table 5. Sample department performance metrics for a unit outside the college

Metric	**Autumn 2007**	**Comparison group avg.***	**Autumn 2012**
Average time to PhD for the six year period 2001-2007	6.3	6.5	6.0
Completion % of grad students to PhD	70	50	70
Number of PhDs/year	17	21	20
% women PhDs/year	12	14	14
Ave. GRE % of enrolled graduate student class	65	73	70
Ave. General GRE % of enrolled graduate student class:			
verbal	69	80	80
quantitative	87	90	90
Total # of graduate students	157	166	160
Total # of graduate students/faculty	2.7	3.1	2.8
Numbers of GRAs, GTAs, and Fellows:			
GRAs	82	84	90
GTAs	64	74	60
Fellows	10	8	10

Total departmental OSURF expenditures per year ($M, FY06)	9.9	14.0	14.0
FY06 OSURF expenditures per faculty member ($K)	171	262	215
Metric	**Autumn 2007**	**Comparison group avg.***	**Autumn 2012**
Total departmental publications over the most recent 10 years (1998-2007)	1782	2117	2000
Publications per faculty member over the most recent 10 years (1998-2007)	30.7	39.9	35

V. Revenue and Expenditure Analysis

A. General Considerations

The CBS administration will work with the department chairs to develop a budget model that determines the relationship between income and expenses for each unit. We will strive to make it transparent. The final version will be posted on the CBS website. This model will:

- Show the department chairs and the faculty where revenue is generated and where it is spent.
- Help to understand the income and expenses of the CLSE, assign "credit" to departments for participation in CLSE teaching and develop principles for distributing CLSE revenue surpluses to departments and programs in accordance with college strategic initiatives.
- Provide templates and frame discussions about the distribution of college resources and expenses to the departments and programs.
- Inform budget issues and decisions in reorganized departments.
- Inform budget decisions resulting from the transfer of Entomology to FAES and the merger of MG and PCMB.
- Allow chairs to predict the fiscal consequence of actions.

The budget model will allow CBS to model the relationship between the size of a department, its teaching and research income and its expenses. An understanding of these relationships will be necessary to optimize resource generation and inform hiring decisions. One goal of the exercise is to understand the levels of subsidy of departments and programs and make them transparent to the faculty. Alignment of income and expenses will be measured using the OSU base budget allocation model. Units generate income primarily through teaching and F&A created by its PIs; expenses are mostly salaries plus benefits for personnel (including fee authorizations), and faculty set-up packages (including renovations).

We will develop a plan for department budgets that has three tenets:

1. Each unit must seek alignment of its income and expenses.

2. In FY12, no unit will be subsidized by more than a defined target. Targets will be determined in part, from the 2008-2009 department planning exercise and recommendations of the life sciences task force.
3. In FY12, no unit will have more than a defined target of its net revenues withheld by the College for cross-departmental subsidization.

The income of a department will be determined using the university general funds base budget model and represents the sources of funds for a department (i.e., net instructional revenues and net F&A recovered). Net instructional income is fees and SSI earned for credit hours taught, less central taxes and student services allocations. Net F&A is total F&A generated less research administration allocations.

Expenses are the department GFSA budget and the department's share of CBS expenses and commitments. Current college commitments include:

- New faculty salary and setup
- Renovation expenses
- Funds for matching equipment
- Special assessments for the Student Information System and OSURF PeopleSoft upgrade
- Arts and Sciences assessments for advising
- POM
- Employee Benefits
- Graduate Student Fee Authorizations
- Annual support for the IGPs

The difference between expense (E) and income (I) represents the amount by which a department's expenses differ from its income. A department's expenses exceed its income if I-E is negative and its sources exceed its uses if I-E is positive. The quantity $S = \frac{I - E}{I}$ then represents the fraction of a department's income that it either receives as a subsidy (if S > 0) or is withheld for another department's subsidy (if S <0). Note that S=0 means that a department is in exact financial balance. As a convenient shorthand, we call S the *Subsidy %*.

There are two variables involved in computing a department's Subsidy % -- income and expense. The primary ways that a department can increase its income are: increase its IDC on sponsored grants, offer new courses, attract more students to existing courses, institute lab fees, and attract development funds. Growing departmental income is challenging. However, in the case of highly subsidized, but highly productive, departments, income growth may be an attractive alternative to downsizing operations to reduce expenses. Surely, there must be innovative ways to approach income growth that are consistent with the Academic Plan and our own ambitions; e.g., attracting more students to our courses by the creation of new Masters programs.

Decreasing expenses inside a department will be the companion action to income growth. Options include redeploying graduate students used as TAs, choosing novel ways to deliver undergraduate instruction, reorganizing the support staff within departments, moving expenses to grants, charging user fees for services, etc.

The College will work with each unit to develop a plan designed to lead that unit to the targeted subsidy level. These plans will be a blend of income and expenditure targets that are suited to the unit's particular characteristics and circumstances. The College will monitor each department's progress and annually assess each department's progress toward the targeted Subsidy %.

At the departmental level, there will need to be ongoing discussions among the faculty and staff about the mixture of expense reduction and income generation that will produce the targeted subsidy levels, and still allow the department's scientific and educational missions to flourish.

B. Budget Principles

The College intends to move to a model where salaries of all faculty, teaching and academic administrative staff and graduate teaching assistants are supported by income generated by tuition and SSI. When the fiscal plan is fully implemented net marginal F&A revenue will be decentralized to the departments where it is generated (net marginal F&A revenue is the difference in F&A between 2002 and the present less research administrative expenses). These resources will be used by the departments to finance research support costs, such as start-up and renovation costs for new faculty, subsidizing shared services, and providing cost share resources for newly submitted proposals.

In addition, departments will be encouraged to increase the amount of release time reimbursements received from sponsored research projects (when allowed by the sponsors). These resources will help the departments to offset any reduction in general funds used to directly support sponsored research.

Also, the College will move to a model in which all salaries and a few key central priorities are centrally funded by net revenues generated by tuition and subsidy. After these costs are financed, the remainder of funds will be distributed by formula to units based on credit hours of instruction differentiated by the cost of instruction. The departmental leadership will annually propose budgets to the college for final approval and will have substantial discretion to align their budgets to support the instructional mission and research priorities identified in this document. This will include strategic sizing of the number of teaching assistants and instructional and administrative staff within each department. Those units that can deliver instruction and support their research priorities within their allotted budget will have the discretion to reinvest those funds within their unit. However, given the volatile nature of F&A generation these resources are not to be used to back permanent commitments.

When the fiscal plan is fully implemented in 2012, annual rate vacated by staff attrition will remain associated with the department and may be reinvested in new staff, additional graduate teaching assistants or other needs.

Annual rate vacated by tenure track faculty attrition will be returned to the College and saved to finance College priorities and generate start-up funds for new faculty. Ultimately the annual rate will be reinvested in hiring faculty in a manner consistent with the priorities that will be determined in the coming year. After this plan is fully implemented, annual rate vacated by assistant professors who are not awarded promotion and tenure will remain in the departments. There will be no financial "incentive" to promote faculty to preserve a salary line in any CBS unit.

C. New General Fund Resources Through 2012

Appendices 1-3 represent three scenarios from the college budget projection that outline free cash and annual rate that can be directed to new hires or other college priorities.

The current university budget model makes it relatively easy to predict marginal income from increased performance. The items listed below represent opportunities for CBS to increase income.

- Increase sponsored research by $3M in grants that pay full F&A (50%) - $1M
- Teach more credit hours (each option generates ~$1M at FY09 rates)
    - 6,654 credit hours (1330 students) in GS-2 courses (e.g., Biology 101)
    - 5,006 credit hours (1001 students) in Bac-3 courses (e.g. Mol Gen 500)
    - 4,195 credit hours to Mas-3 students (graduate students with <50 hours)
    - 3,295 credit hours to Doc-2 students (pre-candidacy doctoral students with less than 260 hours taken including 999)
- Shift from undergraduate program fees to lab fees. This change brings CBS into alignment with MAPS. A shift to $100/course fee and elimination of program fees in FY10 will net about $870k in continuing funds. Each additional $50/course increase yields $570k/year.
- Take advantage of rule changes regarding fee authorizations for post-candidacy doctoral students and summer quarter enrollment, which provide an opportunity to eliminate $400k in continuing funds per year for two years.
- Move all research fee authorizations to grants that allow this expense. This will be phased-in over three years to free up about $750k in continuing funds.

D. Uses of General Funds Resources

1. Hire More Great Faculty

Marginal Revenues will be used for salary and setup costs for new faculty. Revenues in excess of those included in the college budget model will allow departments to hire additional faculty.

2. Shift Introductory Instruction to Auxiliary Faculty

The college will shift to a model of teaching certain undergraduate courses with Auxiliary Faculty. The revisions in departmental and college governance documents and the human resources and financial plans for this shift will be developed over the next year.

3. Enhance Administrative Services to Faculty and Students

The merger of part of Entomology with EEOB, the merger of MG and PCMB and a reorganized Department of Biochemistry and OSBP provides an opportunity to rethink the organization of college and department staff. It is time to consider service centers in parallel with the review of services within the Arts and Sciences.

E. Bottom Line

With the shift to laboratory fees, reduction in fee authorizations and $15M in cash from ASC, we project hiring 26 additional faculty FTEs over the next six years (FY09-14). With increased marginal revenues from teaching, development or additional rebasing from the center opportunities are even greater. If faculty attrition is modest, this should result in a significant increase in the size of the college.

F. Undergraduate Program

CBS is blessed with an abundance of talented undergraduate majors. Although there are costs associated with advising and undergraduate research opportunities, there are also opportunities to increase enrollments in our courses. Departments that increase enrollments will have the income to grow their programs. Along with the income comes the responsibility to teach students well.

G. Graduate Programs

As we implement organizational changes desired by the faculty or recommended by the task forces, we expect that the six-year graduation rate of doctoral students will increase and time to candidacy and degree will decrease. Furthermore we expect the ratio of GRAs to GTAs will increase and the years spent by students as TAs will decrease.

VI. Center for Life Sciences Education

The Center for Life Sciences Education (CLSE) exists as a separate unit within the College of Biological Sciences. The CLSE houses:

- Advising and student services for the biology major,
- Development and coordination of biology courses for majors and non-majors alike,
- Support of instructional laboratories for biology courses,

- Graduate and undergraduate teaching assistant training, through courses, workshops, formal supervision, and informal mentoring,
- Faculty development opportunities focusing on innovative biology teaching and research on teaching and learning,
- Learning outcomes assessment and college-level curricular oversight for all biological sciences majors, and
- Additional college-wide undergraduate student services, including Honors and Scholars programs, student recruitment, undergraduate research coordination, and other student programming.
- Innovative uses of technology to deliver didactic lectures to a larger audience

As part of its mission, the CLSE promotes scientific literacy, encourages student-centered pedagogies, and uses ongoing feedback for data-driven decision making.

The CLSE is a service unit that draws on faculty and GTAs from all CBS departments, and, in turn, generates most of the undergraduate instructional revenues that are redistributed throughout CBS. The existence of a separate unit to administer an interdepartmental biology major and/or coordinate introductory biology courses is a common model among our peer institutions (see Appendix 9). While the CLSE has been successful in increasing credit hours taught, departmental budget allocations are not directly linked to CLSE teaching, and therefore this teaching is perceived as unrewarding in a financial sense. As part of the departmental strategic planning process, the CLSE will work with the departments to develop a funding model that rewards departmental contributions to the CLSE teaching mission.

VII. CBS Space Plan

A. Background

The College of Biological Sciences will continue to manage its space with an emphasis on providing quality research laboratory space to productive faculty and providing high-quality teaching laboratory space for all of our students.

With the completion of the renovation of Jennings Hall, the 6th floor of the Biological Sciences Building, the pending renovation of the 9th floor of the Biological Sciences Building, the pending renovation of the 3rd floor of the Biological Sciences Building and modest renovations at 1315 Kinnear Road, CBS has sufficient space to accomplish its current teaching and research missions and space for growth for at least five years, including the planned addition of 26 faculty FTEs by 2014.

We note that the ideal solution to the reorganization of Biochemistry would be to increase the scope of one of the two proposed new Chemistry buildings to accommodate all biochemists on campus, regardless of their current affiliations. We recognize this dream will only be possible with spectacular success in new development activity.

Appendix 4 summarizes the changes in assignable square feet in CBS during the period of time before occupancy of Aronoff (and before Jennings renovation) to the present. During

that period, our assignable square footage actually went down by over 6,000 square feet. Our strategy was to increase functional research and teaching laboratory space to allow for growth in the number of faculty and students without increasing square footage. Elements of our strategy were to:

- Vacate poor-quality or underused space especially on west campus to reduce POM costs associated with the space.
- Renovate Jennings (including construction of Aronoff Laboratory) to create high-quality, efficient laboratory and office space while reducing assignable square feet in the immediate area.
- Build a 250-seat lecture hall to serve faculty and students and to allow us to increase revenues by booking high-demand courses during popular time slots.
- Accumulate space in the Biological Sciences Building to allow for growth of research laboratories and provide swing space to allow for floor-by-floor renovations of that building.
- "Rent" underutilized space to other units to fund renovations.

B. Challenges in the Biological Sciences Building

The Biological Sciences Building is an impediment to faculty and graduate student recruiting and is a constant headache in terms of faculty retention. The building is nearly 40 years old and it has very few windows. The dreary interior is accompanied by a failing plumbing and HVAC infrastructure and inadequate electrical service. Existing mechanical systems plus the original laboratory casework and finishes represent a significant deferred maintenance burden. Most restrooms are not ADA accessible and laboratories lack the latest in ventilation and safety features. Original floors in the building have asbestos tiles. Fume hoods and some laboratory casework contain transite-asbestos materials. The structure above the ceiling on 8 of the 9 assignable floors of the building has spray-on asbestos fireproofing that has been dislodged by 40 years of vibrations, maintenance, floods, etc. The Office of Environmental Health and Safety cautions us to assume that the upper surface of ceiling tiles, pipes and ductwork is contaminated and must be treated as hazardous waste. Asbestos dislodged by leaks and the potential for airborne particles moving through missing ceiling tiles represent a potential risk to room occupants. The ease, scope and cost of routine maintenance and renovations are complicated by this condition.

Actions:

Option 1: Complete replacement of the building.
This option is self explanatory and is likely the most expensive option. If the new building were to be on a different site, this option would be the least disruptive to the teaching and research activities of the faculty and students. If the replacement is to be built on the current site, considerable swing space would be required. A ballpark estimate of replacement cost for the building based on similar projects at OSU is $85-105M in 2009 dollars.

Option 2: Phased additions and renovations of the Biological Science Building

Although the preferred scenario is a total building replacement, the project could be approached in a stepwise manner to delay the total replacement decision. There are several elements to this option that can be addressed simultaneously or sequentially depending on availability of funds and logistics of the renovations.

Item 2.1a Wrap the south and west sides of the building with an addition that contains windows. This addition would house faculty offices, conference rooms and other people-friendly spaces. It could also include additional laboratory and administrative spaces. This project has been a capital request for the last few biennia. Without this element, the building will continue to be deemed as inadequate by the faculty, staff and students occupying its space. A cost estimate for this item was evaluated as part of a capital request in a prior biennium. The request included 42,000 asf of office, laboratory, classroom, student lounge, conference and office space. The estimated cost was $30,300,000 in 2007 dollars. Note that this option does not address deferred maintenance issues in the unrenovated portions of the building.

Item 2.1b An alternative to item 2.1 would be to relocate utilities from the chase on the east side of the building to a new utility chase, modify the east exterior wall (also the east side of the chase) by adding punched windows or curtain wall, penetrate the west side of the chase to allow light to enter laboratory and office spaces. This option does not add assignable space to the building. There is no cost estimate available at this time for this plan, most of the cost would be in construction of the chase and replacement and reconfiguration of the mechanical and plumbing systems in the building. However, in addition to providing natural light, this item would address deferred maintenance of building utilities and asbestos abatement.

Item 2.2 Continue to address deferred maintenance with HVAC systems: Several ventilation system projects are in progress. The most recent basic renovation request addressed remaining HVAC issues on each floor. Issues with reheat boxes and controls in offices, ductwork between floors and the mechanical penthouse have not been addressed. Costs of this item cannot be estimated reliably until the ongoing projects are complete. At that time we will be able to assess the quality of building ventilation, evaluate the scope of the remaining work and devise a plan to address each remaining component individually or collectively

Item 2.3 Abate asbestos throughout the building: The presence of friable asbestos above the ceilings in the building adds costs and complications to every renovation and many maintenance tasks. Disruption to teaching and research during abatement makes this a difficult task that must be accomplished over several years. The total cost of asbestos abatement is difficult to estimate as costs are affected by the size and scope of each project.

Item 2.4 Conduct floor-by-floor renovations of the building. Renovation of the 6th floor is complete. Renovation of the 9th floor is in design. Renovation of the 3rd floor has been approved. Other floors will follow. The estimated cost of renovations for a single floor without major space reconfiguration is about $3M in 2009 dollars. Floors

remaining are 1, 2, 4, 5, 7 and 8. This is the most likely option and is the one being implemented.

Item 2.5 Until floor-by-floor renovations are complete, CBS will upgrade the quality of space on a room-by-room basis to accommodate new hires and productive faculty. In most cases, these renovations will occur "below the ceiling" to avoid friable asbestos and allow for cost-effective and timely projects. Costs vary according to room size and the scope of renovations but are approximately $100/sq.ft. A reasonable estimate is about $100,000 per project where a project provides laboratory space for a typical faculty member in CBS.

C. Current and Emerging Issues

CBS will attempt to stay ahead of maintenance issues in our newer buildings. We will also pursue funding for laboratory renovations especially those where we can leverage college resources to gain matching funds. There will be continuing needs for modest renovations (less than $50,000) to address programmatic changes and new opportunities in existing buildings.

In the last year, the CBS has committed to transfer the Rothenbuhler Bee Laboratory to OSU Extension. This action will free up over $60k per year in POM costs. CBS has also "rented" six research laboratories and associated offices in Jennings Hall to the College of Education and Human Ecology. This space is swing space for Human Nutrition faculty while space is renovated in Campbell. Funds from the rental will be applied to the Jennings project debt.

Instructional spaces on the 3rd floor of the Biological Sciences Building will be upgraded with capital funds allocated in this biennium. This will require the evacuation of five heavily scheduled teaching laboratories for about a year and will require us to manage instructional space very carefully. We would prefer not to phase the renovation and may need to temporarily assign Jennings space to course normally offered in the Biological Sciences Building and repurpose some research space in Jennings and Biological Sciences into teaching space to accommodate laboratory courses during the renovation.

The College recently acquired over 3,000 square feet of former ULAR space on the 5th floor of the Biological Sciences Building. In the immediate future, this space can provide research laboratory support and computer server space. On the intermediate term, this space must be renovated to have it function as research or teaching laboratory space.

In FY09, the Office of Research assigned 24,290 asf at Rightmire Hall and 13,685 asf at the Biotechnology Support Facility to the Plant Biotechnology organization in the College of Biological Sciences. The space houses and supports faculty in the Plant Molecular Biotechnology and Biotechnology Program. These spaces have been assigned to the Office of Research since they were constructed/renovated in the early 1990's. They have always housed plant biotechnology faculty. The new space assignment better aligns the actual use of the spaces to the university space inventory. This change also allocates marginal

changes in POM to the appropriate using agencies. Space must be renovated to have it function as research or teaching laboratory space.

In FY09, the Office of Research assigned 24,290 asf at Rightmire Hall and 13,685 asf at the Biotechnology Support Facility to the Plant Biotechnology organization in the College of Biological Sciences. The space houses and supports faculty in the Plant Molecular Biotechnology and Biotechnology Program. These spaces have been assigned to the Office of Research since they were constructed/renovated in the early 1990's. They have always housed plant biotechnology faculty. The new space assignment better aligns the actual use of the spaces to the university space inventory

We have the opportunity to undertake modest renovations at 1315 Kinnear Road to accommodate more faculty with research interests in systematic biology. After renovation, we could relocate faculty from central campus and/or accommodate new faculty. As strategic planning proceeds in the departments and as we evaluate opportunities to build world-class programs in systematic biology we can decide on how to best manage space at 1315 Kinnear. Renovations to provide additional office space can be accomplished for less than $100,000. Conversion of office and research service spaces to modern laboratory space with hoods and sinks can be accomplished at a cost of approximately $100/asf.

In the near future, we hope to raise funds to allow for the relocation of the Aquatic Ecology Laboratory from its current space in the Research Center into shell space at 1315 Kinnear. This initiative is independent of the other opportunities at 1315 Kinnear. Costs of this option are likely to be high. The estimate to renovate about 12,000 asf of new space at 1315 Kinnear would be approximately $4,000,000 in 2009 dollars ($250/asf construction costs plus 33% soft costs).

VIII. APPENDICES

APPENDIX 1. CBS RESOURCE SUMMARY SCENARIO 1

Allocate savings from changes in fee authorization policies, shift research fee authorizations to OSURF

ANNUAL RATE	FY09	FY10	FY11	FY12	FY13	FY14
Beginning AR Balance	**$1,891,603**	**$2,409,925**	**$2,420,475**	**$2,171,590**	**$1,823,479**	**$1,440,094**
NMR (from projection)		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$153,123	$32,000	$59,000			
Mid-Year Budget Adjustments	**($219,294)**					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Retirements/Terms (includes benefits)	$477,113	$160,332				
Institute Lab Fees, Eliminate Program Fees					$0	$0
Staff Hiring Additional	($152,720)					
Faculty Hiring Commited - Sal + Bene	($139,900)	($667,897)	($246,740)	$0		
New Faculty Salaries + Benefits		$0	$0	$0	$0	$0
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Ending Annual Rate Balance	**$2,409,925**	**$2,420,475**	**$2,171,590**	**$1,823,479**	**$1,440,094**	**$1,116,109**

CASH	FY09	FY10	FY11	FY12	FY13	FY14
Beginning Cash Balance	**$2,696,927**	**$1,242,342**	**$1,356,323**	**$475,710**	**$398,526**	**$652,326**
Projected NMR		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$855,831	$1,662,867	$1,527,683	$821,448	$172,091	$173,000
Jennings Space Agreement	$307,740	$307,740				
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Faculty Hires - Salary/Benefits	($92,688)	($667,897)	($246,740)			
Faculty Set up Committed	($1,866,578)	($2,283,319)	($1,700,000)	($1,042,000)	($475,000)	($125,000)
Staff Hiring Commitments	($147,862)					
Mid-Year Budget Adjustments	($465,056)					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Institute Lab Fees, Eliminate Program Fees					$0	$0
New Faculty Salaries + Benefits		$0	$0	$0	$0	$0
Faculty Setup Match for New Cash		$0	$0	$0	$0	$0
New Cash for Faculty Setup						
Undergrad Prog Fees Committed	($300,000)					
College operating & misc commitmts	($604,477)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)
Jennings Renovation	($200,000)	($200,000)	($200,000)			
Jennings LOC Principal	($616,421)	($1,000,000)	($1,000,000)	($800,000)		
Jennings Interest (4% of bal)	($135,000)	($112,000)	($72,000)	($32,000)		
Biosci Bldg Commitments	($1,000,000)		($800,000)			
Ending Cash Balance	**($1,167,584)**	**($1,064,152)**	**($1,695,880)**	**($1,424,953)**	**($787,768)**	**($123,659)**

CBS FACULTY HIRING SUMMARY (FTE)

Source of Funding	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4	0			**4.20**
New Hires			0	0	0	0	**0.00**
TOTAL	**1.25**	**6.3**	**2.4**	**0**	**0**	**0**	**9.95**

APPENDIX 2. CBS RESOURCE SUMMARY - SCENARIO 2

Includes Scenario 1 + Lab Fees @ $100/ course in FY10, $150 in FY11 and $200 in FY12

ANNUAL RATE	FY09	FY10	FY11	FY12	FY13	FY14
Beginning AR Balance	**$1,891,603**	**$2,409,925**	**$3,249,775**	**$3,571,540**	**$3,593,424**	**$2,997,730**
NMR (from projection)		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$153,123	$32,000	$59,000			
Mid-Year Budget Adjustments	**($219,294)**					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Retirements/Terms (includes benefits)	$477,113	$160,332				
Institute Lab Fees, Eliminate Program Fees		$829,300	$570,650	$570,650	$0	$0
Staff Hiring Additional	($152,720)					
Faculty Hiring Commited - Sal + Bene	($139,900)	($667,897)	($246,740)	$0		
New Faculty Salaries + Benefits		$0	$0	($200,655)	($212,309)	($217,307)
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Ending Annual Rate Balance	**$2,409,925**	**$3,249,775**	**$3,571,540**	**$3,593,424**	**$2,997,730**	**$2,456,438**

CASH	FY09	FY10	FY11	FY12	FY13	FY14
Beginning Cash Balance	**$2,696,927**	**$1,242,342**	**$3,014,923**	**$4,104,910**	**$4,167,666**	**$3,766,793**
Projected NMR		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$855,831	$1,662,867	$1,527,683	$821,448	$172,091	$173,000
Jennings Space Agreement	$307,740	$307,740				
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Faculty Hires - Salary/Benefits	($92,688)	($667,897)	($246,740)			
Faculty Set up Committed	($1,866,578)	($2,283,319)	($1,700,000)	($1,042,000)	($475,000)	($125,000)
Staff Hiring Commitments	($147,862)					
Mid-Year Budget Adjustments	($465,056)					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Institute Lab Fees, Eliminate Program Fees		$829,300	$570,650	$570,650	$0	$0
New Faculty Salaries + Benefits		$0	$0	($200,655)	($212,309)	($217,307)
Faculty Setup Match for New Cash		$0	$0	($2,000,000)	($2,000,000)	($2,000,000)
New Cash for Faculty Setup						
Undergrad Prog Fees Committed	($300,000)					
College operating & misc commitmts	($604,477)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)
Jennings Renovation	($200,000)	($200,000)	($200,000)			
Jennings LOC Principal	($616,421)	($1,000,000)	($1,000,000)	($800,000)		
Jennings Interest (4% of bal)	($135,000)	($112,000)	($72,000)	($32,000)		
Biosci Bldg Commitments	($1,000,000)		($800,000)			
Ending Cash Balance	**($1,167,584)**	**($234,852)**	**$533,370**	**$574,242**	**$769,063**	**$773,501**

CBS FACULTY HIRING SUMMARY (FTE)

Source of Funding	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4	0			**4.20**
New Hires			0	2	2	2	**6.00**
TOTAL	**1.25**	**6.3**	**2.4**	**2**	**2**	**2**	**15.95**

APPENDIX 3. CBS RESOURCE SUMMARY - SCENARIO 3

Includes Scenario 2 + $2.5M Cash Per Year for Startup in FY10 through FY14

ANNUAL RATE	FY09	FY10	FY11	FY12	FY13	FY14
Beginning AR Balance	**$1,891,603**	**$2,409,925**	**$3,070,995**	**$3,111,181**	**$2,932,410**	**$2,124,407**
NMR (from projection)		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$153,123	$32,000	$59,000			
Mid-Year Budget Adjustments	**($219,294)**					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Retirements/Terms (includes benefits)	$477,113	$160,332				
Institute Lab Fees, Eliminate Program Fees		$829,300	$570,650	$570,650	$0	$0
Staff Hiring Additional	($152,720)					
Faculty Hiring Commited - Sal + Bene	($139,900)	($667,897)	($246,740)	$0		
New Faculty Salaries + Benefits		($178,780)	($281,579)	($401,310)	($424,618)	($325,961)
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Ending Annual Rate Balance	**$2,409,925**	**$3,070,995**	**$3,111,181**	**$2,932,410**	**$2,124,407**	**$1,474,462**

CASH	FY09	FY10	FY11	FY12	FY13	FY14
Beginning Cash Balance	**$2,696,927**	**$1,242,342**	**$2,707,363**	**$3,005,413**	**$2,706,500**	**$1,719,996**
Projected NMR		($234,510)	($193,333)	($290,230)	($322,609)	($260,171)
Additional Resources	$855,831	$1,212,867	$1,977,683	$821,448	$172,091	$173,000
Jennings Space Agreement	$307,740	$307,740				
Changes - Post-Cand Fee Auths + reduced summer	$400,000	$400,000				
Shift of Fee Auths to Grants		$373,125	$187,313			
Faculty Hires - Salary/Benefits	($92,688)	($667,897)	($246,740)			
Faculty Set up Committed	($1,866,578)	($2,283,319)	($1,700,000)	($1,042,000)	($475,000)	($125,000)
Staff Hiring Commitments	($147,862)					
Mid-Year Budget Adjustments	($465,056)					
Additional 0.5% Salary Increase for Faculty		($52,500)	($55,125)	($57,881)	($60,775)	($63,814)
Institute Lab Fees, Eliminate Program Fees		$829,300	$570,650	$570,650	$0	$0
New Faculty Salaries + Benefits		($178,780)	($281,579)	($401,310)	($424,618)	($325,961)
Faculty Setup Match for New Cash		($2,000,000)	($3,000,000)	($4,000,000)	($4,000,000)	($3,000,000)
New Cash for Faculty Setup		$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000
Undergrad Prog Fees Committed	($300,000)					
College operating & misc commitmts	($604,477)	($500,000)	($500,000)	($500,000)	($500,000)	($500,000)
Jennings Renovation	($200,000)	($200,000)	($200,000)			
Jennings LOC Principal	($616,421)	($1,000,000)	($1,000,000)	($800,000)		
Jennings Interest (4% of bal)	($135,000)	($112,000)	($72,000)	($32,000)		
Biosci Bldg Commitments	($1,000,000)		($800,000)			
Ending Cash Balance	**($1,167,584)**	**($363,632)**	**($105,768)**	**($225,910)**	**($404,411)**	**$118,050**

CBS FACULTY HIRING SUMMARY (FTE)

Source of Funding	FY09	FY10	FY11	FY12	FY13	FY14	TOTAL
Existing Commitments	0.95	3.8	1.0				**5.75**
TIE Hires (CBS Commitment)	0.30	2.5	1.4	0			**4.20**
New Hires		2	3	4	4	3	**16.00**
TOTAL	**1.25**	**8.3**	**5.4**	**4**	**4**	**3**	**25.95**

Appendix 4. College of Biological Sciences Assignable Square Footage by Building and Year.

Building	FY02	FY08	Difference
Aronoff	0	53,912	53,912
B&Z/Jennings	84,865	37,632	(47,233)
Rothenbuhler Bee Lab	5,424	5,445	21
Bevis	1,125	0	(1,125)
Biological Sciences Greenhouses	20,779	20,723	(56)
Biological Sciences	94,418	97,892	3,474
General Biology Annex	7,260	0	(7,260)
1991 Kenny	1,591	0	(1,591)
1314 Kinnear	762	776	14
1315 Kinnear	63,211	63,724	513
Riffe	24,547	21,394	(3,153)
Research Center	15,153	11,135	(4,018)
Zoology Lab 1	667	647	(20)
Zoology Lab 2	385	408	23
Zoology Storage	1,899	1,899	0
Grand Total	**322,086**	**315,587**	**(6,499)**

Appendix 5. CBS SWOT Analysis

Strengths

- Our values are aligned with the academic plan and the science and technology plans for the State of Ohio.
- The college has distinctive, cohesive departments and graduate programs.
- We have great faculty including several high-profile faculty.
- The diversified sponsored research portfolio includes support from several federal, state and private agencies.
- Availability of research space for growth.
- Culture of interdisciplinarity - over 1/3 of the salaried faculty have appointments that cross departmental and college lines; 27% of the graduate students are from Life Sciences Interdisciplinary Graduate Programs.
- Three TIE awards demonstrate excellence and focus resources on emerging areas of excellence
- Strong undergraduate programs.
- The number of undergraduate majors has grown over 40% in the last five years.
- Commitment to undergraduate research.
- Interdepartmental Biology major is the largest major at the largest US university. It benefits from faculty expertise that crosses department lines.

Weaknesses

- Declining faculty size and morale
- CBS is relatively small (by OSU standards) with departments that are invisible for a variety of historical issues related to branding (interdisciplinary faculty in a discipline-based ranking world)
- Some departments overly dependent on IGPs as a source of students
- Low funding from industry
- Large class sizes
- The interdepartmental Biology major often suffers from a lack of ownership by the faculty
- Our graduate programs are perceived as weak
- Shortage of well-qualified doctoral student applicants
- Facilities of uneven quality. Certain buildings have huge deferred maintenance challenges. Prospects for improvements of aging infrastructure are limited by high capital costs and long timelines for capital projects.
- Geographic fragmentation interferes with departmental cohesiveness.

Opportunities

- Past productivity and anticipated growth is sufficient to justify new hiring
- In the current federal funding climate, our hard money faculty salaries and our work environment are attractive to faculty candidates relative to medical schools
- There is the potential to recruit a more diverse faculty and graduate student population
- The Arts and Science budget model is under review and possible revision to recognize start-up costs.

- Untapped potential for industrial partnerships through direct relationships and through the Ohio Board of Regents and the Department of Development
- Great potential for increased international collaborations
- Great opportunities in new areas of research if we can develop nimble structures to take advantage of hot areas
- Seemingly unlimited numbers of great undergraduate students
- Untapped potential for new courses to generate new revenues
- Pending endowments can provide basis for advancement of departments and programs
- The availability of Choose Ohio First Scholarships for STEM students presents CBS with an opportunity to increase further the number of students in CBS majors and courses. Increased enrollments will bring many challenges along with increased revenue and a challenge to decrease attrition from STEM majors

Threats

- Set-up costs make it difficult to grow the size of the faculty
- Faculty are leaving for other institutions which have the resources to grow their programs
- Other life sciences units on campus obscure our research identity (branding)
- The condition of the Biological Sciences Building interferes with recruiting and faculty morale
- There is a challenging employment picture for PhD graduates in the life sciences
- The changing federal research funding climate may limit ability of faculty to conduct research
- The uncertain state and university funding climate may further erode the budget and our ability to grow
- CBS majors take more science credit hours outside of CBS than inside. This makes it difficult to recover instructional revenues based on growth of majors and complicates efforts to prevent attrition of freshmen and sophomores.
- Shifts of students to other majors could erode the base budget
- Loss of enrollments in GEC courses could erode the base budget

Appendix 6: Alignment with the Academic Plan

Build a World Class Faculty

The primary focus of the CBS strategic plan is identification of resources to grow the size of the faculty. Faculty positions will be aligned with departments and programs that can move into the top ranks among their peer units.

Define Ohio State as a Leading Land Grant University

CBS is proud to provide affordable access for undergraduate students to high-quality courses and programs in the life sciences. CBS provides fundamental instruction in the life sciences to undergraduates across campus, service courses to health sciences colleges and major programs to over 3100 undergraduate students.

Although the CBS mission emphasizes basic research, there are applications for everything that we do. In some units the applications include understanding the behavior of mosquitoes that transmit disease or managing fish populations in Lake Erie. In others the focus might be on infectious diseases, unraveling genome of crop plants or understanding the inner workings of a cancer cell.

Improve the Quality of the Teaching and Learning Environment

Quality teaching is a part of every department culture in CBS. We are currently strained by high student faculty ratios. In Autumn 2008, CBS has over 40 undergraduate majors per faculty FTE. We simply have to reduce that ratio to improve the learning environment. Our goal is to grow the faculty to give our students the best experiences possible in the classroom, in our teaching laboratories, and to undergraduates doing research in our laboratories. Increases in faculty are also critical to building and maintaining quality graduate programs.

A major thrust of CLSE is science pedagogy. With their people and programs, they are continually improving the curriculum, improving courses, assessing effectiveness of new instructional approaches and assisting faculty and TAs throughout the college to improve the effectiveness their teaching.

CBS has been aggressively improving the physical environment for all of our students. With the completion of Jennings Hall and the pending renovation of the 3rd floor of the Biological Sciences Building, the majority of our classrooms and teaching laboratories will be safe and efficient and should enhance the experiences of all of the students in the labs for years to come.

Enhance and Better Serve the Student Body

CBS has one of the strongest undergraduate populations on campus. Our 3,100 majors are among the most talented on campus and are more diverse than the University as a whole. We have the highest proportion of honors students in the Arts and Sciences and well-established scholars program. Along with student numbers comes responsibility to teach them well, advise them well and provide outside-the-classroom possibilities to learn and serve the community.

Our honors students are advised by faculty while much of the departmental advising is done by a dedicated group of professional advisors. Our undergraduate honorary, Helix Tri-Beta, has been engaged in academic and service activities for over 30 years. Each department has an undergraduate organization. Our student organizations and our Scholars program provide opportunities for student social activities, professional development and service learning.

Create a Diverse University Community

CBS is proud of its diverse undergraduate population. Among our majors, 51.7% are women vs. 47.6% at OSU; 3.1% are Hispanic vs. 2.5% at OSU; 12.3% are Asian American vs. 4.7% at OSU; 0.5% are Native American vs. 0.4% at OSU; 7.5% are African-American vs. 6.8% at OSU and 2.9% are non-resident aliens vs. 2.3% for OSU. We are continuing to work with all appropriate offices on campus to build on our success in recruiting a diverse population of students. Attention must now be paid to recruiting more underrepresented minority graduate students.

Among the salaried faculty ranks 26 % are women. Our goal is to significantly increase the number of women on the faculty. To achieve this goal we strive to retain all of our current female Assistant Professors through promotion to tenure. We must mentor all female Associate Professors to enhance their dossiers with a view toward promotion to Professor. We will set a goal of hiring women in our searches consistent with the size of the pool of new Ph.Ds ; this goal should be increased as proportion of women increases in the pool of job candidates. At least one woman should be hired at the rank of Professor in the next three years. We must adopt best practices to recruit at least one African-American, Hispanic, or Native-American woman in the next three years.

We need to increase representation of underrepresented minorities on our faculty through cultivation of Ohio State students and post-docs from underrepresented groups for our own faculty positions. In addition, all departments should emulate EEOB's proven tactics to aggressively recruit underrepresented minority targets of opportunity.

Help Build Ohio's Future

Faculty and staff in Biological Sciences are committed to supporting our community. Programs to enhance the learning experiences of children of all ages, and foster lifelong learning for adults have been developed and attract impressive participation. Of particular

interest are programs aimed at keeping middle and high school students engaged in learning that will lead them to careers in STEM fields.

- Dr. John Wenzel with the faculty and staff of the Museum of Biological Diversity host over 1,000 community members each year during their annual open house. The millions of specimens housed at the museum are showcased in a fun and family-friendly way that attracts more visitors each year. Last year, a companion booklet was sent to every middle school in the state of Ohio.
- Dr. Amanda Simcox and her students travel to area high schools to enhance understanding of DNA analysis. Students participating in the workshop are provided instruction in the analysis of DNA, and then hands-on experience in molecular genetics laboratory techniques.
- Each year the college participates in Women's Empowerment Day with Columbus City Schools. The college provides mentoring, workshops and scholarships for female students in Columbus.
- The college has been actively involved with Metro High School since its doors opened. Each year, the college sends a graduate student to assist with teaching. Faculty and staff consult with the school on lab construction and configuration, communications, and pedagogical issues.
- Dr. Susan Fisher brings scholars from around the nation to campus each year to foster public discourse about the intersection of science and religion.
- Joan Leonard and the staff of the Biological Sciences Greenhouse host busloads of students each quarter. Children get dirty potting a plant to take home, pet bugs in the insectary, and learn about their environment.

Appendix 7: Alignment with Presidential Priorities

Forge One Trans-Institutional University

CBS is already trans-institutional. One third of the faculty hold salaried cross-college appointments. We draw graduate students from six departmental graduate programs and four Life Sciences Interdisciplinary Graduate Programs. Our biology major and biology courses are interdepartmental.

List of Centers

- The Comprehensive Cancer Center
- The Center for Microbial Interface Biology (and the accompanying TIE in Public Health Preparedness)
- The Mathematical Biosciences Institute (and the accompanying TIE in Mathematical Biosciences)
- The Plant Molecular Biology and Biotechnology Program (and the accompanying TIE in Translational Plant Sciences)
- The Ohio Agricultural Research and Development Center
- The Ohio State Biochemistry Program
- The Biophysics Graduate Program

- The Molecular, Cellular and Developmental Biology Program
- The Environmental Sciences Graduate Program
- The emerging RNA Center
- The emerging Center for Biodiversity Research & Analysis

Putting Students First

See "Enhance and Better Serve the Student Body"

Retain, Attract, and Reward World-Class Teachers and Researchers

The primary focus of the CBS strategic plan is identification of resources to grow the faculty. Faculty positions will be aligned with departments and programs that can move into the top ranks among their peer units. If resources can be identified, we will continue to increase faculty salaries, create an environment where faculty want to stay at OSU, and provide competitive counter offers to faculty who are tempted to go elsewhere.

Recast our Research Agenda

Without additional resources, the CBS research agenda will be defined by the TIE competition that funded the three CBS TIE programs. With additional resources, CBS can pursue new opportunities. Those opportunities will be determined as CBS completes the departmental strategic planning exercise that is currently in progress. We expect that the task forces on Life Sciences and Environmental Sciences will also inform our recast research agenda.

Commit to our Communities

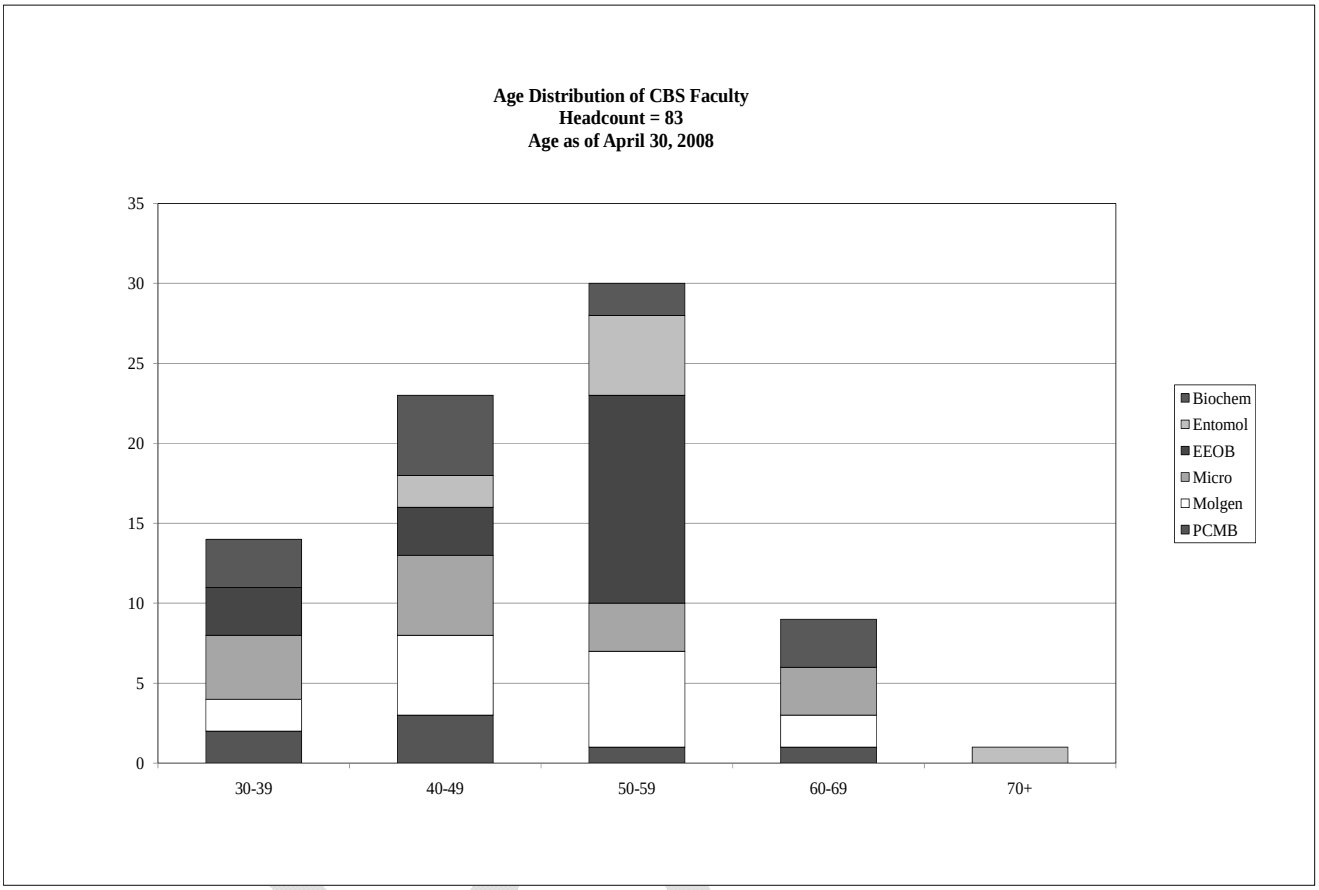
Faculty and staff in Biological Sciences are committed to supporting our community. Programs to enhance the learning experiences of children of all ages, and foster lifelong learning for adults have been developed and attract impressive participation. Of particular interest are programs aimed at keeping middle and high school students engaged in learning that will lead them to careers in STEM fields.

See also "Build Ohio's Future

Simplify University Systems and Structures

CBS wholeheartedly welcomes simplification of administrative systems and structures.

Appendix 8. Age distribution and retirement risk of CBS faculty



Appendix 9. Biology courses and majors at other universities
Information about introductory biology course administration and handling of flexible life sciences majors like the biology major at Ohio State was obtained from web pages at various institutions. Most institutions (those marked with *) have a central (i.e. college, non-departmental) unit responsible for coordination of introductory biology courses for majors and non-majors and/or for advising and student services for their general biology majors.

Big 10 Universities

University of Illinois: departmental courses and majors
Two departments, Integrative Biology and Molecular and Cellular Biology, in the College of Liberal Arts and Sciences split the teaching of **introductory biology** for majors and they both teach courses for non-majors. The advising for **both majors** is housed in the respective departments.

Indiana University: departmental courses and majors
The College of Arts and Sciences has a **Department of Biology** which teaches **introductory biology** and **advises Biology, Biotechnology, and Microbiology majors**.

University of Iowa: departmental courses and majors
The College of Liberal Arts and Sciences has a **Department of Biology** which teaches **introductory biology** and **advises students in 7 life sciences majors**.

***University of Michigan: centralized courses and majors**
The **Program in Biology** in the College of Literature, Science and Arts coordinates introductory biology courses and delivers advising and student services for 7 majors across two departments (EEB and MCDB).

***Michigan State University: centralized courses and majors**
Biological Sciences courses are coordinated by the Biological Sciences program. The **College of Natural Science** Dean's Office coordinates advising and student services for several interdepartmental majors, including **Biological Sciences and Human Biology**.

***University of Minnesota: centralized courses and major**
The **Biology Program** is a unit of the College of Biological Sciences which has administrative and instructional responsibility for **introductory biology courses**, both majors and non-majors, is home to the **Biology major,** and supports all of the college's **instructional laboratories.**

***Northwestern University: centralized courses and major**
The **Program in Biological Sciences** in the Weinberg College of Arts and Sciences coordinates a variety of **Biological Sciences courses** and offers the **Biological Sciences major**.

Pennsylvania State University: departmental courses and majors
The **Biology Department** in the Eberly College of Science offers **six life sciences majors** and coordinates **introductory biology courses**.

Purdue University: departmental courses and majors

The **Department of Biological Sciences** in the College of Science offers 8 programs of study, and coordinates the introductory courses and the major advising for these majors.

***University of Wisconsin: centralized courses and majors**
The **Institute for Cross-College Biology Education** coordinates interdepartmental majors (Biology, Molecular Biology, Biological Aspects of Conservation), cross-college courses, and the Biocore program that is required for many life sciences majors. They also have a separate Center for Biology Education that manages outreach and innovation in biology teaching.

Some Other CBS Benchmark Universities
***Cornell University: centralized courses and major**
The **Office of Undergraduate Biology** coordinates **majors and non-majors biology courses** and provides support services for the **Biology major** at Cornell.

***Stony Brook University: centralized courses and major**
The **Undergraduate Biology Office** in the Division of Biological Sciences administers **biology courses** (including the Biology Core courses that are foundational for all life science and pre-health programs, non-majors courses) and coordinates major advising for the **Biology major**. Other Arts and Sciences departments (EE, Neuroscience) do not have separate majors, but provide undergraduate training through tracks within the Biology major.

***UCLA: centralized course coordination; departmental majors**
The **Life Sciences Core Office,** in the colleges of Letters and Science, coordinates four **Life Sciences courses** (LS 1, 2, 3, 4) that introduce all Life Science majors to the core curriculum, one general education course (LS 15) for students in majors other than life sciences, and LS 187 (Principles of Genomic Research). The **Biology major** is administered by the EEB Department (one of several life sciences departments in College of Letters and Science).

***UCSD: centralized advising and student services; courses?**
The **Biology Student Affairs Office** in the Division of Biological Sciences oversees advising and student services for all 8 majors in the Division. It is not clear from the web site how lower division Biological Sciences (BILD) courses are coordinated, but they are evidently separate from departmental offerings.

University of Colorado: departmental courses and majors
Two departments in the Arts and Sciences**, Molecular, Cellular, and Developmental Biology (MCDB); and Ecology and Evolutionary Biology (EBIO), each teach an introductory course**, and each of their departmental majors (MCDB and EBIO) requires both introductory courses. Both MCDB and EBIO offer their own 2-semester sequences that satisfy part of the natural science requirement for non-majors.