

College of Science

FY20 Financial Plan

Roy Haggerty, Dean
January 25, 2019

Executive Summary

A number of College of Science (COS, the College) metrics turned positive or remain positive this year: graduation rates, overall enrollment in most academic majors, DFW rates, first-year retention for all students as well as Historically Underrepresented Students (HURS), Ecampus student credit hours (SCH), and others (see [COS Financial Plan Metrics](#) and [COS Success Metrics](#)). Our six-year graduation rate has the most consistent positive trend of any college, [climbing more than 10% in a decade](#) for Pell, Historically Underrepresented Students (HURS), and all students. However, the College is fighting stronger headwinds from declining OSU enrollment, reduced funds allocated to the Academic Productivity Pools (net of Ecampus) in the budget model, reduced SCHs from majors outside the College, and escalating OPE costs. According to Budget Office projections and our cost calculations, these headwinds will generate a deficit of more than \$1M in FY20 ([see graph](#), or Appendix D) and thereafter.

At their current rates, these headwinds are stronger than any realistic revenue increases. Consequently, they must be addressed by a combination of expense reductions and greater central investment within or outside of the budget model.

EXPENSE REDUCTION. To reduce expenses in the College while minimizing impact on net revenue-generating activity, the College will reduce the number of tenure-track faculty and increase the number of non-tenure-track faculty. This will be accomplished primarily by attrition in the coming years. As tenure-track faculty voluntarily leave, many will not be replaced. We will have to look at having more non-tenure-track faculty, and also look at increased teaching loads on tenure-track faculty. This path comes with consequences. While improving the finances of the College, it will reduce our contribution

to the university's R1 mission, reduce our ability to provide experiential learning, reduce research expenditures, and reduce the number of graduate students, among other consequences.

CENTRAL INVESTMENT. To increase revenue to COS and other high-tax colleges such as CLA, we request equitably distributing the costs of running the university to all revenue streams, thus increasing the funds available to the Academic Productivity Pools in the budget model. This would re-base the budget model so that it supports the [SP 4.0](#) commitment that arts and humanities are core to the University's mission in their own right as well as drivers of interdisciplinary innovation in collaboration with the sciences. To honor this commitment, dedicated funding needs to be available for colleges that are producing the majority of Degree Foundation SCHs. Such a re-basing of the budget model would give these units the boost they need.

In the short-term, investment could be accomplished by community support funding of \$1.5M (net recurring in addition to the bridge funds) and be complemented by permanent expense reductions within the College to keep the long-term fund balance positive. In the longer-term, we recommend finding an equitable internal tax structure that broadens the tax base and shares costs and strategic investments across the university.

Summary of Opportunities and Strengths

Excellence in Ecampus Labs. *To build a successful business, don't pick an easy problem, pick a hard problem.* That is exactly what we are doing when it comes to online lab education. It is one of the hardest things to do well online. If we could teach more of the most hands-on lab topics online in a fully scalable way, we would be able to offer many more degrees with few competitors in the marketplace. Investments in Ecampus geared specifically toward generation of top-quality online labs could generate significant new revenue to OSU, COS, and several other colleges. Watch this [short video](#) to see our award-winning virtual microscope that is available to distance students.

Science for Everyone. COS teaches 20% of OSU's student credit hours - nearly every student takes at least one science class and most take several. At the same time, 57% of OSU's "gateway" classes (large enrollment, high correlation to success) are in science. Investments to make science classes better will help student success for all of OSU. Our top general education priorities are to expand our Learning Assistants Program (student peer mentors in the classroom), better training for GTAs, professional development for our instructors, curricular redesign, and coordination of large multi-section classes. Furthermore, we would like to expand our Integrated Professional Development (career services) so that all science students know before they arrive at OSU that science degrees lead to good jobs.

Biohealth Sciences. OSU can grow significantly in health science research. OSU receives a far smaller fraction of NIH funding than its peers, but has a core of excellent faculty in COS and several other colleges. Strategic investments in facilities, personnel, equipment, mentoring, support, and partnerships could pay off in large research and educational dividends. However, investments in the past have not all paid off. The life sciences community in COS, Public Health, Vet Med, Pharmacy, Agricultural Sciences, and Engineering, along with the Research Office may benefit from forming a task force to understand why past investments were not as successful as hoped, how other campuses have made significant advances in NIH funding, and how OSU could do the same. Outcomes from the task force could include a report and a set of actionable recommendations.

Data Science. Data science has emerged as a key field for the future of the workforce and economy. A [National Academies study](#) released in 2018¹ recommends tailored data science instruction, embracing data science as a field, and planning for expected growth in the discipline in the coming years. UC Berkeley indicates that [1,000 of its students](#) intend to major in a new data science degree². The College of Science and the College of Engineering are proposing to offer a data science certificate with 27 credits to all OSU undergraduates that can be taken along with any degree³. We hope that it will be centrally promoted to attract new students, many from outside of both colleges. With a modest investment in faculty and advisors, we could launch a full degree program.

Materials Science. Oregon's economy has the potential to benefit tremendously from new materials for the semiconductor and green energy sectors (e.g., solar power batteries). OSU should lead development with investments in facilities and personnel in science and engineering. There are three primary needs - two expensive and one relatively cheap:

1. Creating a modern, co-located space for the materials science faculty in science and engineering;
2. Hiring more faculty in chemistry⁴, physics, and engineering; and
3. Igniting innovation at OSU with modest changes to promotion and tenure expectations and investments in innovation support and education.

Increased Innovation. Innovation means translating research to solve real-world problems. The College is a leader in this area already, with several spin-off companies originating in COS. Innovation grows the economy, which OSU needs for financial support. Innovation helps to generate student success by providing experiential learning opportunities and pathways to careers. Innovation can provide research funding while the idea is being developed and later as intellectual property.

Summary of Challenges and Threats Facing Science

Inequitable Tax Structure Generates Negative Growth in the Academic Productivity Pools. In the Budget Model, the Academic Productivity Pools are getting smaller even though net tuition revenue is growing. Our calculations indicate that net tuition from the Corvallis campus (tuition net of waivers and Ecampus) will grow by about 1.5% in FY20. At the same time, the Academic Productivity Pools net of Ecampus will shrink by 2.1%. Nearly 75% of the College of Science budget comes from this area, and the wellbeing of COS depends on these pools tracking university revenue.

The root of the problem appears to be (see Appendix H) an inequitable internal tax structure combined with increased university costs and strategic investments in the presence of soft enrollment and state support. Revenue streams are internally taxed at rates that range from below 10% to nearly 90%. Increased university costs and strategic set-asides necessarily are funded mostly from high-tax revenue streams. Consequently, units dependent upon those high-tax revenue streams, particularly if they have soft enrollment, face declining budgets.

¹ National Academies of Sciences, Engineering, and Medicine. 2018. Data Science for Undergraduates: Opportunities and Options. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25104>.

² Chronicle of Higher Education. 2018. "With Student Interest Soaring, Berkeley Creates New Data-Sciences Division". <https://www.chronicle.com/article/With-Student-Interest-Soaring/244986>

³ Our data science certificate is modeled after data science minors offered at [MIT](#) and [Stanford](#).

⁴ According to data from CUPA, OSU Chemistry is 57% of the size of 13 peer units at universities such as Louisiana State, Washington State, Utah State, and University of Tennessee - Knoxville. OSU Physics is 46% of the size of peer units at the same universities.

Facilities. Many of our College facilities are in poor shape, making recruitment and retention of both students and faculty increasingly difficult, and hindering both teaching and research. Faculty and student losses can be directly attributed to the challenging conditions in Cordley, Weniger, and Gilbert Halls. Weniger Hall had six floods in CY2018 alone. Improved facilities would improve our success on several fronts.

Tenure-Track Faculty Hires and Retention. OSU's College of Science is undersized relative to its peers nationwide. Our best estimate is that relative to the size of OSU, the College of Science should have up to 15% more tenure-track faculty than we currently have (see [FY19 Financial Plan](#) for in-depth analysis and Appendix G section S5). For example, the Department of Physics is the second smallest R1 physics department in the country and is about half the size of its peer departments. Most other departments are also smaller than their peers. Lack of hiring in core science disciplines threatens OSU's status and reputation, and causes extra challenges in hiring and retention inside and outside of the College. Unfortunately, our plan will make this problem worse.

High Faculty Startup Costs. To maintain our R1 status, we must continue to hire faculty. However, startup costs are particularly large for some fields within the College. For instance, costs can approach \$1M to bring onboard an experimental chemist, and for many fields costs exceed \$500K. Historically, the College has had to pay more than two-thirds of this cost. This level of startup is extremely challenging for the College.

Threat to Progress on Student Success. We have been making good progress on student success. Our DFW rates have declined in gateway classes. Our 6-year graduation rate poses the most consistently positive trend of any unit at OSU, [climbing more than 10% in a decade](#) for all students, as well as for Pell-eligible, Historically Underrepresented Students (HURS). But we have much more work to do. That positive progress and work could be jeopardized if revenue does not keep up with expenses.

Strategies & Actions to Advance Science

Our strategies are the same as in the [FY19 Financial Plan](#), but with greater emphasis on S3 and S5. We have now collected multi-year data on the metrics proposed last year, and those are viewable [here](#), and a description of progress on actions is provided in Appendix G. Strategies S1 - S5 are short-term, ongoing strategies, while L6 - L8 are long-term strategies. Brief overviews are below, with more information in Appendix G.

S1. Improve student recruitment, retention, and success.

More than 70% of our budget comes from student tuition, and much of the rest (such as state contribution) is tightly tied to student success. We need to continue to improve student success, with a particular focus on first generation, Pell-eligible, and HURS, and we need more students to complete their degree in science. In FY18-19, we made progress on retention and success, with most of our numbers trending up. We formed a Science Growth task force that is charged with making more progress on recruitment, particularly on increasing our yield rate and converting applicants and admitted students into matriculated students. Our proposed certificate in Data Science should attract new students to OSU. Our College's recently created career and professional development team is

working to help students position themselves for good careers (with plans underway to expand support).

S2. Grow revenue through extended campus and related activities.

Extended campus—including Ecampus, PACE, and summer classes—helped us grow our revenues to support our broader mission. Our MS and certificate in Data Analytics have grown from zero to 73 students in two years, and will continue to grow as long as we can take steps to scale it well. In FY20 we will launch our first online undergraduate science degree - Zoology. We will launch the full year of introductory physics courses online, which will allow other degrees, such as Environmental Science, to be fully completed online at OSU.

S3. Contain costs and discontinue some existing activities.

We had more faculty retire or leave the College than we hired, and this will continue for the foreseeable future. GTA numbers have been reduced. We have discontinued funding to one of our centers. We have shifted administrative support to student support. We reduced financial commitments and have opted not to participate in some spousal accommodations and targeted opportunity hires.

S4. Increase research productivity and teaching efficiency.

The College is underweight in research relative to peer colleges. For example, the College funding \$/TTF is 28% smaller than Colorado State University, 55% smaller than Michigan State University, 75% smaller than University of Maryland, and about the same as Louisiana State University⁵). We have been trending down in recent years. To help level the playing field, we have opened a one-person office of research development, we are providing seed funding for high opportunity research and innovation, we launched a research equipment renewal program, and we are setting aside startup funds for future hires (though this was reduced in the FY19 budget cut and may be reduced further). Our strategy is to make modest investments that will substantially increase the number of faculty with two or more grants and to build teams that are positioned to secure center-level and training grants.

S5. Partner with the University to improve the College of Science's budget.

As was noted last year, the College of Science appears to have one of the smallest cohorts of tenure-track faculty⁶, suggesting that part of our budget difficulties is related to the fraction of E&G funds allocated to COS. OSU provided bridge funds totaling approximately \$1.6M in FY19, although this has been ~50% offset by a mid-year budget cut. An analysis (Appendix H) suggests that OSU's internal tax structure disadvantages colleges such as Science and Liberal Arts.

⁵ Data provided through personal communication by science deans at Colorado State University; Michigan State University; University of Maryland College Park; and Louisiana State University.

⁶ See [FY19 Financial Plan](#) for data.

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

A highly successful campaign is key to continued student success, improved physical facilities and labs in the College, and increased distinction in our signature areas. Several significant developments are underway.

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

Every building occupied by the College has limited infrastructure for research or teaching. Cordley Hall is about to undergo renovation with other science spaces to follow over the next five to 10 years, depending on the outcome of the capital campaign.

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

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

Financial Planning for FY20

Short Term Outlook

With reductions in the FY19 and FY20 budgets, the short-term outlook for the College E&G budget is fairly negative. The College is losing \$770K in a mid-year budget cut in FY19 and is projected to lose another \$100K in the FY20 budget projection. Even with positive movement in some metrics, offset by cost increases, we are projected to end FY19 approximately “even,” and FY20 with a deficit of over \$1M. Please [see our projection in this graph](#), reproduced in Appendix D.

Five Year Outlook

We expect recent investments in Ecampus development, SCH generation, and student success to begin paying dividends in FY21. This should help to level out the trend in our declining financial performance, provided that the academic pools (net of ecampus) grow at rates comparable to increases in tuition revenue. However, this still leaves the College with recurring annual deficits from \$1M to \$2M going forward. This will produce a compounding negative fund balance that will grow rapidly. By FY22 it could be as high as \$4M to \$6M. If cost increases are greater than projected, or the academic pools do not grow, the negative fund balance will be worse. Even with substantial improvement in metrics and marginal cost savings, it is difficult to envision scenarios in which the College can resolve its financial difficulties without changes both to the budget model and the way the College does business.

Cost & Program Reductions and Reallocations

In the guidance provided for this report, it was noted that revenue growth may not keep up with the costs of delivering existing programs. Colleges were asked to describe what we would do in our respective units to reduce costs, as well as consequences of those changes. The situation described in the previous sections requires two sets of changes.

EXPENSE REDUCTION. The first change is to adjust the balance of teaching and research in the College. Because student recruitment, retention, and success are mission-critical (SP4.0) and revenue-critical (~70% of OSU E&G budget), these must remain our College's priority. Research is mission-critical but less revenue-critical in the short term. Therefore, the College will have to pursue a strategy of limited replacement of tenure-track faculty when they leave. We will look at increasing non-tenure track faculty and at increasing average teaching loads so that instruction is accomplished within our budget. This necessarily will result in a reduction in research output, which will likely negatively impact the reputation of both OSU and the College of Science.

We will need to focus tenure-track faculty (TTF) FTE only within areas with the greatest growth opportunity for research productivity and expenditures, and with the most urgent programmatic needs. COS will likely have to reduce the number of new tenure-track faculty as faculty leave or retire. The consequences include that OSU will move away from R1 status, we will have fewer experiential learning opportunities, the number of graduate students will decrease, research expenditures will decline, and other colleges will have fewer research partners in some disciplines.

CENTRAL INVESTMENT. The second change is to apportion more tuition revenue to the College of Science. Our analysis (*see Appendix H*) shows that different revenue streams at OSU are taxed at remarkably different rates. The consequence of this narrow and unbalanced tax structure is that university cost increases and strategic set-asides are borne disproportionately by units with high taxes. The College of Science is one of those units, as well as the College of Liberal Arts. For the College of Science to have a sustainable budget, this tax structure needs to be fixed. Otherwise stated, COS and CLA are disproportionately reliant on the academic pool funding in the budget model. Cost increases and strategic set-asides reduce this pool (although tuition revenues have risen this year by about 1.5%, the Academic Productivity Pool, not including Ecampus, is projected to be reduced by 2.1%). Resulting reductions in this pool, even in the face of rises in tuition revenue, disproportionately affect COS and CLA.

Hiring Plans for FY19 and FY20

Our hiring priorities emphasize student success, revenue generation, research excellence, and cost containment. To achieve these priorities, we propose minimal (but not zero) hiring of tenure-track faculty. The following searches are now underway and were approved before the budget reduction was announced or the downward budget trend was forecast:

- A new head for Biochemistry and Biophysics to replace Andy Karplus who is retiring;
- Replacements for failed P&T cases; and
- One replacement for a chemistry faculty member who left.
- A staff member for our integrated professional development program.

Other faculty leaving due to retirement or other career opportunities will not be replaced in FY20 in Chemistry, Biochemistry, Physics, Integrative Biology, and Mathematics. We would like to search for a small number of tenure-track faculty in FY20, depending on decisions made following the February budget meeting.

Appendix A: College Portrait

The College of Science offers internationally recognized programs across a broad spectrum of disciplines: biology, biochemistry and biophysics, biohealth sciences, microbiology, zoology, chemistry, physics, mathematics, and statistics. We pursue both curiosity-driven, fundamental research to better understand our world and use-inspired research to tackle the most pressing problems of our time, from climate change to cancer. We value excellence and diversity.

Enhancing OSU's reputation as a leader in science

Our faculty have received national and global recognition in science. This year all three OSU professors who were named 2018 [Fellows of the American Association for the Advancement of Science](#) are in the College of Science (in chemistry, biology and biochemistry and biophysics). One of our chemistry professors was named a [2018 Fellow by the American Chemical Society](#). Distinguished Professor of Marine Ecology [Jane Lubchenco](#) received the prestigious National Science [2018 Vannevar Bush Award](#) for her exceptional lifelong leadership in science and technology and substantial contributions through public service in science, technology and public policy. Mathematics Professor [Juan Restrepo](#) was chosen as a [2018 Fellow for the Society of Industrial and Applied Mathematics \(SIAM\)](#) for his outstanding research and service for the community. Another mathematics faculty member, Elise Lockwood, was awarded a 2019-20 Fulbright Award supporting a sabbatical in Norway.

Given the increased budgets for research funding at NIH, we have refined our research strategy to encourage and support our faculty to submit more proposals to secure NIH funding. The Department of Mathematics received its first ever NIH grant. A population biologist [published a paper](#) in *Science* about how cities' population and transportation patterns affect how flu epidemics play out. An international collaboration led by our microbiology faculty made a [key advance](#) toward understanding which gut microbes may play important roles in how humans and other mammals evolve.

National leadership in science education

OSU's Department of Physics is one of three universities to receive a [national award for improving undergraduate physics education](#) in 2018. The Department of Physics is leading a five-year, [\\$2.2M effort](#) to help physics departments at colleges nationwide improve their programs and instruction. Mathematician Elise Lockwood received an [MAA Award](#) for Research in Undergraduate Mathematics Education. The College partnered with the Center for Lifelong STEM Learning on a recent [five-year \\$1 million grant from Howard Hughes Medical Institute to improve instruction in STEM classrooms](#).

The College of Science is playing a lead role in OSU's [Faculty-Student Mentor Program](#) to strengthen faculty and student relationships, with the goal of improving student retention and graduation rates. The program supports OSU's strategic goal of improving the success of underrepresented minority students, first generation and Pell-eligible students who are in their first year at the university.

High-achieving students

Our students have achieved extraordinary success. For example, Delaney Smith, a junior biochemistry and biophysics major, received the [Barry Goldwater Scholarship for 2018](#), the top undergraduate award in the country for sophomores and juniors in STEM. She was the only Goldwater Scholar selected from an Oregon institution this year. She is a finalist for the prestigious Gates Cambridge scholarship, an extremely competitive program.

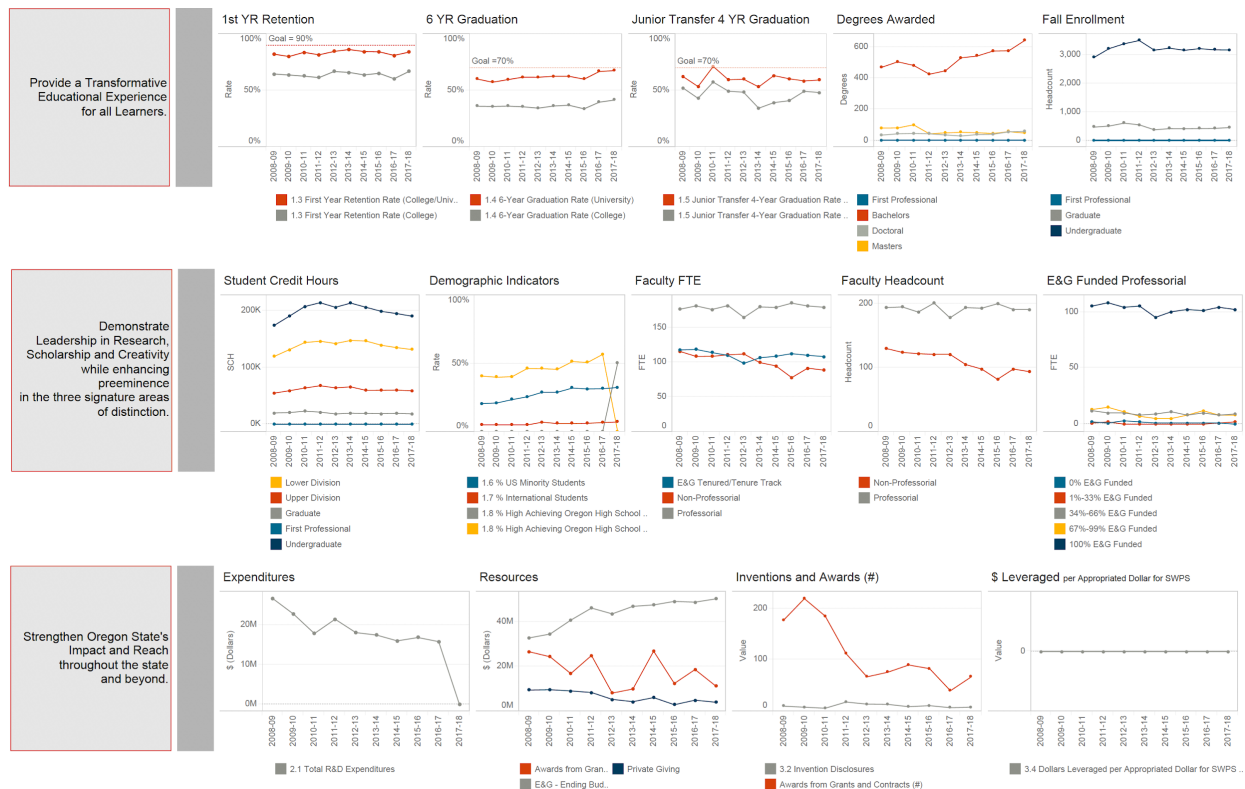
Appendix B: Financial Information

See financial information provided by the Budget Office at these links:

- (1) [Financial analysis](#) (Excel file – most easily viewed if downloaded);
- (2) [FY19 Indicators](#).

Appendix C: Strategic Plan Metrics

Selected metrics relevant to SP4.0 are shown for the last four years. These are from the CORE dashboard titled “College Success Metrics” (report ID DBB0110). A link to the pdf is [here](#).



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Appendix D: Three-year Financial Projections (FY20, FY21, FY22)

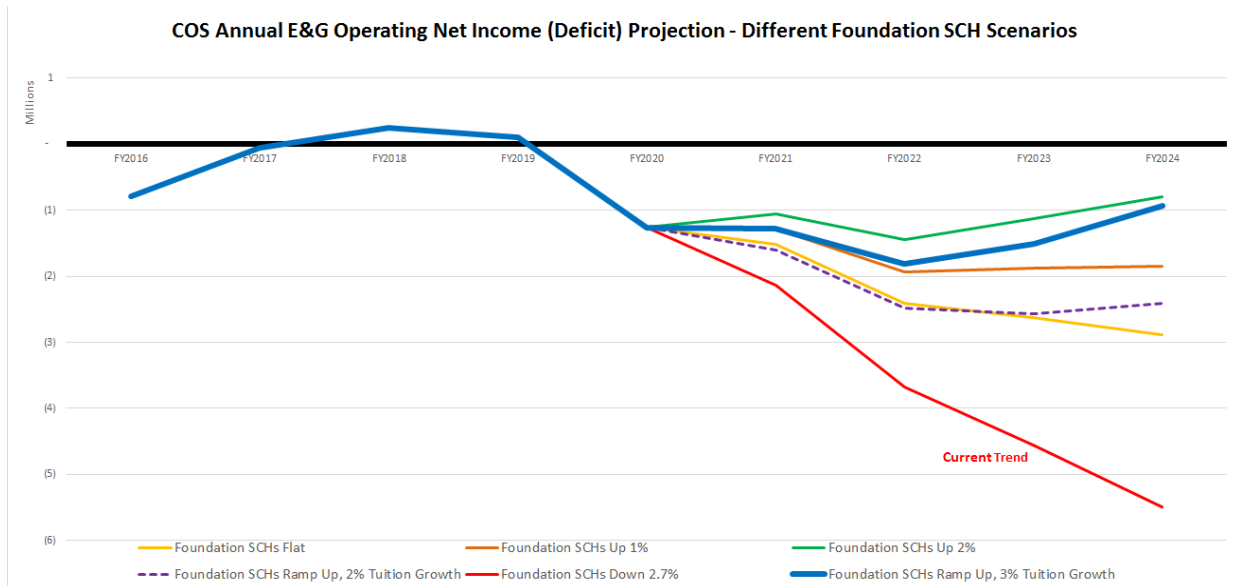
OSU COLLEGE OF SCIENCE - ALL E&G OPERATING PROJECTION

EXECUTIVE SUMMARY by Category, FY 2018 - FY 2022

As of 1-22-2019

| Operating E&G Indexes | ACTUAL FY 2018 | PROJECTED FY 2019 | PROJECTED FY 2020 | PROJECTED FY 2021 | PROJECTED FY 2022 |
|---|-------------------|----------------------|----------------------|----------------------|----------------------|
| Metrics Budget (NOT ECampus, Summer ROH, & Fees) | 33,278,120 | 32,127,066 | 32,010,000 | 33,301,000 | 34,765,000 |
| Bridge Funds | 64,678 | 1,900,000 | 1,900,000 | 1,200,000 | 600,000 |
| ECampus, Summer Session, and ROH | 7,622,432 | 8,117,114 | 8,661,000 | 9,258,000 | 9,914,000 |
| Internal/External Fees & Sales | 1,558,671 | 1,568,682 | 1,569,000 | 1,569,000 | 1,569,000 |
| Net Other Budget Inflows and Outflows | 672,698 | 566,936 | 513,000 | 503,000 | 440,000 |
| Total Net Budget Inflows and Revenues | 43,196,599 | 44,279,799 | 44,653,000 | 45,831,000 | 47,288,000 |
| Salaries and OPE | 40,931,378 | 41,826,677 | 43,517,000 | 44,674,000 | 46,613,000 |
| Services & Supplies | 1,936,443 | 2,270,965 | 2,316,000 | 2,363,000 | 2,410,000 |
| Capital Outlay (Capitalized) | 50,193 | 50,193 | 50,000 | 50,000 | 50,000 |
| Net Transfers Out/(In) | 24,744 | 24,744 | 25,000 | 25,000 | 25,000 |
| Total Expenses | 42,942,758 | 44,172,579 | 45,908,000 | 47,112,000 | 49,098,000 |
| Projected Annual OPERATING E&G Surplus/(Deficit) | 253,841 | 107,220 | (1,255,000) | (1,281,000) | (1,810,000) |
| Beginning Operating Fund Balance | 101,542 | 355,383 | 462,603 | (792,397) | (2,073,397) |
| Projected OPERATING E&G Fund Balance | 355,383 | 462,603 | (792,397) | (2,073,397) | (3,883,397) |

| NON-Operating E&G Indexes | ACTUAL FY 2018 | PROJECTED FY 2019 | PROJECTED FY 2020 | PROJECTED FY 2021 | PROJECTED FY 2022 |
|---|-------------------|----------------------|----------------------|----------------------|----------------------|
| Net Activity in Non-Operating E&G Indexes | (208,629) | 163,733 | - | - | - |
| Beginning Non-Operating E&G Fund Balance | 3,628,753 | 3,420,124 | 3,583,857 | 3,583,857 | 3,583,857 |
| Projected TOTAL E&G Fund Balance | 3,775,507 | 4,046,460 | 2,791,460 | 1,510,460 | (299,540) |



Appendix E: Enrollment Planning Targets & Assumptions (FY16 - FY22)

The College does not possess the expertise to do a high-quality job of enrollment management in-house. Our calculations above are based on a simple linear projection from FY16 through FY19. Our expectation for the total number of our undergraduate students is flat and for our number of graduate students is increasing. We anticipate that increase to continue since it relates to the new online MS Data Analytics program in statistics.

For undergraduate students, we see a decline among the in-state student population, but an increase in our out-of-state population. The first follows the general population trend in Oregon, the second is due to our increased marketing out-of-state, particularly in California. The number of undergraduate minority students is slowly increasing. For undergraduate transfer students, we use the DPP enrollment as an indicator. This enrollment is also increasing, which indicates a shift away from first-year students. There is no net effect on the total undergraduate student population. We do not try to predict the number of undergraduate international students, because there was a decline nationwide in the FY19 numbers. We have invested in an international student recruitment campaign which could impact AY20 and beyond. Linear trends would see a small increase, but based on short-term changes, a continuous decrease appears more likely.

Appendix F: Academic Hiring in FY20

In the absence of much greater central investment, as tenure-track faculty retire, we will have to look at increasing the number of non-tenure-track faculty. We will also examine increasing teaching loads for some tenure-track faculty. This will reduce costs while maintaining a transformative education that is accessible to all learners (Goal 2 of SP4.0) but it will degrade our research and innovation missions (Goals 1 and 3 of SP4.0) and reduce our number of graduate students.

While many retiring tenure-track faculty will not be replaced, a small number of hires will be made each year, including the current year, to advance research opportunities within the [College's strategic plan](#) and meet departmental programmatic priorities, and to promote equity, inclusivity, and justice (SP4.0 Goal 4). We are committed to setting aside funds for research and innovation seed funding, renewing lab space, purchasing equipment, and seeking funds for new space for existing tenure-track faculty.

Appendix G: Detailed Progress on FY19 Investments and Metrics

Our strategies to advance the College of Science are the same as those in the [FY19 Financial Plan](#). We have now collected multi-year data on the metrics proposed last year, which are viewable [here](#). Strategies S1 - S5 are short-term and ongoing strategies, while L6 - L8 are long-term strategies.

S1. Improve student recruitment, success and retention.

ACTIONS:

1. Strengthen our degrees, pathways within degrees, and key courses leading to health sciences professions. *Status: Life sciences degrees are growing. Instructional and advisor hires have been made. Professional development for students is expanding within the life sciences.*
2. Actively recruit new students from high schools and community colleges, particularly high-achieving students. *Status: We hired a transfer advisor and recruiter who began work in the summer, focusing on the community colleges.*
3. Lower DFW rates in all Science “Gateway Courses.” *Status: Our gateway class student success is improving. For the first time, we are monitoring the combined DFW rate in all classes, and we see a long-term improvement, including in the past year.*
4. Improve climate for majors in the college and measure climate annually. *Status: The [Campus Inclusivity Survey](#) is administered biennially. We will use this survey instrument, which will next be administered in Spring 2019.*
5. Increase staffing and support for reducing barriers to success, early intervention, and experiential learning. *Status: We have added advising staff for transfer students and made personnel changes to improve services for all students.*
6. Expand integrated professional development. *Status: We are making progress, but the mid-year budget cut resulted in a canceled search and is already slowing progress.*
7. Increase online student success. *Status: We have not yet begun to work on this in a sustained way.*

In addition to the actions noted above, we have seen the number of graduating students in COS climb consistently, 6-year graduation rates have climbed, and overall retention rates have risen.

METRICS:

1. COS retention rates within major for 1st and 2nd years – for all students, for HURS, and for Pell
2. COS 6-year graduation rates – for all students, for HURS, and for Pell-eligible
3. Number of COS majors
4. Number of COS majors who are high-achievers
5. Number of COS SCHs
6. Combined weighted DFW rates in historically “Gateway 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 each of face-to-face and online environments
7. Results from College climate survey for students in spring term 2019

S2. Grow revenue through extended campus and related activities.

ACTIONS:

1. Launch online Zoology degree by fall term 2019. *Status: On track.*
2. Increase Ecampus offerings, with focus on key courses, online degrees, partnerships, and licensing, and write a business plan for Ecampus expansion within College. *Status: Progress has been made in all areas. We have added and are adding new courses, a new Zoology degree, and have written a business plan. We explored a partnership in Chemistry with [REDACTED] but decided against it. We explored adding a semester option, but it is cost-prohibitive for COS.*

⁷ Gateway classes were previously called “Roadblock” classes. These are high-enrollment classes that are correlated to student success. They are MTH 111, 112, 241, 251, 252, 254, 306, ST 306, 351, BI 211, 212, CH 121, 201, 232, PH 211, 212.

3. Expand 4+1 offerings within the College. *Status: All of our departments with an undergraduate program (other than Statistics) either now have a 4+1 program or will soon have one. While our numbers are still small, they are growing. Overall numbers will likely plateau at less than 20 students each year.*
4. Build and market virtual labs and elevate OSU's brand around expertise in this space. *Status: We are expanding our online lab capability in Chemistry, Integrative Biology, Biochemistry and Biophysics, and Physics.*
5. Grow Data Analytics MS. *Status: The degree and certificate have grown from zero students two years ago to 73 students today.*

METRICS:

1. Number of online degree majors
Number of Ecampus SCHs
2. Number of 4+1 students in College of Science

S3. Contain costs and discontinue some existing activities.

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

ACTIONS:

1. Not replace some retiring faculty; backfill some retiring Tenure-track with Non-tenure track faculty. *Status: Several retiring Tenure-track faculty from FY18 and FY19 are not being replaced. This will continue for the foreseeable future.*
2. Develop efficiencies to decrease number of GTAs in some departments. *Status: Chemistry has moved aggressively to reduce the number of GTAs. Other programs are managing their numbers carefully.*
3. Examine cost-benefit of COS funding of all centers. *Status: Complete. We have discontinued the funding of one center.*
4. Reduce clerical support in the Dean's office, shifting FTE to student engagement. *Status: Complete. One assistant has moved, shifting focus from 0% to 75% student engagement.*
5. Not offer some classes. *Status: We have discontinued a number of classes - as can be seen in our metrics, and the number of small classes has declined significantly. We have also increased the caps on some classes in Mathematics.*
6. Examine 201 accounts. *Status: Still to be done.*
7. Reduce commitments to startup and external collaborations, saving \$435K/year. *Status: Complete.*

METRICS:

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

S4. Increase research productivity and teaching efficiency.

ACTIONS:

1. Establish a full-time Research Support Services office with focus on major proposals to increase extramural funding. *Status: Complete.*
2. Implement tenure-track workload policy, including restrictions on teaching courses with few students. *Status: A policy outlining our current practices is complete, but further development must wait for a collective bargaining agreement.*
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. *Status: Complete.*
4. Review all position descriptions with non-standard teaching loads. *Status: Still to be done.*
5. Incentivize course buy-outs by TTF. *Status: Still to be done with the exception of standardizing the cost of a course buy-out. Note that this probably cannot be done now without a collective bargaining agreement.*

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's budget.

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 of [FY19 Financial Plan](#). *Status: COS was provided bridge funding in FY19. However, some of this was eliminated via the mid-year FY19 budget cut.*

METRICS:

1. Ratio of COS size: OSU size, relative to national peers. According to latest CUPA data (December, 2018), OSU's COS is about 15% smaller than its peers relative to the size of the peer institutions⁸.

⁸ The method is similar to last year; details follow. 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.

1) 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).

2) Sum the headcount for these CIP codes at OSU. That number is 179. OSU COS has about 120 faculty, so 179 indicates that ~60 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 larger than it really is).

3) Sum the headcount of ALL faculty at OSU in all CIP codes. That number is 1064. The COS CIP codes make up 16.8% of OSU (179/1064). This compares to actual COS faculty, which make up about 12.5% of OSU.

4) Pull the same data for OSU's national comparator group. This group consisted of 28 universities that OSU uses for comparing salaries and other HR purposes (the group changed this year relative to last): Auburn, Colorado State, Georgia Institute of Technology, Georgia State, Iowa State, Kansas State, Louisiana State, Rutgers, Temple, SUNY-Buffalo, UC Riverside, UC Santa Barbara, University of Colorado at Boulder, U Delaware, U Hawaii Manoa, U Kansas Main Campus, U Louisville, U Mass Amherst, U Missouri at Columbia, U Nebraska Lincoln, U North Texas, U Oklahoma Norman, U Oregon, U

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

ACTIONS:

1. Fully onboard new development staff. *Status: Complete.*
2. Develop a compelling vision and concomitant strategic plan for the campaign. *Status: Complete.*
3. Invest up to one quarter of the Dean's effort in fundraising. *Status: The dean is working toward this goal.*
4. Expand our capacity in alumni and community relations. *Status: No change from last year. Expansion is pending budget.*

METRICS:

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

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

ACTIONS:

1. Renovate Cordley Hall. *Status: Cordley is on schedule for renovation.*
2. Raise funds for rebuilding – and then rebuild – infrastructure for departments outside of Cordley Hall. *Status: OSU leadership and OSUF leadership have been briefed on COS aspirations for new facilities for Chemistry, Physics, and some parts of the School of Life Sciences.*
3. Renovate other lab and teaching space in the College. *Status: Renovations are underway for the anatomy and physiology lab, Maude David's lab, and improved space for Wei Kong's lab.*

METRICS:

1. Progress on items above.

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

ACTIONS:

1. Invest in personnel in marine science, sustainable materials, biohealth science, and data science. *Status: One TTF was hired in Data Science. TTF searches underway for two chemists, one biochemist (head of BB), and one biologist.*
2. Partner with other colleges, the Marine Studies Initiative, and relevant Centers and Institutes to build OSU's strength in marine science area. *Status: Not started.*
3. Raise funds for endowed professorships in each area of distinction. *Status: OSU leadership and OSUF leadership have been briefed on COS aspirations in these areas.*

METRICS:

1. Number of faculty in areas of distinction.

Tennessee Knoxville, U Utah, Virginia Tech, Washington State, and Wayne State. Of these universities, nine returned data. Sum all of the faculty and divide by nine. Sum all of the faculty in the same CIP codes as OSU COS and divide by nine. The average number of faculty in the same CIP codes as OSU's COS at these universities is 163.7. The average total number of faculty at these universities is 843.9. The COS CIP codes make up 19.4% of these universities, which is about 15.3% larger than at OSU.

Appendix H: Analysis of Internal Tax Rates on OSU Revenue.

A preliminary analysis of the Shared Responsibility Budget (SRB) Model reveals a structural “tax” issue that disadvantages some units. In particular, as costs rise and set-asides for strategic priorities are made, the main source of revenue for those appears to be units that are dependent upon high-tax revenue streams. *However, the analysis should be repeated by someone who understands the SRB Model in its entirety.* Nonetheless, the basic conclusions should be correct: Strategic investments and increasing costs are not shared equitably across campus.

“Tax” here is defined as the fraction of revenue not directly returned to the unit in which the revenue was generated.

The analysis looked at a range of revenues to the College of Science and, as a comparison, to the College of Engineering. The analysis also looked at what happens to all unit budgets under two particular strategic decisions: Setting aside \$5M more in revenue for the Capital & Infrastructure Renewal (CIR) fund, and changing the productivity split from 59/41 to 58/42 in the FY20 SRB.

The analyses were conducted using the [latest version of the SRB available](#), from Nov. 30, 2018. (This is an excel sheet and is best viewed by downloading.)

Tax Analysis

For the tax analysis, we assumed \$10,000 of revenue. In the SRB Model, we added the revenue to the revenue tab, and, if appropriate, added the corresponding number of SCH to the corresponding location in a tab such as Foundations SCH, Undergrad Completions, etc. We then calculated the difference in the unit budget before and after the \$10,000 change in revenue.

Tax Analysis Results

The results show that different revenue streams have very different tax rates, ranging from below 10% to nearly 90%. Since the different types of revenue are not distributed equally between the units, and some revenue streams are not available to some units, there are very different tax rates among different units. Note, however, that beyond the direct return shown below, units such as COS receive other indirect returns from these revenues, such as for degree completions.

| COLLEGE | \$10,000 REVENUE | REVENUE TO COLLEGE | TAX RATE |
|-------------|------------------------------------|--------------------|----------|
| Engineering | Dedicated State Funds - e.g., ETIC | \$9,212 | 8% |
| Engineering | Pro-school differential tuition | \$8,538 | 15% |
| Engineering | Ecampus tuition | \$6,643 | 34% |
| Science | Ecampus tuition | \$6,600 | 34% |
| CEOAS | F&A --> ROH | \$4,200 | 58% |
| Most others | F&A --> ROH | \$2,600 | 74% |
| Engineering | Grad Tuition - Non-Majors | \$2,498 | 75% |
| Engineering | LD Tuition - Majors | \$2,208 | 78% |
| Science | Grad Tuition - Non-majors | \$2,189 | 78% |
| Engineering | UD Tuition - Majors | \$2,017 | 80% |
| Engineering | Grad Tuition - Majors | \$1,959 | 80% |
| Science | UD Tuition - Foundations | \$1,883 | 81% |
| Engineering | LD Tuition - Foundations | \$1,883 | 81% |
| Science | LD Tuition - Foundations | \$1,670 | 83% |
| Science | LD Tuition - Majors | \$1,670 | 83% |
| Science | UD Tuition - Majors | \$1,480 | 85% |
| Science | Grad Tuition - Majors | \$1,190 | 88% |

Strategic Investments Cost to Units - Analysis for CIR

For the first analysis of the strategic investment cost to units, we assumed an increase in the Capital and Infrastructure Renewal (CIR) Fund by \$5M, from the FY20 value of \$15M to the presumed FY21 value of \$20M. We assumed no change in revenue. We added \$5M to the CIR fund and calculated the change to each unit budget.

Results: Strategic Investments Cost to Units - Analysis for CIR

The table below shows that the cost of changes in strategic investments is not borne equally by units. Units with high tax rates pay more.

| UNIT | % CHANGE IN UNIT BUDGET |
|---|----------------------------|
| Instruction & Research Units: | |
| Interdisciplinary Graduate Programs | -1.49% |
| Science | -1.34% |
| Business | -1.20% |
| Liberal Arts | -1.17% |
| University Honors College | -1.17% |
| Agricultural Sciences | -0.97% |
| Education | -0.97% |
| Engineering | -0.91% |
| Forestry | -0.79% |
| <i>Instruction & Research Average -----</i> | -0.76% |
| Earth, Oceanic & Atmospheric Sciences | -0.64% |
| Pharmacy | -0.57% |
| International Programs | -0.31% |
| Veterinary Medicine | -0.20% |
| Research (Centers/Institutes/Programs) | -0.14% |
| University Libraries | 0.00% |
| Public Health & Human Sciences | 0.00% |
| Extended Campus | 0.00% |
| Research Equipment Reserve | 0.00% |
| Service, Support, and Management Units: | |
| Undergraduate Studies | -0.427% |
| <i>Service, Support, and Management Average -----</i> | -0.018% |
| Outreach & Engagement | -0.016% |
| Enrollment Management | -0.008% |
| Academic Affairs | -0.004% |
| Student Affairs | -0.001% |
| Information Services | 0.000% |
| Facilities Services | 0.000% |
| Athletics | 0.000% |
| University Relations and Marketing | 0.000% |
| Research Administration | 0.000% |
| University Business Centers | 0.000% |
| All other service, support, and management units | 0.000% |

Change in Productivity Split – Cost to Units Analysis

For the second analysis of cost to units, we changed the productivity split in the Step 2 Productivity Split of the SRB from 59/41 to 58/42. In other words, we reduced the revenue to the academic units by 1% and increased the revenue to central by 1%. We assumed no change in total revenue.

Results: Analysis for Change in Productivity Split

The table below shows that the cost of changes in revenue sharing between academic and central units is not born equally by units. Units with high tax rates pay more.

| UNIT | % CHANGE IN UNIT BUDGET |
|---|----------------------------|
| Interdisciplinary Graduate Programs | -2.21% |
| Science | -1.99% |
| Business | -1.78% |
| Liberal Arts | -1.74% |
| University Honors College | -1.74% |
| Agricultural Sciences | -1.44% |
| Education | -1.44% |
| Engineering | -1.35% |
| Forestry | -1.18% |
| <i>Instruction and Research Average -----</i> | -1.13% |
| Earth, Oceanic and Atmospheric Sciences | -0.95% |
| Pharmacy | -0.84% |
| International Programs | -0.46% |
| Veterinary Medicine | -0.30% |
| Research (Centers/Institutes/Programs) | -0.20% |
| University Libraries | 0.00% |
| Public Health and Human Sciences | 0.00% |
| Extended Campus | 0.00% |
| Research Equipment Reserve | 0.00% |

Conclusions and Comments

1. These analyses should be verified by someone who understands the budget model fully. For example, some units appear to have budgets that are unchanged by set-asides and cost increases – this may be due to certain budget “floors” or thresholds in the model that these units are already below.
2. The tax analysis is incomplete in that some of the tax revenue is returned to the units, effectively reducing some of the tax rates. Some of the highest tax rates on tuition are therefore effectively lower.
3. While there may be errors, we believe the overall results are correct: The burden of marginal changes in costs and strategic investments are carried more by some units than others. In particular, units dependent on revenue streams that are taxed at a high rate bear most of the burden of cost increases and strategic set-asides.