



# College of Science

## FY19 Financial Plan

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### Executive Summary

Given projected cost escalations and declining metrics (majors, student credit hours, etc.) in the College of Science, it is imperative that we make immediate investments to generate net revenue. The College's FY18 budget, based on metrics, is nearly balanced if we make no investments to bring additional revenue into OSU or COS. However, our operating fund balance is nearly zero after several years of expenditures being larger than revenues and is projected to go slightly negative by the end of FY18, and much more negative in FY19.

We have identified \$1.5M of investments that should generate more than \$3.5M/year (moderate confidence) in revenue to the College of Science and more to OSU. These investments plus normal cost escalation require an increase in our metrics-based budget in FY19 of 3.3% (\$1.1M in FY19) from the university, along with approximately \$1.7M that we will generate from cuts and increased FY19 revenue generation. Together this should generate significant revenue for the college while increasing student success. The investments are (1) Expand recruitment and advising; (2) Increase instructional and degree capacity, primarily in the pre-health sciences; (3) Improve the quality of instruction and degrees; (4) Expand e-campus; and (5) Increase extramural funding. Details are given in Table 2, with further detail available upon request. We judge our revenue forecast to have moderate confidence, but these investments should generate more than \$3.5M/year of revenue to the College of Science, though it could take several years to realize fully.

These investments carry the endorsement of the COS department heads and our senior leadership team.



An increase of 3.3% (\$1.1M) in the metrics-based budget may require non-recurring bridge funding, but the amount is uncertain. Our current projections of cost escalation are \$1.6M/year, and projections from the Budget Office for the FY19 budget model indicate a decrease in the metrics-based budget of approximately \$1.6M/year. Taking these at face value along with our increased FY19 revenue generation and cuts, COS would need bridge funding of \$2.65M in FY19 and a similar amount in FY20 (potentially plus cost escalation). This would then ramp down over 2-3 years in FY21-23. Of course, if our metrics in FY18 are better, or if the FY19 budget model is more favorable, then the requested bridge funding will be lower.

Lastly, the Appendix presents a study of the size (as a proxy for budget) of the OSU College of Science, relative to OSU as a whole, that is required to meet our mission. Our conclusion is that COS is undersized by between 8 and 50% relative to OSU as a whole. We acknowledge that some other units are undersized as well, but ask that we work together on the budget model to return COS to fiscal health while maintaining health in other units.

## Science's Strategic Landscape: Opportunities & Threats

The College of Science FY19 Financial Plan takes into account the opportunities and threats facing COS as we approach FY19. COS serves a large portion of OSU students with high quality STEM courses. Science and non-science majors alike benefit from the high impact courses that satisfy Baccalaureate Core Course and other degree requirements. This document shows how investment in COS presents a tremendous opportunity to enhance the educational experience for all OSU students. Conversely, a lack of investment is a threat to the whole university that could reduce student success and damage our reputation and rankings.

### Opportunities

**There is a large clientele for COS courses and majors**, both within the university and externally in a broader population of prospective students. For example, Science coursework is critical to Engineering, which generates 25% of our SCH. Science degrees are societally important and lead to high-paying jobs, with many resulting in average salaries beyond \$100K by mid-career<sup>1</sup>. Even more importantly, Science research is critical to growing Oregon's economy and well-being.

**Demand for online education will grow, particularly among prospective students who cannot come to a campus.** COS offers courses and degrees to help these students, and must position itself online with relevant, high-quality offerings.

**We have the opportunity to significantly grow our philanthropic base.** COS has ~28,000 living alumni, several thousand of whom have significant financial capacity. OSU is launching a new capital campaign soon, we have excellent students and faculty, and we have a great story to tell.

**Science is central to OSU's overarching goals of healthy people, living on a healthy planet, in a healthy economy.** We have strategic opportunities to build distinction in marine science, sustainable materials science, biohealth science, and data science.

1 <https://www.payscale.com/college-salary-report/majors-that-pay-you-back/bachelors?page=33>

## Threats

**Growth in costs among OSU support units, among units with revenue but that require subsidy, and in COS itself *within the context of a flat university budget.*** Based on the sum of SCHs, F&A, and other revenues, COS earns significantly more revenue for OSU than it expends. However, much of that revenue subsidizes other activity in the university. Cost growth across OSU within a flat budget environment threatens COS, because these costs reduce the allocatable budget pools and create pressure to reduce the fraction of revenue that COS retains.

**Insufficient student success and persistence.** The College of Science’s DFW rates are too high in several areas, particularly for at-risk students, and too many COS majors transfer out of the College or leave OSU without ever completing a degree. Most of OSU’s “roadblock courses” for student success are in Science<sup>2</sup>. Our SCHs are down quite a bit—4.8% overall since AY2014-15. Undergraduate SCHs have declined 5.4%, with a drop of about 8% in lower division courses and an increase of 1% in upper division courses. In contrast, OSU SCHs are up 3.5% overall for the same period. Our first-year in-major retention has dropped from 65% to about 60% (though most of the remaining students stay at OSU).

**Community colleges in Oregon offer many of the lower division courses that makes up the bulk of our SCHs.** If students complete an increasing number of their general coursework elsewhere, COS could suffer.

**Much of our infrastructure is of poor quality, both for education and research.** Visiting students walk through our halls and may have the impression, from aesthetics alone, that Science is not thriving at OSU. Much of our research space is inadequate for world-class innovation.

## Science’s Strategies and Actions

Short-term (less than 2 years) strategies are labeled S, Long-term (up to 5 years) strategies are labeled L.

### S1. Improve student recruitment, success and retention, aka “Student Success.”

More than 70% of our budget comes from student tuition, and much of the rest (e.g., state contributions) is tightly tied to student success. We need to improve student success, with a particular focus on first generation and URM students, and we need more students to finish their degree in Science. We need to ensure they are successful, know they are welcome, and that they are part of a College that supports them. We need to make strong and swift progress.

#### ACTIONS:

1. Strengthen our degrees, pathways within degrees, and key courses leading to health sciences professions.
2. Actively recruit new students from high schools and community colleges, particularly high-achieving students.
3. Lower DFW rates in all Science “Roadblock Courses.”
4. Improve the climate for majors in the college and measure satisfaction levels annually.
5. Increase staffing and support for reducing barriers to success, early intervention, and experiential learning.
6. Expand integrated professional development.
7. Increase online student success.

2 [http://undergraduate.oregonstate.edu/sites/undergraduate.oregonstate.edu/files/documents/osuroadblock\\_courses\\_v.2015-2016.pdf](http://undergraduate.oregonstate.edu/sites/undergraduate.oregonstate.edu/files/documents/osuroadblock_courses_v.2015-2016.pdf)

## METRICS:

1. Retention rates within each major for 1st and 2nd year students – for all students, for URM students, and for Pell-eligible students
2. 6-year graduation rates – for all students, for URM students, and for Pell-eligible students
3. Number of COS majors
4. Number of COS majors who are high-achievers
5. SCHs
6. Combined weighted DFW rate in “Roadblock Courses” (MTH 111, 112, 241, 251, 252, 254, 306; ST 351; BI 211, 212; CH 121, 201, 232; PH 211, 212) for academic year in both on campus and online environments
7. College climate/satisfaction survey for students in spring term

## S2. Grow revenue through extended campus and related activities.

Extended campus—including ecampus, PACE, and summer classes—allow us to grow our revenue stream to support our broader mission. While our offerings have been growing, and we have learned a tremendous amount about which are successful, we need to fill some holes: ensure we offer degrees that are fully online, take advantage of opportunities to transition students into professional programs and help professionals transition between careers in an economy with increasing disruptions. We also need to expand our 4+1 accelerated master’s programs and related offerings so students can matriculate through the master’s level or earn professional certification.

## ACTIONS:

1. Bring Zoology degree online by Fall 2019.
2. Develop a business plan for ecampus to increase ecampus offerings, with a focus on key courses, online degrees, partnerships, and licensing.
3. Add introductory physics and other key courses by Fall 2019.
4. Expand 4+1 offerings.
5. Build and market virtual labs and create awareness of OSU’s brand and deep expertise in this space.
6. Grow MS in Data Analytics program.

## METRICS:

1. Number of online degree majors
2. Number of ecampus SCHs
3. Number of 4+1 students in College

## S3. Contain costs and discontinue some existing activities.

The College of Science is committed to offering high quality courses and programs for OSU students. We will undertake the numbered items below, and will only undertake subsequent bulleted items if fiscal conditions force them.

## ACTIONS PLANNED:

1. Not replace some retiring faculty; backfill some retiring Tenure-track with Non-tenure-track faculty, saving more than \$600K/year.
2. Develop efficiencies to decrease number of GTAs in some departments.
3. Examine cost-benefit of COS funding of all centers.
4. Reduce clerical support in the Dean’s office by shifting FTE to student engagement.
5. Not offer some classes.
6. Examine 201 accounts.
7. Reduce commitments to startup and external collaborations, saving \$435K/year.

## ACTIONS THAT COULD BE UNDERTAKEN IF BUDGET REQUIRES:

In the absence of investment (i.e., we do not plan to do these unless the budget forces them), activities that could be reduced and/or eliminated but would negatively impact student success and retention (counter to our strategies) include:

- Reduced hours and staffing in the Math Learning Center that would reduce hands-on Mathematics tutor and instruction.
- Reduced hours and staffing in the Mole Hole and Worm Hole learning centers that would reduce hands-on Chemistry and Physics tutoring and instruction, respectively.
- Fewer expensive laboratory courses that provide experiential learning.
- Fewer course innovations such as flipped classrooms and experiential learning that require resources to develop.
- Elimination of release time for faculty to develop new Ecampus courses that have the potential for revenue development.
- Faculty hiring restricted to non-Tenure-track Instructors who are less expensive and do not require large start-up costs.
- Reduce or eliminate COS-specific career services programs that identify future employment and employers for science graduates.
- Cut GTA training.
- Increase class sizes.
- Cut Learning Assistant program.
- Trim trailer options in all departments.
- Eliminate any expenditure not legally required that does not return positive ROI to COS.

## METRICS:

1. E&G Expenditures per SCH
2. Number of SCHs/GTAs

## S4. Increase research productivity and teaching efficiency.

We are committed to excellence in research, but the College of Science is “underweight” in research relative to peer colleges (i.e., COS funding dollar/Tenure-track faculty is 28% lower than Colorado State University, 55% lower than Michigan State University, 75% lower than University of Maryland<sup>3</sup>). However, significant funds flow from the educational part of our mission, which is 70% funded by private tuition dollars, to support research, which is primarily a public good. While some research support is necessary, in the difficult financial circumstances the College finds itself, the research enterprise must support more of its own mission. Alternatively, the College of Science budget will require additional university or public funds in order to maintain the current level of research subsidy or to increase the level of subsidy to that of its peers. At the same time, we need to make sure we are using our teaching resources in the most efficient possible manner.

## ACTIONS:

1. Establish full-time Research Support Services office with focus on major proposals to increase extramural funding.
2. Implement tenure-track faculty workload policy, including restrictions on teaching courses with few students.
3. Require all small classes (less than seven at graduate level, less than 12 at undergraduate level) to have Dean’s approval to be taught in-load.
4. Review all position descriptions with non-standard teaching loads.
5. Incentivize course buy-outs by TTF.

3 Data provided through personal communication by deans at Colorado State University College of Natural Sciences; Michigan State University College of Natural Science; University of Maryland College Park College of Computer, Mathematical, and Natural Sciences

**METRICS:**

- 1. Number of proposals submitted with budget more than \$500K
- 2. Number of courses taught in load with enrollments < 12 (undergrad), < 7 (grad)
- 3. F&A dollars
- 4. Research expenditures per tenure stream faculty

**S5. Partner with the University to improve Science budget.**

Although COS generates significantly more E&G revenue than its expenditures, it has been chronically short of funds, and periodically in fiscal crisis. Compared to the size of its R1 university peers (based on numbers of students and SCH), COS appears to have one of the smallest cohorts of tenure-stream faculty<sup>4</sup>. This may explain part of the College’s chronic budget difficulties—the fraction of university budget allocated to COS may be insufficient to its mission. This is not to minimize the need for reforms within the College, but to state that solutions require a partnership.

**ACTIONS:**

- 1. Work with the Provost, the Budget Office, and the Provost’s Council of Deans to create a budget model that funds COS at levels that are in proportion to other similar units nationwide but still allows appropriate and necessary subsidies to flow to other OSU units. See Appendix.

**METRICS:**

- 1. Ratio of COS size: OSU size, relative to national peers

**L6. Partner with the OSU Foundation for a highly successful campaign for Science.**

A highly successful campaign is key to enhanced student success, an improved physical plant for the College, and increased distinction in our signature areas.

**ACTIONS:**

- 1. Fully onboard new development staff (short-term).
- 2. Develop a compelling vision and concomitant strategic plan for the campaign.
- 3. Invest up to one quarter of the Dean’s effort in fundraising.
- 4. Expand our capacity in alumni and community relations.

**METRICS:**

- 1. Annual private giving and grants
- 2. Metric TBD on alumni and community relations

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4 See Appendix

## L7. Renovate and rebuild research and teaching space in Science.

Every building occupied by the College has limiting infrastructure for research or teaching.

### ACTIONS:

1. Renovate Cordley Hall.
2. Raise funds for rebuilding – and then rebuild – infrastructure for departments outside of Cordley Hall.
3. Renovate other lab and teaching space in the College.

### METRICS:

1. Progress on items above

## L8. Increase distinction in Marine, Biohealth, Materials, and Data Sciences.

The first three of these areas are existing strengths within the College. The fourth is an area we would like to build on in terms of research and education.

### ACTIONS:

1. Invest in personnel in marine science, sustainable materials science, biohealth science, and data science.
2. Partner with other colleges, the Marine Studies Initiative, and relevant Centers and Institutes to build OSU's strength in the area of marine science area.
3. Raise funds for endowed professorships in each area of distinction.

### METRICS:

1. Number of faculty in areas of distinction
2. Grants and contract spending in areas of distinction.

## Science's Financial Plan, Investments & Hiring Needs

### Financial Plan

Implementing the metrics-based budget model in FY18 increased the COS budget by about \$635K. Additional non-recurring bridge funds of \$65K were also allocated. Prior budget models increased COS by about +\$1.4M/year, but a combination of modest declines in COS metrics, increases in other college's metrics (leading to smaller allocatable funds for COS), and university-wide cost escalation and set-asides (e.g., capital renewal funds) lowered the FY18 budget model by more than \$700K, and now FY19 is projected to have a negative delta relative to the budget model prior to metrics. Additionally, COS must increase its revenue by approximately \$1.6M/year to keep pace with expected cost increases. Together, these point to an urgent need to implement strategies S1 – S5 above and their associated actions. Some of these strategies require investment, primarily for hires.

**COS requests non-recurring bridge funds for FY19 and FY20 that increase its metrics-based budget by +\$1.1M/year (3.3%) beyond the FY18 budget and cover cost escalations in FY20.** If the Budget Office's and our FY19 projections are correct, this will require approximately \$2.65M/year in bridge funding. This amount

is a combination of \$1.5M in investments, a projected decline in the metrics-based budget for FY19, and cost escalation. However, the total need is offset by increased FY19 revenue in COS, and reductions in expenditures of about \$1.7M/year (without these, the need would be more than \$4M).

Below is a summary of our Fiscal Plan with bridge funds.

Operating E&G Indexes	Actual	Projected	Projected	FY 17–FY 18	FY 18–FY 19
	FY 2017	FY 2018	FY 2019	% Change	% Change
Metrics Budget (NOT ECampus, Summer ROH, & Fees)	32,300,444	33,570,949	32,012,189	3.9%	-4.6%
Requested Bridge Funds		64,678	2,650,000		
ECampus, Summer Session, and ROH	7,351,419	7,488,123	8,146,066	1.9%	8.8%
Internal/External Fees & Sales	1,694,889	1,743,650	1,763,650	2.9%	1.1%
Net Other Budget Inflows and Outflows	(235,605)	(181,872)	253,201		
<b>Total Budget Inflows and Revenues</b>	<b>41,111,147</b>	<b>42,685,529</b>	<b>44,852,106</b>	<b>3.8%</b>	<b>4.8%</b>
Salaries and OPE	39,145,018	40,802,815	42,560,984	4.2%	4.3%
Services & Supplies	1,844,749	2,056,150	1,991,850	11.5%	-3.1%
Capital Outlay (Capitalized)	107,811	50,000	50,000	-53.6%	0.0%
Net Transfers Out/(In)	72,032	94,167	64,167	30.7%	-31.9%
<b>Total Expenses</b>	<b>41,169,611</b>	<b>43,003,132</b>	<b>44,667,001</b>	<b>4.5%</b>	<b>3.7%</b>
Projected Annual OPERATING E&G Surplus/(Deficit)	(58,464)	(317,603)	158,105		
Beginning Operating Fund Balance	160,193	101,729	(215,874)		
Projected OPERATING E&G Fund Balance	101,729	(215,874)	(57,769)		
<b>NON-Operating E&amp;G Indexes</b>	<b>Actual</b>	<b>Projected</b>	<b>Projected</b>		
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>		
Net Activity in Non-Operating E&G Indexes	(1,261,138)	(565,000)	(700,000)		
Beginning Non-Operating E&G Fund Balance	4,889,891	3,628,753	3,063,753		
Projected TOTAL E&G Fund Balance	3,730,482	2,847,879	2,305,984		

**Table 1.** Executive summary of FY19 Budget, College of Science.

## Notes & Definitions

**OPERATING E&G INDEXES** - includes all regular department operations (research, teaching, administration, ECampus, Summer Session, and Cost Shares), as well as Dean’s Office, Cosine, Dean’s Budget Reserve, and NMR Facility.

**NON-OPERATING E&G INDEXES** - includes new faculty startup funds, professional development funds, Endowed Chair match funds, RERF allocations TCF allocations, LIG allocations, Center for Advanced Materials, and Arthropod Collection.

**METRICS BUDGET (NOT ECAMPUS, SUMMER, ROH, AND FEES)**- For FY 2018 and FY 2019, this is the projected budget based on the new metrics budget model for degree foundations, undergrad completions, research, strategic populations, and graduate completions. These are all of the metric areas with the exception of Alternative Delivery (ECampus and Summer). COS estimates for ECampus, Summer Session, and other earned revenues are stated separately on this table.

**NET OTHER BUDGET INFLOWS AND OUTFLOWS** - Inflows include Honors MOU, Grad Health Life, ECampus Development, Laurel Block Grant, as well as other budget transfers from the Provost’s Office and other units for specific projects. Outflows include transfers to

support University-wide facilities, start up funding, contracted support for specific projects and faculty members, as well as other budget transfers out of the COS operating indexes.

Projection for operating indexes is based on departmental and College spending plans, as well as analysis of recent trends

Non-Operating indexes are very difficult to project, as they represent the accumulation of many non-recurring activities (e.g.: lab startups for new faculty, one-time faculty development opportunities, etc) and spending is at the discretion of a large number of individual faculty members to whom these funds are committed. As a general trend, we expect the balances in these funds to decrease over the next few years as startup funds are spent and expire.

## Investments

Below are the \$1.5M investments we will make to increase COS metrics.

Strategy	Note #	Activity	COS Foundation Funds	E&G Funds
S1	1	Increase advising & recruitment		\$211,000
S1	2	Increase instructional & degree capacity in pre-health sciences	\$310,000	\$273,000
S1	3	Improve quality of instruction & degrees		\$100,000
S2	4	Expand ecampus	\$125,000	\$233,500
S4	5	Expand research funding	\$200,000	\$68,500
<b>TOTAL</b>			<b>\$625,000</b>	<b>\$886,000</b>

**Table 2.** Planned investments in late FY18 and FY19 to increase COS metrics.

### Notes

1. This involves hiring three new staff (see Table 3) to recruit and advise students and provides a modest budget (\$5,000) for student engagement. New recruiting and advising staff will focus on outreach and engagement of high schools and community colleges as well as first-year and transfer students. We are restructuring the Dean's office to provide more student engagement and reduce clerical support.
2. This involves expanding our Biohealth Sciences (BHS) instructional capacity, restructuring our advising and instruction in BHS, expanding our GTA and office support for the new Biochemistry and Molecular Biology degree. We will renovate a lab to significantly expand our capacity to teach Anatomy and Physiology to our students, which will attract new majors. We will develop a new lab to teach cell culturing in the summer. We will also add a trailer sequence in a bottleneck course in Chemistry.
3. We will hire a precalculus math curriculum coordinator and instructor. Evidence shows that coordinating the many sections of these classes increases student success. While this investment will not significantly improve COS metrics, it will help student success (graduation and persistence) in other colleges.
4. We will expand our ecampus offerings in most departments. Although the majority of expenses will be covered in existing budgets by adjusting faculty and staff priorities, additional funds are needed to develop a new introductory sequence in Physics, to launch new ecampus efforts in Biochemistry, to grow the M.S. in Data Analytics program, and to launch the B.S. in Zoology online degree.
5. We will invest OSU Foundation funds in new equipment and establish a full-time Research Proposal Support office to increase extramural funding.

## Hiring Needs

COS will make the hires below. Note, these are already included in the Investments in Table 2, above.

Strategy	Note #	Position	Level	Salary Expected	Cost Share/ Unit	FY19 Fully Encumbered Cost to COS	Expected hire date
S1	6	Biohealth Sciences (BHS) instructors (x2)	Instructor	\$137,000		\$135,000	7/1/18
S1	7	Math “roadblock course” curriculum coordinator	Instructor	\$60,000	—	\$100,000	7/1/18
S1	8	Half-time office support, Biochemistry	OS1	\$14,000	—	\$25,000	4/1/18
S1	9	GTAs to grow BMB degree	GTA	\$32,000		\$58,000	4/1/18
S1	10	Transfer recruiter & advisor	Advisor	\$43,000	40%, OAA	\$43,000	4/1/18
S1	11	Recruiter & 1st-year advisor	Advisor	\$43,000		\$72,000	8/1/18
S1	12	SLS Professional Development Instructor/Recruiter	Instructor	\$60,000		\$91,000	7/1/18
S2		Assistant Professor in Data Analytics	TT Faculty	\$75,000		\$123,500	8/15/18
S2		Introductory Biology Instructor, half-time	Instructor	\$32,000		\$40,000	9/16/18
S4	13	Research Proposal Support Director	Professional Faculty	\$90,000		\$68,500	3/1/18
<b>TOTAL</b>						<b>\$756,000</b>	

**Table 3.** Expected hires in late FY18 and FY19.

### Notes.

6. This involves hiring three instructors (one to replace an instructor who left and two new positions). We will restructure other staffing and advising to reduce the overall cost. Together, these moves will significantly expand our capacity in the new Biohealth Sciences (BHS) degree. The net cost, because of staff reductions, is only \$135K.
7. Incumbent would be responsible for coordinating curriculum in MTH 111, OSU’s top “roadblock” course, and MTH 112, one of the other top 20. Success here would follow with a curriculum coordinator for the calculus series. [http://undergraduate.oregonstate.edu/files/documents/osuroadblock\\_courses\\_v.2015-2016.pdf](http://undergraduate.oregonstate.edu/files/documents/osuroadblock_courses_v.2015-2016.pdf). Incumbent would also become a permanent instructor in MTH 111 and 112.
8. Additional clerical staff in Biochemistry is needed to handle a growing number of students in the Biochemistry and Molecular Biology (BMB) degree.
9. GTAs are needed for the growing BMB courses.
10. A transfer recruiter and advisor will focus on recruiting students to OSU from community colleges and advising those students as they transition to OSU. This position will be funded 40% from the Office of Academic Achievement.
11. A recruiter and 1st-year advisor will focus on high school recruitment into COS majors and on advising freshmen.
12. This hire will expand our integrated professional development efforts within the life sciences. COS majors have difficulty with the perception and questions about what students do with the degree after graduation. This incumbent will help life sciences majors develop job-ready “soft” skills. These efforts will be integrated into our recruiting efforts so that prospective students and parents more easily see the value and marketability of science degrees.
13. This will allow us to open a full-time Research Proposal Support office with a Ph.D.-level research developer. The goal is to expand our research funding and to help COS faculty by more fully support their research efforts.

## Appendix—COS’s Fractional Budget Comparison to Peers

**What size should the College of Science be, relative to OSU, to accomplish its mission?** Unlike professional schools, there is no national database by which to compare colleges of science faculty, staff, or budget.

We conducted our own study of the size of OSU’s College of Science compared to other similar units at peer institutions. In this study, we were not interested in knowing if COS is smaller than similar units nationwide – we know that is the case. Most of OSU’s units are smaller than their peers because OSU has fewer resources. Instead, **we were interested in knowing if COS is smaller than other similar units relative to the university itself.** In other words, if we scaled other universities’ budgets to OSU’s budget, how large would their colleges of science be? Alternatively, if COS occupied the same fraction of OSU that other colleges of science occupy, how large would it be? Is OSU’s College of Science’ budget the right size compared to the size of the university budget itself?

We make two assumptions in this. First, we assume that the number of tenure-track faculty (TTF) scales with the resources of peer colleges. Budgets are not publicly available or easily compared between colleges of science. Instead, we used tenure-track faculty (TTF) as a proxy for size and budget. Second, we assume that the mission of our peer colleges is proportional to the size of the university. Science is a necessity in every major university, and bigger universities have more Science majors, Science SCHs, and so forth.

We collected two sets of data: (1) a survey of a small number of peers; and (2) TTF data from universities in the College and University Professional Association for Human Resources (CUPA) database.

### Summary

Results in both data sets are consistent – **the OSU College of Science makes up a significantly smaller fraction of the university than other colleges of science make up of their universities.** Oregon State’s COS is about 8% smaller than Colorado State University’s COS as a fraction of CSU. OSU COS is about 47% smaller than the average of 22 universities in the national comparator group, again relative to the size of those universities themselves. At the same time, OSU COS is also less research productive than the peer colleges we surveyed. The reasons for this are unclear, but a contributing factor is certainly related to budget – larger budgets allow for smaller teaching loads, larger departments with more and better facilities, and so forth.

## Survey

In December, 2017, a survey was sent to approximately 20 deans of colleges of liberal arts, colleges of science, and colleges of arts and sciences at public universities (mostly land grants). Three of the surveys returned so far are from Colleges of Science (Colorado State University, Michigan State University, University of Maryland College Park). The questions asked and the results returned are shown below in Table A1.

What is the name of your university?	Oregon State University	Colorado State University	Michigan State University	University of Maryland, College Park
What fiscal or academic year are the data from?	2016, 17	FY 2016-17	2015-2016	2017
What is the name of your college?	College of Science	College of Natural Sciences	Natural Science	College of Computer, Mathematical, and Natural Sciences
<b>Metrics</b>				
How many student credit hours (SCHs) did your university generate?	1,056,190	757,929	1,383,852	941,467
How many SCHs did your college generate?	214,069	190,733	278,585	223,043
How many SCHs were lower division?	135,004	128,331	detail not available	147,722
How many SCHs were upper division?	60,105	50,152	detail not available	60,016
How many SCHs were graduate level?	18,960	12,250	266,130	15,305
Does your university run on Semesters (16 weeks) or Quarters (10 weeks)?	Quarters (10 weeks)	Semesters (16 weeks)	Semesters	Semesters
How many tenure-track/tenure-stream faculty are there at your university?	974	1081	1935	1,568
How many non-tenure-track faculty (instructors, etc.) are there at your university?	570	765	1035	3,157
How many tenure-track faculty are there in your college?	122	182	343	341
How many non-tenure-track faculty are there in your college?	59	54	80	830
What is your university's general fund budget, not including research awards?	\$514,885,000	\$463,184,755	\$1,263,800,000	\$1,607,046,323
What is your college's budget not including research awards? (base operating budget)	\$38,790,000	\$37,119,155	\$73,036,837	\$89,345,793
What is your university's total tuition revenue?	\$275,341,886	\$372,833,157	\$830,376,148	\$590,000,000
What is your university's total research awards?	\$246,600,000	\$314,097,732	\$323,639,349	\$514,747,497
What is your college's total research awards?	\$16,842,001	\$34,954,824	\$104,519,280	\$187,309,490
What is your university's total enrollment?	30,354	35,093	48,617	40,521
What is your university's enrollment for undergraduates?	25,327	30,516	38,006	29,868
What is your university's enrollment for graduates?	5,027	4,577	10,611	10,653
What is your college's total enrollment?	3,594	5,521	6,362	8,247
What is your college's enrollment for undergrads?	3,174	4,822	5,439	5,969
What is your college's enrollment for graduate students?	420	699	923	1,286

<b>Analyses</b>				
Ratio of College:University SCH	0.203	0.252	0.201	0.237
Ratio of College:University enrollment	0.118	0.157	0.131	0.204
Ratio of College:University undergrad enrollment	0.125	0.158	0.143	0.200
Ratio of College:University grad enrollment	0.084	0.153	0.087	0.121
Ratio of College:University TTF	0.125	0.168	0.177	0.217
Ratio of College:University NTTF	0.104	0.071	0.077	0.263
Ratio of College TTF:NTTF	2.068	3.370	4.298	0.411
Ratio of College:University General Fund Budget	0.075	0.080	0.058	0.056
Ratio of College:University Research Funding	0.068	0.111	0.323	0.364
College Fraction of TTF: College Fraction of SCH <i>(SCH for OSU are divided by 1.5 to account for difference in quarters/semesters)</i>	0.62	0.67	0.88	0.92
College Fraction of TTF:College Fraction of Research Funding	1.83	1.51	0.55	0.60
College Fraction of TTF:College Fraction of Graduate Enrollment	1.50	1.10	2.04	1.80
College Fraction of TTF:College Fraction of Undergrad Enrollment	1.00	1.07	1.24	1.09
Extramural funding/TTF	\$138,049	\$192,059	\$304,721	\$549,295
How much smaller is OSU in extramural funding \$ per TTF?	—	-28%	-55%	-75%

**Table A1.** Survey questions asked of 20 deans science, liberal arts and combined science/liberal arts at public and land grant universities.

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**Key results:**

- | OSU’s College of Science has fewer tenure-track faculty (TTF) relative to the amount of teaching it does than the other three universities.
- | OSU COS has fewer TTF relative to its share of undergraduate majors than the other three universities.
- | OSU COS has fewer graduate students relative to the size of the college than the other three universities.
- | OSU COS generates a smaller fraction of its university’s research funding when scaled to the number of TTF. On a per-faculty basis, OSU generates 28% less research funding than CSU’s equivalent college, 55% less than MSU’s, and 75% less than UMD’s.

## CUPA Data Comparing OSU College of Science to Peers

The College and University Professional Association for Human Resources (CUPA) maintains a database of personnel for universities. With the assistance of Tracey Yee, we queried this database to compare OSU's College of Science to equivalent units in peer universities nationwide. The procedure was as follows.

Identify the Classification of Instructional Program (CIP) codes for OSU's College of Science. These are 26.02 (Biochemistry and Biophysics); 26.01, 26.07, 26.13 (Integrative Biology); 27.05 (Statistics); 40.02 and 40.08 (Physics); 26.04 and 26.05 (Microbiology); 40.05 (Chemistry); and 27.01 and 27.03 (Mathematics). Personnel for 26.11 (the category is Biomathematics and Computational Biology) was split equally between MB, BB, and IB.

Sum the headcount ( $\geq 0.75$  FTE) for these CIP codes at OSU. That number is 178. OSU COS has about 122 faculty, so 178 indicates that 56 faculty in other colleges are categorized in these same science categories. The same is likely to be true at other universities, but if not, this will generate a conservative comparison (i.e., will indicate that COS is relatively larger than it really is).

Sum the headcount of ALL faculty  $\geq 0.75$  FTE at OSU in all CIP codes. That number is 1073.

Pull the same data for a **national comparator group**. This group consisted of 22 universities that OSU uses for comparing salaries and other HR purposes: Colorado State University, Florida State University, Georgia Institute of Technology, Iowa State University, Kansas State University, Texas A&M University, University of Arizona, SUNY – Buffalo, UC-Riverside, UC-Santa Barbara, University of Colorado, University of Delaware, University of Hawaii – Manoa, University of Kansas, University of Louisville, University of Massachusetts – Amherst, University of Nebraska – Lincoln, University of Oklahoma – Norman, University of Oregon, Virginia Tech, Washington State University, Wayne State University. These universities have an average enrollment that is nearly identical to OSU's – OSU's is 30,354 and the average of these universities is 30,121. The average number of faculty in the same CIP codes as OSU's COS at these universities is 290. The average total number of faculty at these universities is 1133. In other words, while the universities are slightly smaller (on average), they have about 5.6% more faculty. However, **their colleges of science faculty are 62% larger.**

Pull the same data for OSU's aspirational peers. This group consisted of 14 land-grant universities that are somewhat larger than OSU and typically have higher national rankings. The group is: Colorado State University, Cornell University, Iowa State University, Michigan State University, North Carolina State University, Pennsylvania State University (main campus), Purdue University (main campus), Texas A&M University, Ohio State University, University of Arizona, UC-Davis, University of Illinois, University of Wisconsin – Madison. These universities have an average enrollment that is significantly larger than OSU's – OSU's is 30,354 and the average of these universities is 43,719. The average number of faculty in the same CIP codes as OSU's COS at these universities is 431. The average total number of faculty at these universities is 1708. While these universities are 44% larger (on average), they have about 59% more faculty. However, **their colleges of science faculty are 242% larger.**

## Avg Univ Size relative to OSU based on enrollment

	OSU	OSU National Comparator Group*	OSU Aspirational Comparator Group**	
	1	0.99	1.44	
	# OSU Incumbents	Average # Incumbents	Average # Incumbents	Average # Incumbents scaled to OSU enrollment
<b>“Biochemistry &amp; Biophysics”<sup>5</sup></b>				
Professor	6.0	8.7	10.9	7.59
Associate Professor	6.3	7.0	8.1	5.65
Assistant Professor (including New)	5.3	6.8	6.1	4.21
Total TT <sup>9</sup>	17.7	22.5	25.1	17.45
<b>“Integrative Biology”<sup>5</sup></b>				
Professor	23.0	24.4	47.9	33.29
Associate Professor	15.3	20.9	22.1	15.37
Assistant Professor (including New)	33.3	21.0	23.9	16.62
Total TT <sup>6</sup>	71.7	66.4	94.0	65.28
<b>“Chemistry”</b>				
Professor	9	15.2	20.4	14.17
Associate Professor	4	4.8	10.6	7.36
Assistant Professor (including New)	5	6.8	12.2	8.47
Total TT	18	26.8	43.2	30.00
<b>“Mathematics”</b>				
Professor	17	24.3	33.6	23.33
Associate Professor	5	11.9	12.2	8.47
Assistant Professor (including New)	6	14.0	19.8	13.75
Total TT	28	50.2	65.6	45.56
<b>“Microbiology”<sup>5</sup></b>				
Professor	8.0	15.5	18.3	12.73
Associate Professor	3.3	14.3	12.5	8.68
Assistant Professor (including New)	3.3	13.5	12.0	8.33
Total TT	14.7	43.3	42.8	29.74
<b>“Physics”</b>				
Professor	6	21.9	34.3	23.82
Associate Professor	6	11.4	8.0	5.56
Assistant Professor (including New)	4	9.0	10.4	7.22
Total TT	16	42.3	52.7	36.60
<b>“Statistics”</b>				
Professor	2	13.0	46.0	31.94
Associate Professor	4	14.0	30.0	20.83
Assistant Professor (including New)	6	11.0	32.0	22.22
Total TT	12	38.0	108.0	75.00

5 The OSU numbers are fractional because the faculty coded as Biomathematics, Bioinformatics, and Computational Biology were split equally between Biochemistry, Microbiology, and Integrative Biology.

6 The Department of Integrative Biology has only 20.8 FTE (head count of 24). Many non-COS Faculty are coded here.

<b>Total COS TT Faculty</b>	<b>178</b>	<b>290</b>	<b>431</b>	<b>300</b>
Total TT Faculty at University	1073	1133	1708	
<b># COS TT Faculty / # Total TT Faculty at University</b>	<b>17%</b>	<b>26%</b>	<b>25%</b>	

**Table A2.** Number of faculty at OSU who are coded (CIP codes) in the same scientific disciplines as OSU’s College of Science and the average number of faculty at groups of other universities coded in the same way.

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**Key results:**

OSU’s College of Science has many fewer tenure-track faculty (TTF) relative to other universities’ equivalent Colleges of Science. OSU’s COS is about 17% of TTF while other universities’ COS are about 25%. Presumably, the fraction of students taking science classes and the amount of scientific activity is similar at OSU relative to other universities. While OSU COS probably has less extramural funding than most of these other universities, nearly all COS faculty at all universities are funded by general funds.