W&M 2026 Faculty Committee Final Report

Chris Abelt, Bill Cooke, David Feldman, Catherine Forestell, Ronald Hess, Jack Martin,
Alan Meese, Margaret Saha
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1. Introduction

William & Mary has a well-deserved reputation for excellence in teaching, innovative, high impact research, and successful integration of teaching and research. The faculty are justifiably proud of our academic model, in which:

- 85% of our undergraduates report a significant research experience;[1]
- 86 percent of undergraduate classes have fewer than 40 students — nearly half have fewer than 20 students;
- 53% of students study abroad;
- 91% of students graduate in six years; the retention rate is 95%.

These distinctive traits are associated with the size of our student body and with the quality of our faculty:

- Our undergraduate enrollment is fairly small at 6,299 in 2014;
- Our student-to-faculty ratio of 11:1 is more typical of a private university;
- Our percentage of tenured/tenure-eligible faculty is high at 78.5%.

The small undergraduate enrollment and low student-to-faculty ratio make it possible for faculty to work closely with a large percentage of undergraduates. The type of faculty is also important. Because tenured/tenure-eligible faculty have lighter teaching loads and are research active, they have greater opportunities to mentor students. Evidence of this can be seen across campus as students engage in various creative activities, including research. The fruits of these efforts are displayed in the Integrated Science Center, for example, where numerous faculty publications with student co-authors are featured. In the 2017-18 academic year, nearly 100 students in ISC departments (Applied Science, Biology, Chemistry, and Psychological Sciences) were co-authors on peer reviewed journal articles.

These aspects of our operating model have led to our reputation as a Public Ivy, yet being "Public" and being "Ivy" are sometimes difficult to balance financially and politically. In 2016 the Board of Visitors became interested in the growing disconnect between our operating model and our financial model.[2] The BOV hoped to do some mid-range planning that year before

[1] Cristol et al, 2018, "The State of Undergraduate Research at the College of William & Mary, 2016-2017."
2 The tension between our operating and financial models is explored in Jeremy P. Martin, 2016, "A Primer for W&M 2026 Conversations." Here, Martin defines these models as follows: "…an organization's operating model is how it delivers value to its "customers" (more often called "constituents" or "stakeholders" in higher education). An organization's financial model is how it secures the resources with which to operate."

searching for the next president. A window of ten years was chosen because that is the average span of a university president.

During its 2017 summer retreat, the BOV identified five key objectives for William & Mary:[3]

- Build a strong and sustainable operating and financial model to ensure William & Mary's excellence and ascendency.
- Commit to socioeconomic diversity (access and affordability) to ensure a diverse university community and a diverse educational experience.
- Position William & Mary at the intersection of the humanities and technology and support a stronger emphasis on STEM-H disciplines, including engineering and design and data literacy.
- Support William & Mary's position as a leader in global citizenship and developing strong leaders in all professional pursuits.
- Position William & Mary at the center (geographic and thought leadership) of a mega region between Virginia Beach and Richmond.

The disconnect between our operating and financial models poses a challenge in meeting these objectives:

- Budget projections suggest that by 2027 we will be carrying a yearly deficit of over 10 million dollars;
- Based on past trends, Richmond's contributions are not expected to increase over the next ten years;
- Although the Promise increased our revenue, it may have reached its limit.

The ensuing conversations that sought to bring W&M's financial model in line with its operating model are known collectively as "W&M 2026". The Board discussed a variety of solutions for realignment. For example, one solution involved seeking legislation in the General Assembly allowing W&M to increase the percentage of out-of-state undergraduates in exchange for growing the undergraduate enrollment. Estimates suggested that gross revenue would increase $3,742,500 for each 100 out-of-state students admitted in this way.[4]

By the fall of 2017, deans and members of the faculty began to hear reports that the BOV was considering the option of substantially increasing undergraduate enrollment. Faculty in Arts & Sciences, where the faculty-student ratio is uneven between departments, were especially concerned. The questions routinely asked were: a) What is the amount and source of the budget shortfall that the BOV is attempting to address? b) To what extent is the BOV considering increasing undergraduate enrollment, and what is the rate of that increase? c) How would an increase in enrollment affect our student-to-faculty ratio? d) If new faculty were hired, how would

[3] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2017-07-william-and-mary-2026.pdf.
[4] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2017-07-william-and-mary-2026.pdf, slide 21.

that affect our NTE-to-TE ratio? e) Are there other sources of revenue that might help and thus obviate the need for such drastic change?

In response to the BOV's strategic planning process, the Executive Committee of the Faculty Assembly appointed a faculty working group in October of 2017. This group was charged with developing recommendations for addressing projected fiscal shortfalls over the next decade. It consisted of five Faculty Assembly members (Abelt, Forestell, Hess, Martin, Meese) and three faculty members from the Faculty of Arts & Sciences (Cooke, Feldman, Saha).

This group began meeting in November of 2017. Over the course of the fall and spring semesters it collected information from a variety of sources and met with members of the campus community. These members included Gene Tracy, director of the Center for Liberal Arts, who provided insight into the effects of student growth on the College Curriculum; Dennis Manos, Vice Provost for Research and Graduate/Professional Studies, who provided information about the Engineering and Design Initiative, and Tim Wolfe, Associate Provost for Enrollment and Dean of Admission, and Henry Broaddus, VP for Strategic Initiatives, who provided information about financial aid.[5]

In order to address concerns and reach out to the broader campus community, the group held a town hall for faculty in December of 2017, where the Provost and several other key administrators across campus provided faculty with information about W&M 2026. Over 50 faculty members and university administrators attended this 90-minute session. This was followed in the spring with two faculty forums in which we invited faculty and administration to join committee members to discuss W&M 2026 and to share their ideas about planning for the future of William & Mary.

Over the course of our committee meetings we discussed issues that relate to the Academic Mission of William & Mary, our operational model, and the financial projections that threaten to limit our academic/scholarly aspirations. These discussions focused on understanding the nature of the projected budget shortfall (as outlined in **Section 2** below), and several possible solutions: increasing "ordinary" revenue by growing undergraduate enrollment (**Section 3**); increasing efficiency by creating a summer semester (**Section 4**); and, increasing "extra-ordinary" revenue by developing new certificate or degree programs (**Section 5**).

[5] We are grateful to the following for meeting with us and/or providing information: Liz Barnes, Henry Broadus, Dan Cristol, Joe Dobrota, Michael Halleran, Sam Jones, Colleen Kennedy, Dennis Manos, Jeremy Martin, Gene Tracy, Tim Wolfe, and Janice Zeman.

2. The Nature of the Problem: Projected Shortfalls, Growing Limits of the Promise

2.1 Sources of Revenue

In meeting with the Provost and others, we confirmed that the William & Mary has five main sources of revenue:[6]

- State allocation
- Grants and contracts
- Philanthropy
- Auxiliary services
- Tuition

It is tuition that generates the most revenue. The tuition rates as of 2017-2018 are $16,370 (+$5,674 in fees) for in-state; $37,425 (+$6,245 in fees) for out-of-state.

The key drivers of tuition revenue appear in Table 1.[7]

Table 1. Key Drivers of "Ordinary" Revenue.

a. Incremental Tuition

For Every 1% Increase in Tuition	Gross Revenue
1% Increase in In-State Undergraduate Tuition under Promise	$180,000
1% Increase in In-State Undergraduate Tuition no Promise	615,000
1% Increase in Out-of-State Undergraduate Tuition	790,000
1% Increase in In-State Graduate Tuition, Excl. Law/Business	40,000
1% Increase in Out-of-State Graduate Tuition, Excl. Law/Business	32,000

[6] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2017-11-strategic-initiatives-new-ventures.pdf.
[7] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2017-07-william-and-mary-2026.pdf, slide 21.

b. Enrollment

For Every 100 New Undergraduate Students	Gross Revenue
100 In-State Undergraduate Students	$1,637,000
65 In-state/35 Out-of-State Undergraduate Students	2,373,900
100 Out-of-State Undergraduate Students	3,742,500

From Table 1, we see that adding 100 out-of-state undergraduates would generate $3,742,500. Adding the same number of students at our current ratio of 65 in-state to 35 out-of-state would generate $2,373,900.

In addition, there is what the Provost calls "extra-ordinary" revenue. The net revenue from these sources (real or projected) is listed in Table 2.[8] Growth in any of these programs could potentially provide additional revenue.

Table 2. "Extra-ordinary" Revenue.

a. Arts & Sciences

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
St. Andrews Programme	$852,089	$910,243	$933,133	$900,000	$1.08M	$1.15M
Summer School	1.60M	2.10M	2.20M	2.2M	2.26M	2.30M
Online Summer School				288,000	300,000	300,000
Classical Studies Post-Bacc.		33,224	24,690	6,200	?	?

b. Mason School

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Online MBA	$222,768	$792,716	$1.43M	$1.53M	$1.62M
MSBA (on campus)	2,160	(162,093)	884,000	648,000	634,000
Online MSBA				178,000	772,000

c. School of Education

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Miami-Date Ed.D.		$114,000	$114,000	$114,000	?
Executive Ed.D.	$216,918	155,940	250,500	1.43M	2.30M
Online M.ED. in Counseling				43,500	98,000

[8] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2017-11-strategic-initiatives-new-ventures.pdf.

d. Law School

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
LLM Program	$886,000	$705,000	$1.65M	$1.25M	$1.25M	$1.25M
Summer/Special Programs	198,000	228,000	295,000	285,000	285,000	285,000
Online Certificate-Veterans Law			$100,000	$100,000	$100,000	$100,000

e. VIMS/SMS

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Oyster Breeding	$138,250	$202,463	$179,925	$175,000	$175,000	$175,000

The revenue generated by "extra-ordinary" programs is small relative to the entire budget, but could in some cases be expanded.

Further meetings with the Provost and Sam Jones gave us insight into the budget. According to budget projections for there will be an annual deficit of $10M by 2027. We were further struck by the dramatic growth in the cost of financial aid under the Promise. Financial aid expenditures appear to have risen 150 percent from 2012-13 to 2017-18 and now approach $30 million annually, with need-based aid for undergraduates accounting for most of the increase[9]. Additional difficulties associated with financial aid stem from the fact that the amount of financial aid needed in any one year appears to be unpredictable: because we admit students in a "need-blind" manner, we can only estimate how much aid is needed in a given year.

2.2 Growing Limits of the Promise

The William & Mary Promise, which was adopted in 2013, was designed to enhance the quality of our undergraduate education while increasing predictability and affordability for in-state students by providing a 4-year tuition guarantee to incoming undergraduate students and reducing the net tuition paid by middle-income families. The Promise allowed W&M to increase tuition and fees in a way that parents appreciate and that was politically acceptable. In-state tuition and fees have increased (101% and 22%, respectively) dramatically since the Promise was implemented in fiscal year 2013. Tuition now comprises 75% of the total cost (not including room and board), up from 64% in 2012. W&M was the first in the Commonwealth to adopt this innovative model. As a result, W&M's sticker price for tuition for first-year students will be 10% higher than that of the second most expensive state school (UVA), and total costs are 25% higher when fees are included. While the tuition and fees are still below most private research universities, competition from other Virginia state schools means that additional increases in tuition may have a negative impact on the

[9] Source: https://www.wm.edu/about/administration/bov/_documents/meetings/2017_2018/2018-4-financial-affairs-jones-sebring.pdf , slide 6

quality of incoming classes. Coupled with the high sticker price are the diminishing returns of tuition (due to necessary increases in financial aid to maintain accessibility). It should be noted that a tiered tuition policy will raise the same revenue from a given constant percentage increase as a non-tiered one.

While the Promise increased in-state tuition, out-of-state tuition remained relatively high. In fact, despite the large in-state tuition increases, out-of-state students still shoulder a greater proportion of the costs even when the state's contribution is counted. In AY 18-19 an in-state student together with the Commonwealth will contribute only 89 cents for every dollar from an out-of-state student (Table 1, third to last row). This comparison is with the list price only. It does not include financial aid, which goes largely to in-state students.

Going forward, the rate of inflation should be considered when setting the percentage cost increase for the entering class. With the promise of no increases in tuition, the one-time increase should at least keep up with inflation when expressed as a yearly equivalent over four years. For example, the 4.4% increase in AY 17-18 translates to a yearly increase of 1.73% (Table 1, penultimate row). However, inflation for that year was 2.65% according to the International Monetary Fund data (imf.org). The 6.5% increase approved April 20th, 2018 translates to 2.53% per year, a value just above the 2.38% inflation rate. Also, the Promise should be modified if there is ever a year where the percentage increase in tuition is zero or unusually low. In such a case, the Promise could be reduced to cover three years with the increase in the fourth capped by the cumulative increase of inflation.

Table 3. Tuition and Fees

Academic Year												
	18-19	**17-18**	**16-17**	**15-16**	**14-15**	**13-14**	**12-13**	**11-12**	**10-11**	**09-10**	**08-09**	**07-08**
In-state Tuition ($)	17434	16370	15674	13978	12428	10429	8677	8270	7523	6388	6090	5549
Fees ($)	5966	5674	5560	5394	5228	5034	4893	4862	4665	4412	4156	3615
Increase from the Previous Year (%)												
In-state Tuition	6.5	4.4	12.1	12.5	19.2	20.2	4.9	9.9	17.8	4.9	9.7	
Fees	5.1	2.1	3.1	3.2	3.9	2.9	0.6	4.2	5.7	6.2	15.0	
Overall	6.2	3.8	9.6	9.7	14.2	13.9	3.3	7.7	12.9	5.4	11.8	
Increase in Total Revenues Across All Classes from the Previous Year (%)												
In-state Revenue	7.6	8.6	10.5	9.4	8.4	5.1	3.3	7.7	12.9	5.4	11.8	
Out-of-state Revenue	3.7	3.3	2.9	2.9	3.8	2.9	3.8	6.5	9.0	5.6	8.9	
Overall	5.5	5.7	6.2	5.6	5.7	3.8	3.6	7.0	10.5	5.5	10.0	
In-State vs. Out-of-State Revenue Generation												
In-state T&F (% total)	47.2	46.3	45.1	43.3	41.8	40.8	40.3	40.4	40.1	39.3	39.4	
In-state + State per $1 Out-of-state Student	0.89	0.88	0.87	0.85	0.85	0.85	0.84	0.85				
One-Time Increase if Distributed over 4 Years (%) vs. Inflation												
In-state tuition (4 yrs) (single yr increase)	2.53 (6.5)	1.73 (4.4)	4.62 (12.1)	4.77 (12.5)								
Inflation	2.38	2.65	1.28	0.12	1.61	1.47	2.08	3.14	1.64	-0.4	3.8	

Our discussions over the 17-18 academic year revealed the degree to which W&M is dependent on tuition for its "ordinary" operating budget. There are some promising sources of "extra-ordinary" revenue, but these have so far generated comparatively small amounts. While the Promise was successful in allowing W&M to raise tuition and fees over the short-term, this is no longer a viable source of revenue growth. In the following sections, we explore a few solutions that have been proposed for the growing budget shortfall.

3. Solution 1: Increase "Ordinary" Revenue by Growing Undergraduate Enrollment

Enlarging the population of undergraduates is one way to help W&M's financial model converge with its operating model. An increase in out-of-state and international students would be the simplest way to improve W&M's finances, because these students pay on average three times as much as the average net revenue generated by a Virginia resident student. Many major public research universities have done just that.

Purdue University under President Mitch Daniels is one prominent example. Since the fall of 2008, Purdue has added 3,585 foreign and non-resident students while shedding 4,346 in-state undergraduates. State resident students have fallen from 65% of the undergraduate enrollment to 53%. Coupled with an increase in per-student funding from the state of Indiana, this has permitted Purdue to hold in-state tuition constant for seven consecutive years. The Purdue example is not isolated. Most mid-western public universities have followed a similar pattern, as have other flagships like the University of Alabama.

Unlike Indiana or Alabama, the state of Virginia is unlikely to allow W&M to decrease the number of undergraduate seats for resident students, so the only path to a larger revenue stream is overall growth in the number of places for resident and non-resident students. To preserve the operating model, growth in the undergraduate population requires increases in faculty and staff sufficient to preserve the high-touch undergraduate education that is our brand. The committee is very wary of growth ideas that presume we can reduce our ratio of tenured and tenure-eligible faculty per 100 full-time-equivalent students without reducing the quality (real and perceived) of a W&M education.

3.1 Problems with Increasing Undergraduate Enrollment: Assessing the Undergraduate Experience in Arts & Sciences

Undergraduate growth would have the greatest impact on Arts & Sciences, but departments and programs in A&S have different student-to-faculty ratios and different abilities to adjust to growth. In order to assess the implications of growth, we examined the 10 departments in Arts & Sciences that produced the highest number of undergraduate majors in the academic year 2015-16 (at which

point William & Mary reported a 12:1 student-to-faculty ratio). These 10 departments produced between 49 and 145 majors each, for a total of 821 majors, or over 58% of the 1411 graduates that year (Figure 1).[10]

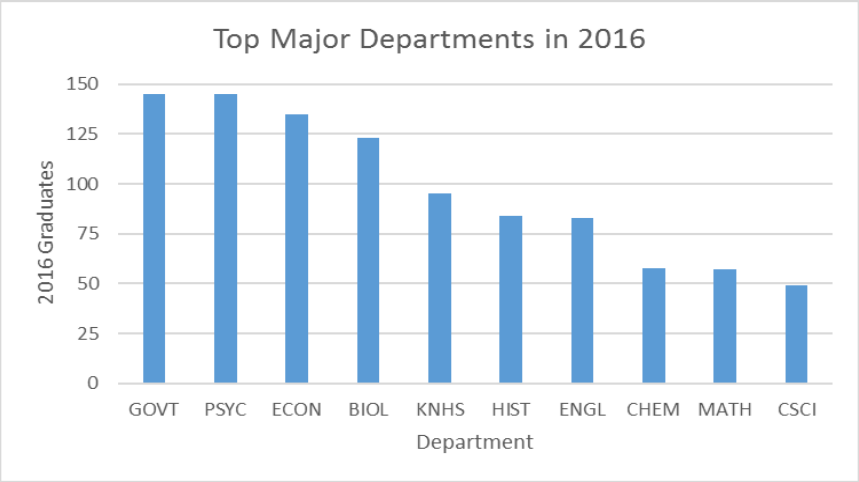

Figure 1: Number of graduates in departments in Arts & Sciences with the highest number of graduating students in 2016.

When we analyzed the course distribution by size for graduates of these departments, we found that Biology and Chemistry majors spent nearly 40% of their time in classes with more than 50 other students (Figure 2). By contrast, other majors attend classes that large less than half as often (i.e., approximately 14% of classes are greater than 40). On average, only a third of the Biology and Chemistry students' classes had 25 or fewer students.

The Arts & Sciences faculty have voted to restrict COLL 100 courses to 25 students, believing that larger sections would inhibit close student-faculty interaction. With a 12:1 student-to-faculty ratio, one might expect that the majority of the students' classes would fall into this category, but they clearly do not, at least for students in some of the larger STEM departments.

[10] Other majors with similar large numbers, such as Finance, Accounting, and Marketing are not included in this analysis because they take many classes outside of Arts & Sciences. Majors in Interdisciplinary Studies, such as Neuroscience and International Relations, are also omitted from this analysis because they take courses required for their major in several departments.

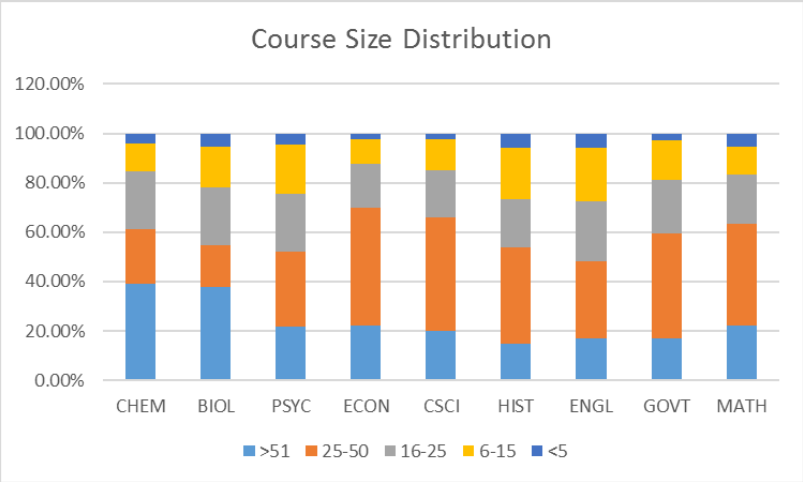

Figure 2: Course distribution by size for students in A&S departments with the highest number of graduates in 2016.

If we look only at courses that students take in their major, we see even more variation (Figure 3). Again in contrast to the other majors shown, for Biology and Chemistry students, nearly half of their major classes had enrollments over 50.

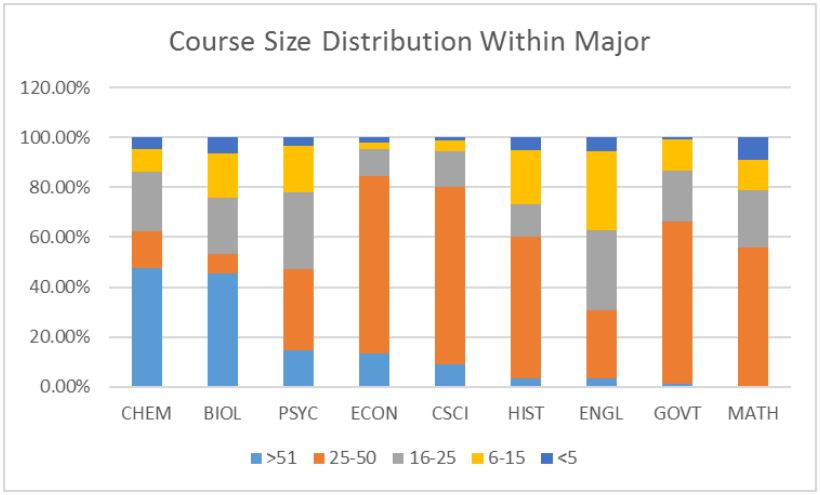

Figure 3: Major course distribution by size for students in A&S departments with the highest number of graduates in 2016.

As an alternative view, we also looked at the numbers of students taught by faculty in these departments. To compile this list, we included only courses taught in the 2015-2016 academic year. Courses taught by graduate students or by special case instructors were excluded.[11]

[11] The special case instructors include those who taught infrequently either because they were an adjunct instructor or because they had their tenure home in another department. For example, we excluded Senator Thomas Norment

The variation in the average number of students per instructor is sufficiently large to be instructive. As shown in Figure 4, during the 2015-16 academic year the average instructor in Biology, Chemistry, Kinesiology & Health Sciences, or Psychological Sciences taught more than 140 students, whereas the average instructor in English taught 46 students per year. Thus, English instructors could easily maintain the advertised 12:1 ratio by teaching two courses per semester. This variation also happens at other universities, and is usually explained by ability of some disciplines to use large lecture courses, while others may not. For example, larger courses in the English department could either limit classroom discussion time or impede an instructor's ability to review submitted papers. In contrast, Chemistry courses often have little discussion time (although they do have lab time) or formal writing. However, such large class sizes are impossible to maintain for meaningful undergraduate research, which typically involves one-on-one student instructor interaction.

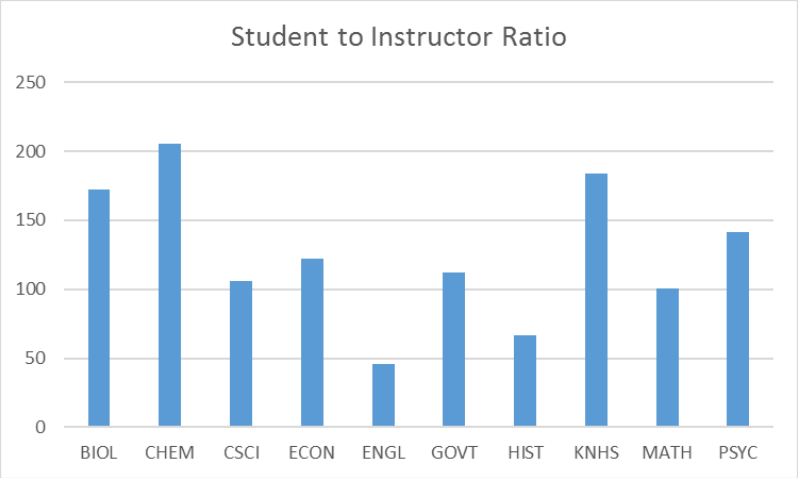

Figure 4: Average number of students taught per year per instructor in A&S departments with the highest number of graduates in 2016.

Undergraduate research is a major feature of a William & Mary education. A recent study of William & Mary undergraduate research (Cristol et al. 2018) finds that 85% of student respondents report having had a significant research experience.[1] With the large numbers of students in each of these 10 departments, and the resulting large class sizes, it is becoming increasingly difficult to provide meaningful research experiences to undergraduates. Moreover, when Engineering and Design and similar new majors come online, a growing proportion of our entering class will likely pursue STEM majors. Although our NTE faculty provide our students with valuable in-class experiences, they do not typically engage students in research experiences. Therefore, providing a majority of STEM students with significant research experiences will become more of a challenge

and his class of 50 students from this analysis because he does not teach regularly. We excluded Marc Raphael (Religious Studies) and his students from the list of Government courses. We also excluded Linguistics instructors and their students from the English department totals.

if the university chooses to deal with student growth by hiring non-tenured, rather than tenured faculty members. Although not considered in the present analyses, it is worth noting that almost half of the departments discussed also have graduate programs. Although graduate students provide some support for undergraduate programs, they also require resources from faculty to complete their programs.

4. Solution 2: Increase Efficiency of Existing Facilities by Creating a Summer Semester

One way to minimize the costs of growth, and thus leave more revenue for quality enhancement and tuition control, is to utilize the campus more thoroughly over the summer. If W&M moves to a three-semester academic year, the undergraduate population could be increased significantly (by 1,000 or more) without forcing a proportionate increase in the capital or labor costs of running the university. Such expansion could spread the university's fixed costs over a larger student body, thereby reducing the costs of educating each student and increasing net revenue per student, other things being equal.

Once the current expansion of air-conditioned dorm space is complete, the existing stock of housing could handle a summer term of 2,000 without building new space for classrooms or for housing and dining. W&M should soon have over 2,700 air-conditioned spaces for summer use, which would accommodate a full summer semester plus other commitments of space to activities such as summer research. The revenue stream from added non-resident students would permit adding enough tenure-eligible faculty to preserve the current undergraduate experience.

Our existing NTE faculty offer a source of productive cost control in creating a summer session. Many of them would see substantially higher wage income from teaching in a full summer semester. Their benefits package already includes things like health insurance that would not increase if they taught a three-semester year.

Dartmouth is a prominent example of a peer institution that has moved in this direction (although Dartmouth has quarters instead of trimesters). Dartmouth uses the summer to bond the sophomore class, and this also permits the curriculum to be efficiently geared toward one class's needs. That approach may not work for W&M, but it reflects one option. Many issues need to be examined in order to make a full summer semester feasible. These include the length of the term, how the university could increase enrollment without diluting admissions standards, and how a new term would affect scheduling. Existing tenure-eligible faculty could opt to spread their teaching over three terms, or to concentrate it in two of the three terms. This has implications for scheduling and governance that would need to be studied further.

The committee has not attempted to build a full model of a working summer semester. There are too many details that need to be evaluated and built into any formal proposal. But developing a fully integrated summer semester offers a potential option for moving the financial model of the university closer to the operating model of an elite institution.

5. Solution 3: Increase "Extra-Ordinary" Revenue by Developing New and Existing Programs.

In recent years various units of the university have created programs that leverage W&M's brand and academic talent to satisfy demands for flexible educational programming in a rapidly evolving educational marketplace characterized by new technologies that facilitate distance learning.[12] We believe that W&M can build upon these recent initiatives in an effort to generate revenue and extend our reach to populations of students who are not currently well-represented on our campus, such as nontraditional students. Below we review programs at other universities in the region.

5.1 Extension Courses

Many universities generate revenue by offering online or on-campus extension courses. W&M has the Christopher Wren Association, which is aimed specifically at retirees in the Williamsburg area and operates on a *pro bono* basis. It may be worth investigating whether courses designed for working adults might be profitable if they were available at our DC campus.

5.2 Bachelor Completion Program

Such programs would allow students who have earned significant academic credit elsewhere to complete a bachelor's degree at William & Mary. Both the University of Virginia and Georgetown University offer such programs. UVA offers both a Bachelor of Interdisciplinary Studies and a Bachelor of Health Sciences Management. Georgetown offers a Bachelor of Liberal Studies. Coursework includes a blend of in-person and online learning. Students at UVA generally matriculate part time, taking two or three courses per semester, and complete the program in three or four years. UVA charges a flat fee of $25,800 for such a degree, regardless of residency.[13] Georgetown charges $984 per credit or $55,104 for the 56 credit hours necessary to earn this degree.[14] William & Mary could presumably replicate such programs, drawing upon experience with other online programs and integrating transfer students from Virginia's community colleges into the university's academic program.

5.3 Post-Bachelor Pre-Med Degree

[12] Some such efforts, including the Classical Studies Post-Bac program, have drawn upon initial start-up funds from the College's creative adaptation fund and now generate net revenue

[13] UVA granted 62 Bachelors of Interdisciplinary Studies degrees in the most recent academic year and 4 Bachelors of Health Sciences Management. The latter degree may be new: UVA granted no such degrees until recently.

[14] Georgetown granted 32 such degrees in the most recent year for which data were available. The School allows matriculants to transfer up to 64 credit hours from other institutions.

Post-bachelor pre-med degrees allow students hoping to attend medical school to supplement their undergraduate science education, particularly as a means of preparing for the MCAT. UVA, Georgetown and numerous other institutions offer such programs, which appear to be aimed at students with little or no undergraduate math or science background.[15] Such programs last between 12 and 15 months. At UVA and Georgetown, students are in residence full time and take pre-existing courses alongside undergraduate students during the summer, fall, and spring semesters.[16] Schools also offer advising, letters of recommendation, and other academic support.[17] Georgetown charges $1,396 per credit for the 30 credits necessary to earn such a certificate, for a total of $41,880. UVA charges $30,382 for Virginia residents and $36,110 for out-of-state students. Enrollment in UVA's program is between 26 and 50 students, while enrollment at Georgetown's is between 51 and 100.

William & Mary apparently has the infrastructure and expertise necessary to begin such a program. The university has significant strength in various STEM subjects related to the study of medicine as well as enormous expertise spread across faculty in many departments in terms of advising and preparing students for applying to medical school. Although, as discussed in Section 3, many of our STEM departments are currently strained, with additional resources they could presumably leverage their strengths to create programs similar to those offered at UVA and Georgetown. Moreover, the programs at UVA and Georgetown are very competitive with many students unable to gain acceptance, so there remains a significant need for additional programs in the state.

We could also broaden this program to include students who wish to pursue graduate work in biomedical research; many students discover too late in their undergraduate careers that they wish to pursue an advanced degree and require additional coursework or lab work for a competitive application. William & Mary has a well-documented reputation for sending students on to graduate programs, so such a program is likely to be successful.

Georgetown offers a Masters in Professional Studies in 17 different subjects from Applied Intelligence to Urban & Regional Planning. Courses are taught by "industry experts" and not tenure-line faculty. Matriculation is usually part-time, and most such subjects entail a blend of online and face-to-face instruction. Instruction emphasizes "specialized knowledge, applied

[15] Georgetown requires applicants to possess a "B or above" on "any" science or Math coursework taken as an undergraduate.

[16] Georgetown promises "Co-matriculation with undergraduate students for all lectures and most labs."

[17] For instance, Georgetown offers:

- The opportunity to be evaluated and receive a recommendation letter from the Pre-Med Committee (after completion of 30 credits at Georgetown University).
- Volunteer and seminar opportunities and information in the health field.
- One-on-one advising and other academic support.
- Eligibility to register with the Georgetown University Pre-Medical Society and Post-Bac Student Group.
- Workshops and seminars on how to prepare for, apply to, and interview for medical school.

research and hands-on practice," culminating in a "capstone project" instead of a thesis. Such degrees require 30-33 credits of instruction, and Georgetown charges $1,345 per credit hour. Assuming a requirement of 30 credit hours, the price per degree is thus $40,350.[18] In the spring of 2018, Georgetown awarded 810 such degrees, generating gross revenue over $32 million.

5.5 Certificate Programs

Many institutions, including the University of Virginia and Virginia Tech, offer certificates in various subjects. Virginia Tech offers more than 60 certificates, while the University of Virginia offers 16.[19] Most but not all such certificates are post-undergraduate. At Virginia Tech such certificates are often offered concurrently with a master's degree and require 9 or 12 academic credits. UVA apparently offers such certificates on a "stand alone" basis, unrelated to any other academic program. Fourteen of UVA's certificates are earned entirely online. The price for UVA's certificates ranges from $6,000 to $12,150 for in-state students, while tuition is generally twice that for out-of-state students. The price for Virginia Tech's certificates is apparently the normal per-credit hour price of the courses necessary to obtain the certificates. William & Mary may find it difficult to replicate Virginia Tech's certificate model, which appears largely parasitic on the school's various master's degree programs, including those offered in Northern Virginia, where the school began offering certificates in 1968. UVA's "stand alone" model may be more promising but at the same time less lucrative, as it would entail some fixed set up costs. William & Mary could draw on the experience of those units that already offer such certificates.

5.6 St. Andrews William & Mary Joint Degree Programme: Expansion to STEM Fields

By all measures the St. Andrews William & Mary Joint Degree Programme has been an enormous success for both students and faculty. The program has grown each year and now includes joint degrees in Classical Studies, Economics, English, Film Studies, History, and International Relations. Students in the program gain from the greater diversity of coursework at each university, and W&M gains about $1M per year (see Table 2a).[20] Because of the structure of departments at St. Andrews, students majoring in computational areas or the sciences are currently not able to participate in this program (or any such program). Our committee suggests that the St. Andrews joint degree program be expanded to include several STEM majors, in particular Neuroscience, as a means of enhancing our students' educational options and generating revenue. There are several compelling reasons for this. First, there is a demand among students majoring in science to

[18] *N.b* that such tuition includes the cost of "accommodations" but not travel, food or books.

[19] Topics at Virginia Tech range from Religious Studies to Naval Engineering to Non-Profit Management to Race and Social Policy to Marriage and Family Therapy. The school currently offers 68 certificates and is apparently planning to expand its offerings. At UVA topics include: Criminal Justice, Public Administration, Accounting, Health Sciences Management, Information Technology and Leadership.

[20] About half of students in the joint-degree program are in-state students, but in-state and out-of-state students pay the same tuition and fees, which amount to $39,990 for AY 2018-19.

participate in a joint degree program, particularly St. Andrews. Those of us in the sciences have many testimonials regarding STEM student interest, particularly Neuroscience students. Second, St. Andrews has an excellent Neuroscience curriculum and is renowned for research in this area. In addition, there are excellent physics programs that would also serve our majors very well. Third, several years ago Dean Griffin set the groundwork for establishing a joint degree in Neuroscience that received a great deal of enthusiastic support. While it was not initiated at that time, we suggest that we revisit the possibility of joint degrees in Neuroscience and other STEM fields. There is substantial interest, and this would generate significant revenue. Even if St. Andrews is unwilling to expand the program, the same model could be applied at another university.

5.6 Post-Bac and/or Master's Program in Bioinformatics

There is a huge demand within the state of Virginia as well as nationwide for individuals competent in the field of bioinformatics; as healthcare becomes more focused on precision and personalized medicine and as the costs of DNA sequencing decrease dramatically, there is an ever growing need for trained bioinformaticists. Given the excellent reputation that W&M enjoys in personalized student mentoring and in placing students in biopharma as well as academic positions, it is likely that both post-bac programs as well as a specialized master's program may generate significant revenue. This initiative would also dovetail well with the current Data Science initiative.

6. Final Thoughts

Over the course of the 2017-18 academic year through conversations with faculty and administrators at William & Mary we learned a great deal about William & Mary's financial situation and available resources. We have been told that one of the main drivers of the 2026 deficit is now a rapid increase in need-based financial aid. This is of particular concern especially if there is a recession. In such an economic situation the state would likely cut our budget and the demand for aid would rise as incomes fall or stagnate.

There are significant economic challenges in our future that will require important changes to our operating and financial models. The faculty are committed to engaging fully in the strategic planning process to address these challenges.