WILLIAM & MARY

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

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## Submitted to Peggy Agouris, Provost


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## Table of Contents

# CDSAS STEERING COMMITTEE REPORT

## EXECUTIVE SUMMARY

If approved, a proposed school of Computing, Data Science and Applied Science ("CDSAS") at William & Mary would become the first new school established at the institution in more than half a century. Proponents of this new entity believe that once established, it will address increased student demands in these three areas, elevating William & Mary's national profile in industries marked by robust economic growth across the country. They also note that increased visibility and autonomy for these three disciplines will strengthen recruitment of world-class faculty and graduate students and attract increased external funding for research (both external grants and state funds). Others in the community have expressed concerns that such a school might draw resources away from the rest of Arts & Sciences (A&S) and thus undermine William & Mary's traditional strengths in providing undergraduates with a superlative interdisciplinary education.

Throughout the spring of 2023, this 15-member Steering Committee explored the possibilities for a new autonomous unit and invited comprehensive feedback from the community by holding various town halls (both virtual and in-person), attending meetings with faculty and student groups as well as others, and conducting multiple on-line surveys. Many of those consulted expressed particular concern about the administrative costs of a new structure. Of the different models under consideration, respondents clearly preferred those that offered students the opportunity to matriculate into the new unit after general admission to W&M and the completion of a defined number of credits. Far less support was offered for either a "graduate school only" model or a "direct admission" model. During the course of its work, the Committee was informed that faculty in the Physics (PHYS) department unanimously voted to become part of this new entity as well.

Whether a new unit for CDSAS is situated inside or outside of A&S (substantial support was expressed for both of those two options), an overwhelming majority hoped that such an entity would offer students throughout the university the opportunity to access the new school's course offerings; many believe a new unit should facilitate cross-school collaborations between faculty and students of different schools, as well as foster the interdisciplinary teaching and research which aligns with William & Mary's traditional strengths. Developing streamlined processes for faculty to hold joint and affiliate appointments with departments and programs in the new entity will be key to enabling such interdisciplinary collaborations. Finally, faculty and students alike urged the administration to design structures for undergraduate admission and/or majoring in the new school which will address and satisfy the needs of students throughout the university.

## I. INTRODUCTION

Beginning in November 2019, faculty from the Department of Computer Science (CSCI) began discussions with administration officials about the potential creation of a school of computing at William & Mary. These discussions were discontinued in Spring 2020 but resumed in the Fall of 2021. By this time, a new Data Science Program had been created as a semi-autonomous unit within CSCI.

### Design Work Group

In May 2022, the Provost formed an ad-hoc design work group to explore the possibility of establishing a new unit in Computing, Data Science, and Engineering. The design team included the heads of CSCI and Applied Science (APSC), representation from all four William & Mary schools, and members of the dean's office in A&S. With regard to the potential creation of a school, the group was charged with assessing and responding to multiple factors including: (1) Emerging trends in higher education to create entities that can better compete for dedicated state and federal government resources in their respective disciplines; (2) Increased student demand for graduate and undergraduate education in those same areas; (3) Increased interest from a robust industry sector; and (4) The desire to elevate William & Mary's national profile in these areas, which would, in turn, enhance research activities and student recruitment.

The design work group met multiple times during the spring and summer of 2022. In June 2022, the group began to focus its efforts more specifically on a proposal for a school in CSCI, DSCI and APSC. In August 2022, the heads of CSCI and APSC and the Director of DSCI were tasked with developing a concept outline. In October 2022, the Provost met with representatives of the Faculty of A&S (including members of the Faculty Affairs Committee) to discuss the state of the proposal. Following those meetings, the Provost delivered the design work group's draft report to the faculty for more widespread consideration and feedback.

The design work group's draft report offered initial answers as to why an autonomous unit was necessary to achieve its desired goals. In addition to discussing "next steps" in the process, the report also laid out a brief timeline of preliminary discussions and activities. Central to these discussions was the desire to maintain and expand collaborations between the proposed new unit and other university units/departments/schools through core membership and flexible affiliations by individuals and/or program clusters. The group expressed interest in maintaining and expanding William & Mary's excellence in teaching and research. The intellectual/academic vision of the leaders who head the three academic units that were at the center of the design work group's effort can be found in **Appendix A**.

### Steering Committee

In December 2022, the Provost appointed fifteen members to a university-wide Steering Committee for Computing, Data Science, and Applied Science (CDSAS). The membership of the Steering Committee is provided in **Appendix B.** Members were selected by the Provost in consultation with the Faculty Assembly, A&S Faculty Affairs Committee, A&S Council of Chairs & Program Directors, and the Co-Chairs of the Steering Committee.

The charge to the Steering Committee (provided in full in **Appendix C**) tasked its members "with exploring the possibilities for an autonomous academic unit for the computing, data, and applied sciences at William & Mary," while pursuing the goals of expanding the University's excellence in teaching and research, and increasing the University's ability to attract and retain exceptional faculty, staff, and students.

Other specific charges to the Committee included:

- To research and analyze the advantages and disadvantages of different models for an autonomous, more visible structure for computing, data science, and applied science, and assess the suitability of these models for W&M;
- To work with the W&M Budget Office and the Associate Dean for Finance & Administration in A&S to generate financial models to support different structures; and
- To examine the impact of a new University unit by interacting with relevant constituency groups and addressing the opportunities and challenges identified through this process.

The Committee was asked to provide relevant data and options for moving forward in a report due by the end of the spring 2023 semester.

All members of the Steering Committee contributed to the drafting and editing of this report. The Committee discussed the report outline together, and then sections of the report were drafted in teams of two to four. Once an initial draft was complete, all members of the Steering Committee contributed to the review and editing of the report.

## II. STEERING COMMITTEE PROCESS

### Subcommittees

The Steering Committee was divided into two subcommittees. Subcommittee 1 (**Appendix D**) assessed "operational requirements of the proposed new school, including possible structure(s), financial and HR needs, and corresponding academic and implementational implications." Subcommittee 2 (**Appendix E**) assessed anticipated functioning of a new school "within the context of the University's academic mission" with a focus on "collect[ing] feedback from departments and programs that are particularly interested in collaborating in more depth with the new school (opportunities), identify[ing] broader issues that may result from the establishment of a new school (challenges), and propos[ing] mechanisms to pursue these opportunities and address the challenges."

The Steering Committee scheduled weekly meetings on Wednesdays during the spring semester, alternating between Committee meetings and Subcommittee meetings. A complete list of all Committee meetings and participating guests is provided in **Appendix F**. Guests participating in Full Steering Committee Meetings included the assistant VP for Budget and Financial Planning and the Associate Dean of Finance and Administration for the Faculty of Arts and Sciences. Guests participating in Subcommittee 1's meeting on February 15, 2023 included the CFO and Senior Associate Dean of the Mason School of Business.

Adrienne Howard, Project Manager in the Office of the Provost, served in an administrative capacity to assist members of the Committee. She attended all meetings of the full Committee

and all meetings of Subcommittee S1. The Steering Committee's membership and work were publicized in a variety of ways, including via an email from the Provost on January 23, 2023, and on the CDSAS website.

**Gathering Feedback**

The Committee communicated with the W&M community via email, the Steering Committee website, and the W&M Digest. **Appendix G** outlines the Steering Committee's communication plan, details the communications timeline, and gives sample communication verbiage used.

A number of different methods were used to gather feedback from the W&M community. Survey One, initially shared on February 1 with a deadline of February 27, 2023, invited respondents to submit questions they wanted the Steering Committee to address. This survey received 90 responses. Survey Two, initially shared on April 25, 2023, with a deadline of May 4, 2023 garnered feedback on variables for the new academic unit. This survey received 521 responses. Copies of these online surveys are provided in **Appendices H and I.** An online form for individuals to submit comments to the Committee was available on the Steering Committee Website. **Appendix J** is a blank copy of this online form.

Members of the Committee also met with all groups who requested meetings. Groups involved in the meetings included the Student and Graduate Student Assemblies, the Faculty Assembly, and several W&M departments/schools. **Appendix K** contains a complete list of meeting requests, dates of each meeting, and Committee members attending. The Committee also received written statements from individuals, groups, and departments, and received results from the relevant portion of the Student Assembly Omnibus Survey. The full Student Assembly Omnibus Survey Steering Committee Report is included as **Appendix L**.

In addition, several open town halls were held on campus. Members of the W&M community were notified in advance of each town hall by email, W&M Digest postings, and publication on the W&M website. Three in-person town halls, open to all members of the W&M community, were held on Feb. 22, 28 and March 7th, 2023. The town halls were transcribed so that questions could be addressed and analyzed to identify themes. Virtual (recorded) town halls were held for graduate students (April 3, 2023) and undergraduate students (April 6, 2023).

## III. PROPOSED COMPOSITION OF THE NEW SCHOOL

The Steering Committee recognizes that expertise in computing, data and applied sciences extends well beyond the faculty of the CSCI and APSC Departments (CSCI currently houses the DSCI unit). For this reason, the Steering Committee invited requests for inclusion from other departments and programs who were interested in participating in this new academic unit.

To date, only the Physics Department has expressed a desire to be an additional founding member of the new academic unit along with CSCI, DSCI and APSC. On March 10, 2023, the Physics Department voted unanimously to either (1) join the new school or (2) be part of a significant restructuring of A&S that would provide the Ph.D.-granting departments with their own Dean who reports directly to the Provost. The Physics Department provided the Steering

Committee with a "white paper" explaining the rationale for including Physics as a founding member of the new unit (See **Appendix M**). Among the reasons offered were the following:

1. The Physics Department has extensive faculty expertise in computational physics and in large-scale data analysis. (This includes a highly ranked research group in computational nuclear theory as well as experimenters at both JLab and Fermilab, who are routinely involved in large-scale data analysis);
2. In its long-range plan, the Physics Department has committed to substantial growth in its research groups that focus on quantum science, including the fundamental research that is relevant to quantum computing. (The development of functional quantum computers would have a transformational effect on both computing and data science);
3. The PHYS, CSCI, APSC and DSCI Departments/Units have a commonality of purpose: all are Ph.D.-granting STEM departments who aspire to compete with similar departments at R1 research universities, even if W&M remains R2 overall. As this distinguishes them from other units in A&S, keeping them grouped together administratively is the most effective way of meeting their specialized needs and helping them to flourish; and
4. The grouping of PHYS and APSC in the same academic unit is the least disruptive way to assure a continuation of the popular Engineering Physics and Applied Design (EPAD) undergraduate degree track. This track is currently the only opportunity for W&M undergraduates to have exposure to engineering and represents a collaborative effort between the PHYS and APSC Departments.

After the PHYS Department's position became known, the APSC faculty unanimously endorsed the inclusion of PHYS in the new academic unit (their memo is provided in **Appendix N**). The Chair of CSCI and the Director of DSCI have each expressed their support for the inclusion of the PHYS Department as well.

## IV. SUMMARY OF INITIAL FEEDBACK RECEIVED

The analysis of the 90 responses from the first survey (see Section 2, above) identified several core themes including funding for the proposed unit and views about its possible impact on (1) W&M's culture and identity; (2) the student population; (3) interdisciplinary research; and (4) A&S and its faculty. Some respondents expressed frustration at the lack of clarity as to how members of the Steering Committee were selected (see "Introduction" p. 4 above, for an explanation of the selection process).

Respondents identified the following areas of concern:

1. **Preserving funding for other units:** Some expressed anxiety that the creation of a new unit would cause financial harm to other units within A&S. Others worried that the A&S budget would ultimately have to bear the cost of the new unit; they were also concerned that indirect cost recoveries on external grants would be cut, thus impoverishing the departments that carry more of the teaching burden (especially in the general education [COLL] curriculum) and have less grant-funded research.

2. **Preserving liberal arts culture and identity**: Respondents considered the impact on W&M's culture and identity, wondering whether the proposed unit would fit in a leading liberal arts institution, and why creating a new unit is considered mission critical.

3. **Improving computer and data sciences learning in the undergraduate curriculum without additional costs:** The impact of the new unit on the student population ranked high among the responses. There was near unanimous agreement that the creation of any new unit should not have a detrimental impact on students' learning experiences (especially undergraduates). Respondents sought reassurance that the COLL curriculum in particular would not suffer since the liberal arts curriculum is W&M's comparative advantage and is what attracts many students to W&M. Some faculty and students voiced the hope that the new unit would contribute more substantially to the COLL curriculum and that introductory courses to computer science and data science would be expanded due to the growing demand. Others were concerned that the new unit would cause a hike in tuition and fees, which would hurt accessibility and diversity either to the unit or to W&M as a whole.

4. **Ensuring interdisciplinarity:** Responses also highlighted concern about W&M's commitment to interdisciplinary research and teaching. DSCI research is inherently interdisciplinary, as witnessed by faculty across many departments and schools working on data-informed and related research. Faculty sought reassurance that the creation of a new unit would foster interdisciplinarity and not raise barriers to interdisciplinary research with faculty in A&S and in interdisciplinary programs such as Computational and Applied Mathematics and Statistics (CAMS) and EPAD.

5. **Considering a computer science school & an interdisciplinary data science unit within A&S:** Some faculty emphasized that the vision of DSCI at W&M had started out as an interdisciplinary one, focused on liberal arts undergraduate teaching and research. These faculty suggested that while CSCI has made a compelling argument for a separate school, the option of DSCI remaining in A&S should also be considered. Faculty also highlighted that an interdisciplinary DSCI institute or initiative, one which weaves DSCI thinking, teaching, and research into the "university's fabric," is the structure that many of the top universities from Stanford to Harvard have chosen.

Overall, many initial views tended to be negative and cautious. As the members of Subcommittee II conducted listening sessions with departments and groups of faculty who sought smaller meetings, additional views not expressed in the initial survey responses became apparent. Some faculty expressed concerns as to how the administration had handled the process of reviewing the initial proposal to create the new unit, while others asked practical questions about how to most effectively collaborate with members of the new unit going forward.

Initial feedback also highlighted several opportunities. For example, one of the main benefits identified relates to the possibility that the new unit would attract more interdisciplinary grants engaging faculty from across campus. In addition, some noted that the new unit might expand research and applied opportunities for students and faculty, while others acknowledged that consulting firms pay a premium for students with majors in social sciences who also have experience with machine learning, data visualization, and object-oriented programming

experience. The new unit should ensure that non-computer/data science majors continue to have access to these valuable skills through courses, including introductory level COLL courses. **Appendix O** provides a summary of themes from both Survey One and the listening sessions.

## V. SUMMARY OF RESPONSES TO SECOND SURVEY

In April 2023, the Steering Committee distributed its second survey (see Section II above). Demographics of respondents and information about how they heard about the new unit are provided in **Appendix P**.

### A. Question 1: Inside A&S

Question 1 asked the following:

**If the new academic unit is inside A&S, which of the following features do you feel should be incorporated into its organizational structure? You may select as many features as you want.**

Table 1. Ranks the features listed by the number of times the feature was selected. The feature selected by the most respondents is ranked first.

| Option | Ranking: 1=most popular |
|---|---|
| There should be no obstacles to students double-majoring, or majoring and minoring, in a department or program in the new entity and a department or program outside the new entity. | 1 |
| It is important for the new entity to promote and facilitate interdisciplinary collaboration and programming. | 2 |
| Faculty should be able to hold joint and affiliate appointments between a department or program in the new entity and a department or program outside the new entity. | 3 |
| It is important for departments and programs in the new entity to contribute courses to the COLL curriculum. | 4 |
| Undergraduates will apply as they do now to A&S, as undeclared majors. If they wish to declare a major or minor in one of the programs offered in the new entity (CSCI, DSCI, APSC), they will apply separately for admission to the entity. "Non-major" courses in CSCI, DSCI, and APSC are open to students who have not been admitted to the entity. | 5 |
| Faculty in the new entity should have curricular control of all courses taught within the new structure except COLL. | 6 |
| The new entity should have an independent budget and control over all search authorizations and hiring decisions. | 7 |
| The new entity should make independent recommendations on personnel issues such as tenure and promotion (i.e., it should have its own entity-wide committee on retention, promotion and tenure which will forward its recommendations directly to the Provost and by-pass the A&S retention, promotion and tenure committee). | 8 |

Respondents were also allowed to include narrative responses to this question. Common ground reflected in these narrative responses included the following:

- "The undergraduate education structure should not change."
- "The COLL curriculum should remain under the Educational Policy Committee, and faculty of the new entity (whether within or outside A&S) should contribute to it."
- "There should be no changes to admission and major declarations for undergraduate students. Some said quite clearly that students should not encounter barriers to entry like the one they experience at the School of Business."
- "The new unit should have curricular control as other units do."

**B. Question 2: Outside A&S**

Question 2 asked the following:

**If the new academic entity is outside A&S, which of the following features do you feel should be incorporated into its organizational structure? You may select as many features as you want.**

Table 2. Ranks the features listed by the number of times the feature was selected. The feature selected by the most respondents is ranked first.

| Option | Ranking: 1=most popular |
|---|---|
| There should be no obstacles to students double-majoring, or majoring and minoring, in a department or program in the new entity and a department or program outside the new entity. | 1 |
| It is important for the new entity to promote and facilitate interdisciplinary collaboration and programming. | 2 |
| Faculty should be able to hold joint and affiliate appointments between a department or program in the new entity and a department or program outside the new entity. | 3 |
| It is important for departments and programs in the new entity to contribute courses to the COLL curriculum. | 4 |
| The Educational Policy Committee should control the COLL curriculum for all majors, regardless of any other specifics regarding structure of a new entity. | 5 |
| The new entity should make independent recommendations on personnel issues such as tenure and promotion (i.e. it should have its own entity-wide committee on retention, promotion and tenure which will forward its recommendations directly to the Provost and by-pass the A&S retention, promotion and tenure committee). | 6 |
| The new entity should have an independent budget and control over all search authorizations and hiring decisions. | 7 |

| | |
|---|---|
| Undergraduates will apply as they do now to A&S, as undeclared majors. If they wish to declare a major or minor in one of the programs offered in the new entity (CSCI, DSCI, APSC), they will apply separately for admission to the entity. "Non-major" courses in CSCI, DSCI, and APSC are open to students who have not been admitted to the entity. | 8 |
| Prospective students will apply directly to the new entity to major in one of its programs (CSCI, DSCI, APSC) | 9 |

Respondents were again allowed to include narrative responses to this question. Common ground reflected in these narrative responses included the following:

- "The entity should strive to make computing courses even more accessible to undergraduate and graduate students."
- "The entity should have curricular control and control over hiring decisions."
- "The unit should have financial and administrative independence to support the growth and development of Computer, Data, and Applied sciences."

There was considerable opposition expressed to any model where students applied separately for admission.

Many pointed to advantages of the new entity remaining within A&S, including the following:

- "It complements W&M's longstanding strengths as a liberal arts institution."
- "It fosters collaboration between faculty and students in CS/DS/AS and other departments/programs in A&S."
- "A&S and the new entity would not have to compete for resources and no new layers of administrative overhead."
- "It would provide maximum flexibility for undergraduate students."
- "Structures for accreditation, registration, governance, etc. already exist in A&S and therefore redundancy for a new external entity would not be necessary."

Advantages of the new entity moving outside A&S, as reflected in narrative responses, included the following:

- "It offers budgetary and academic autonomy and thereby a chance for CDSAS to grow."
- "Graduate degrees issued by an independent entity have more value in the market."
- "The needs of CS/DS/AS departments are very different from the rest of A&S (except possibly from Physics) and could be addressed."
- "It may enhance chances of interdisciplinary collaborations because CS/DS will be more visible."
- "It might allow A&S to modify many of its outdated administrative processes, policies, and techniques."

Narrative responses regarding interdisciplinary impact included the following:

- "Interdisciplinary work and collaboration should be encouraged regardless of the model. The new entity should promote collaborations outside the entity, with the goal of building

partnerships for high caliber research that will be the basis for sustainable external grant funding."
- "I support joint appointments or affiliations with the entity. It has been very difficult to get the administration to agree to such cross-school joint appointments."

Considerations regarding budgetary and financial independence which were raised in the narrative responses included the following:

- "The new entity should have budgetary independence to hire, manage its staff, and grow its postgraduate (and potentially undergraduate) program."
- "Financial independence is a benefit because it would make the resource allocations to other departments in A&S more transparent than it is now."
- "Having a say in faculty and personnel decisions is highly beneficial within an organization because those who are closer to the matter have key insights no one else can provide. "

**C. Question 3: Graduate School**

Question 3 asked the following:

**Another option would be for the new academic entity to offer graduate programs only. What do you see as the advantages and disadvantages of such a structure? How might we address the disadvantages? Note: the usual model in such cases is for faculty to be appointed to the department/program, which remains within A&S, but for the graduate school to have its own administrative and budgetary infrastructure for graduate program related issues only - similar to our Office of Graduate Studies.**

243 respondents answered this question, and of the 243, the majority (around 54%) responded negatively to the idea of the new unit offering graduate programs only. Around 17% of responses were positive or inconclusive, while 9% of respondents said they could see both advantages and disadvantages. Four respondents were neutral. Remaining responses did not express an opinion.

The most frequent reason offered by those whose responses were unfavorable was the potential disadvantage(s) to undergraduates (e.g., that undergraduates learn from graduates and should not be separated from them; and that a separate graduate school might create a two-tier structure for faculty as well as students). They also worried that faculty time and research effort would be diverted away from undergraduates to bolster an independent graduate program. Many who worried about undergraduate education were dismayed to think (erroneously) that an undergraduate major in Computer Science, Data Science, or Applied Science would no longer be offered at all.

Other explanations for negative responses noted the possible need to report to two deans if the new unit had a separate administrative structure; the expense of a new unit, which would erode resources for the rest of A&S and for undergraduate education in these departments/programs; the belief that a separate graduate school would silo not only these departments from A&S but the rest of A&S graduate students from those in the new unit; and the potential detriment to interdisciplinary collaborations across these departments.

Common responses by those who supported the graduate school option emphasized: (1) the importance of keeping undergraduate A&S intact; and (2) the need to satisfy what the proposing units want, especially with regard to graduate recruitment and faculty recruitment. However, even among those who responded in the affirmative for liking the graduate school only option, several respondents did note that a robust computer science and data science education still needs to be made available to undergraduate students. Several respondents also noted that, if this model were chosen, then the graduate program should be under the larger Graduate Studies infrastructure rather than its own separate entity (although a smaller number of respondents also did indicate the opposite sentiment – that the new entity should have its own infrastructure separate from the currently existing Graduate Studies infrastructure).

**D. Question 4: Preferred model**

Question 4 asked the following:

**If you have a strong preference for one or more of the models described on the previous pages (inside A&S, outside A&S, graduate-only), please identify and explain your preference here.**

Table 3. A rough count of responses to the survey question.

| | |
|---|---|
| Inside A&S | 108 |
| Outside A&S | 83 |
| Graduate school | 24* |
| No preference | 4 |
| No school | 8 |
| Inconclusive | 16 |

*2 responses noted especially strong opposition

Explanations of preferences were largely in line with data and explanations summarized above.

**Inside A&S**: Many respondents were concerned about so-called "silo-ing" if a new school was created outside A&S. They worried that it would be more difficult for people and ideas to move freely "between the three (or four) departments and the rest of A&S (joint appointments, double majors, research and teaching collaborations). They were also concerned that separating out three (four) departments would "damage our brand as a liberal arts and sciences university" that offers a well-rounded education to every undergraduate, with equal value placed on all disciplines and inter-disciplines. They felt it would send a message that our undergraduate education was no longer holistic and integrated, and there was concern that since data is integral to a range of disciplinary methodologies, it made no sense to create distance between the data science program and other data-reliant departments in A&S.

Some also worried about the additional costs incurred by a new administrative infrastructure for the new school. Concern was expressed that A&S would become the "service" unit for the new

school, teaching lower-level and COLL courses to undergraduates who would then shift their allegiance to the new school once they declared a major. There was also anxiety that faculty in the new school would not be in a position to contribute to the COLL curriculum or provide elective courses for non-majors. Some respondents expressed the view that a new CDAS(P) school within A&S should be balanced by new schools within A&S in other disciplinary and interdisciplinary areas.

**Outside A&S**: Respondents felt that the academic units that proposed the new unit do need more freedom to grow and expand in ways that are especially and uniquely necessary for their disciplines. They need to develop their own infrastructure (including autonomous budgetary and governance structures) so that they can be more nimble and responsive to emerging needs and opportunities. These departments function differently than other departments in A&S, with their focus on undergraduate teaching alongside nationally ranked graduate programs and research. There were also comments that W&M needs a new school to remain competitive in terms of attracting students, faculty and external funding.

### E. Question 5

Question 5 simply asked for any final comments. The most frequent comments pertained to the need for restructuring within A&S. There was considerable enthusiasm for making broader changes that might address an outdated model that is no longer allowing A&S to function efficiently. Some responses qualified the support for restructuring with a call to manage change carefully rather than quickly. There were repeated comments that A&S is not managing its limited resources wisely now, and this new entity could put even more financial pressure on A&S. A subset of respondents feared W&M's inability to compete with larger, tech-focused schools. A half dozen responses articulated the need for a self-governing graduate school that could manage its resources in a way that makes sense for CSCI and APSC. A handful of responses lamented our not simply returning to the idea of a department of data science.

## VI. DISCUSSION OF POSSIBLE MODELS FOR A NEW SCHOOL

Subcommittee 1 of the Steering Committee did considerable research on different organizational models at other universities. There are a number of different options. The Subcommittee examined the following models:

- Large R1 Universities, including Boston University (approximately 17,000 undergraduate students), Georgia Tech (17,500), and University of Pittsburgh (20,000).
- Mid-Size Universities with standalone schools, including Brandeis University (3,600 undergraduate students), Case Western University (5,800), New Jersey Institute of Technology (9,000), Drexel (12,800), and Northern Kentucky University (10,800).
- Small Liberal Arts Colleges without separate schools, including Mount Holyoke (2,200 undergraduate students), Denison (2,200), and Lafayette College (2,700).

Details can be found in **Appendix Q**.

The Steering Committee examined several other schools in order to better understand what was occurring in departments and schools of computing across the country. It should be noted that

size was just one of many criteria in determining what other institutions might offer useful information. The Steering Committee did not limit itself in this regard; members consulted other institutions' experiences widely and communicated their findings to the rest of the Steering Committee. In the final analysis, the members of the Steering Committee determined that an in-depth examination of a handful of schools would provide far more helpful information than if it were to merely skim the surface of what was happening at a great number of computing departments and schools across the country.

Building in part on that research, this section examines the advantages, disadvantages, considerations and implications of various possible models for a new school at W&M. The primary variable under consideration is the organizational structure of the new school with respect to A&S. Should the school be its own separate entity, or should it remain inside A&S?

The features of a new entity that were listed for consideration and possible selection in the survey included the following:

1. Independent budget and control over search authorizations and hiring decisions;
2. Independent recommendations on personnel issues such as tenure and promotion (including potentially having its own Retention, Promotion and Tenure Committee);
3. Faculty can hold joint and affiliate appointments between units inside and outside the new entity;
4. Faculty in the new entity have curricular control over all courses taught within it, except for COLL, which continues to be managed by A&S Educational Policy Committee;
5. The Educational Policy Committee should control the COLL curriculum for all majors;
6. Departments and programs in the new entity will continue to deliver courses in the COLL curriculum;
7. The new entity will be structured to promote interdisciplinary collaboration and programming;
8. Undergraduates apply as undeclared majors, and apply separately to major or minor in the new entity;
9. Prospective students apply directly to the new entity to major in one of its programs; and
10. There will be no obstacles to students double-majoring or majoring/minoring in departments and programs inside and outside the new entity.

Many of these features are relevant whether or not the entity remains inside A&S.

## A. New Unit Positioned Inside A&S, with its own Dean/Vice-Dean: Advantages and Disadvantages

### 1. Admissions

A **"direct admission model**," where prospective students apply directly to a specific unit, is not currently in place at W&M for any of its undergraduate programs. Feedback provided by students at in-person forums and through written responses indicated a clear preference for preserving the current admissions process (where all students are admitted into A&S and declare their major after they have completed a defined number of credits) and the general curriculum for all students during their first two years at William & Mary. There was also a clear consensus among respondents to the survey, and in our meetings with faculty and staff,

that the process by which students enter the new school should be identical to current practices by which students choose to major in programs within A&S. In other words, while there may be prerequisites that must be met, many believe the process to declare a major in one of these programs should not be competitive and that the new school should not cap or otherwise impose unnecessary restrictions on the number of students admitted in a given year.

There are, to be sure, certain operational advantages for faculty and leadership in the new unit in having a more competitive admission process with caps, whether students are admitted directly to the new school or admitted via a selective process in their sophomore year (the current process for students who wish to declare a major in the Mason School of Business). A competitive admissions process would allow leadership in the new units to predict with greater certainty the number of majors they will have or will admit in any given academic year, thus helping advantage budgeting and school/department-level planning efforts. Additionally, the new school would be able to select exactly the students they want (more academic experience, higher grades, etc.). However, both of these advantages would have a negative impact on other units in A&S, who do not at present have the same kind of control over admissions to their majors and who could see a larger number of students needing extra support entering their departments/programs, if the less well qualified students are rejected for admission to the new academic entity. A competitive process would also place the onus on Arts & Sciences to provide adequate and probably additional seats for prerequisite courses for majors in the new schools; in town hall meetings, students openly expressed concerns about the potential for "bottlenecking of entry requirements." What if students during their freshman and sophomore years struggle to enroll in classes considered prerequisites for admission to the new school? Will there be competition for seats in classes in the new unit between those who wish to remain in A&S and those who are seeking admission to the new unit? Will one group or the other receive registration priority?

A competitive admission process during the sophomore year would also raise the possibility of students choosing to matriculate at William & Mary in hopes of being admitted to the new school, only to be denied admission and prevented from taking courses they had long hoped to take. Would double majoring or minoring in computer science and/or data science still be possible for such students? The Steering Committee is also concerned about students who are admitted into the new school, but then wish to change their major to something outside the new school after a given period of time; or vice versa. This kind of flexibility is essential.

In summary, unrestricted declaration of majors in the units in the new school appears to most closely support the overarching principle that there should be no obstacles for students who wish to pursue joint degrees, major, double-major, or even minor in programs within the new school as well as A&S.

**2. Independent control of budgetary and personnel matters**

Inherent to the nature of "separate schools" at W&M is the institution's traditional understanding that each school maintains independent authority over budget and personnel matters (including search authorizations, hiring decisions, and recommendations regarding tenure and promotion) that are internal to the school. Here, however, we consider an

independent unit or division within the existing structure of the Faculty of Arts and Sciences (A&S).

First, the reporting line of the new school's dean/vice-dean will impact the independence of the unit. If the new school dean reports to an executive dean of A&S, how would the new school's control over these areas be truly independent in its control of budget and personnel? By contrast, if the new school dean reports directly to the Provost, they would maintain a higher level of control of the unit's budget, search authorizations and hiring decisions. But in that case, the new school would only be "inside A&S" in the sense that select curricular policies (for example, those related to the COLL curriculum and provision of adequate seats for undergraduates) would remain under A&S control.

A direct operations connection between the new school, the Provost, the Budget Office, and the W&M Office of Sponsored Programs (OSP) would be an essential component of independence with regard to budget and personnel matters. The same goes for a direct operations connection between the new school and W&M's Human Resources (HR) office. A reorganization of the current A&S structure in these areas would likely be required.

Additionally, independent control over personnel decisions requires that the dean of the new school should forward all retention, promotion and tenure recommendations directly to the Provost. Separate Retention, Promotion, and Tenure committees elected from the membership of departments within the new school would allow the faculty and administrators who have the deepest understanding of the disciplines represented in the new school to have the greatest influence on final decisions.

**3. Curricular control of courses taught within the new entity.**

In Survey #2, Question 1, the sixth highest ranked option out of eight options focused on faculty within the new school retaining control of courses taught within the school. (The exception would be COLL courses, which would remain under the purview of EPC). Indeed, both proponents and opponents to the idea of having a new school within A&S were in general agreement that EPC should have control of the COLL curriculum. For a school located within A&S, independent curricular control of non-COLL courses would require new mechanisms for approvals outside of the existing EPC approval processes and could be complicated.

**4. Departments and programs in the new entity should continue to deliver courses in the COLL curriculum.**

The COLL curriculum is designed to deliver a foundational, cross-disciplinary liberal arts and sciences education to all undergraduates, irrespective of major. COLL courses are taken across all four years. Not surprisingly, there was strong support expressed throughout the W&M community for continued participation in the COLL curriculum by units in the new school.

The Steering Committee agrees with respondents' premise that all undergraduates need to have access to CSCI, DSCI, APSC and PHYS courses as both COLL and elective options. Training in both computer science and in data science is increasingly important for success in a wide range of careers, and undergraduates benefit significantly from the opportunity to take courses in these fields. Historically, CSCI, DSCI, and to a lesser extent PHYS, have lacked the resources to offer many COLL courses and still meet their obligations to their majors. In spite of this, each unit has contributed several COLL courses every year, mostly COLL 200 and COLL 400 (though DSCI has offered a very successful COLL 100 jointly with Russian Studies, and APSC regularly offers a section of COLL 150). The capacity to increase participation in the COLL curriculum would be one significant benefit of growth in these units.

**5. The new entity should be structured to promote interdisciplinary collaboration and programming.**

There exists widespread agreement on the value of interdisciplinary activities at W&M. Most of those surveyed want the new unit to foster such collaborations, regardless of whether it is situated inside or outside of A&S. Interdisciplinary collaborations are enabled and incentivized in a variety of ways, including but not limited to the following:

- faculty affiliations;
- the ability of students to double major or major/minor across units; and
- promoting research- and programmatic-focused partnerships.

**a. Faculty Affiliations**

In Survey #2, the option "Faculty should be able to hold joint and affiliate appointments between a department or program in the new entity and a department or program outside the new entity" was the third most popular element in both questions among those surveyed. As we note above, respondents viewed interdisciplinarity as very important, and the Committee believes that the two issues are linked. Respondents also acknowledged the interdisciplinary nature of the data science field and promoting joint and affiliate appointments was viewed as important.

**b. Double Majors**

There was strong consensus that the creation of a new unit should not preclude William & Mary students from pursuing double degrees, from double-majoring, or from otherwise majoring in departments and programs that are situated both inside and outside the new entity. For example, a new unit may wish to align semester start and end dates at different schools as well as their class schedule times to make it easier for students to pursue joint degrees or to occasionally take classes outside the school where they are pursuing their degree.

**c. Promoting Interdisciplinary Collaborations**

Interdisciplinary collaborations are promoted in two ways: by *limiting inhibitors* and *establishing enablers* for such activities.

Inhibitors include disciplinary differences in research practices and culture; associated communication barriers; challenges resulting from the risk-reward ratio of interdisciplinary activities, especially for early career researchers; the failure to recognize and reward faculty for such activities (e.g., when assessing promotion and tenure portfolios); and the inability to distribute research-generated resources across units in a wholistically satisfactory manner.

Of course, the absence of inhibitors does *not* guarantee that interdisciplinary collaborations will proliferate and prosper. Accordingly, structuring the new entity in a manner that includes interdisciplinary enablers can have a strong positive impact on interdisciplinary activities in W&M. Examples of such enablers include:

- The design of thematic research laboratories as functional components of the new entity (e.g. an interdisciplinary research laboratory on data and society, or an interdisciplinary research laboratory on cybersecurity) to serve as vehicles for interdisciplinary teams in their pursuit of joint research and the development of novel interdisciplinary course offerings. When properly incentivized (e.g., through small seed grants to support such interdisciplinary collaborations), these research laboratories can be quite attractive and effective;

- Novel affiliation models, such as limited residence appointments of faculty from other units (an enhanced version of a joint appointment, comparable to Boston University's program on Computing & Data Sciences Faculty Fellows), can support engagement with the new unit;

- Support for joint honors theses across the new unit and the rest of A&S, to allow for students from different majors to pursue concurrently theses on complementary topics establishing larger bodies of interdisciplinary work that can serve as springboards for subsequent research collaborations; and

- Support for PhD theses directed by faculty in A&S in non-PhD granting departments similar to the arrangement that currently exists with non-PhD granting departments in Area III and Applied Science.

## B. New Unit Positioned Outside A&S, with its own Dean/Vice-Dean: Advantages and Disadvantages

1. At a minimum, the **EPC should control the COLL curriculum for all majors.** Currently, the EPC is responsible for reviewing all proposals related to COLL, including addition of a COLL attribute to an existing course, creation of a new COLL course, proposals to revise the COLL curriculum, etc. The EPC works in collaboration with the Center for the Liberal Arts (CLA) to support faculty in developing new COLL courses and in revising existing ones. The establishment of a new School outside of (or even inside) FAS would require an appropriate restructuring of EPC membership so that all units – whether inside or outside A&S – continue to provide oversight of COLL, and to

participate in in (see #3 below). The continuation of EPC oversight for the COLL curriculum if the new entity is outside A&S was the fifth highest ranked option in Table 2.

Continued EPC control of the COLL curriculum ensures consistency, especially within specific course attributes (COLL 100, COLL 200 etc.). Another option would be oversight of the new school's COLL courses by an EPC-equivalent within the new school, which would duplicate administrative and curricular functions. However, such a structure, though reducing the likelihood of inconsistency between different courses fulfilling the same attribute, does not entirely eliminate it.

2. **A new school would likely maintain independent control of budgetary and personnel matters**. See Section VI.A.2 above.

3. **Departments and programs in the new entity continue to deliver courses in the COLL curriculum.** This feature was the third-most popular feature selected by respondents to Question 2 of Survey #2, indicating its relative popularity and importance to those responding to the survey. The discussion for the subsection of Section VI.A.4 above is the same should the entity be positioned outside A&S; see above.

4. **Faculty can hold joint and affiliate appointments between units inside and outside the new entity.** As was the case with the responses to this variable when the new entity was positioned inside of A&S, many respondents to Question 2 of Survey #2 selected the joint and affiliate appointments option. Respondents considered joint and affiliate appointments to be highly desirable to foster collaborative efforts. They also noted that it is not easy under the current regime to have joint appointments between entities inside and outside of A&S, and they urged making such appointments easy and seamless. Respondents in surveys and in requested meetings noted that it might be more difficult for faculty in A&S to collaborate with faculty in the new entity. Ensuring seamless and easy processes for faculty to have joint and affiliate appointments between A&S and a new school would likely also alleviate this disadvantage.

   The Committee acknowledges potential challenges associated with reducing barriers for faculty to hold joint appointments, and they note that several issues would need to be sorted out prior to the establishment of a new school. For example, there may be significant differences in tenure and promotion criteria between departments of the new school – which maintain a strong focus on graduate education – and undergraduate-only departments within A&S. In contrast, establishing the status of affiliates can foster collaborative efforts without the challenges of meeting tenure and promotion guidelines across departments with very different missions.

5. **A new entity should maintain curricular control of courses taught within it.** See Section VI.A.3 above.

6. **The new entity should be structured to promote interdisciplinary collaboration and programming**. See Section VI.A.5 above.

## C. Graduate programs only

A&S at William & Mary currently features 11 graduate-degree-granting departments or programs. Six are Ph.D.-granting (American Studies, Anthropology, Applied Science, Computer Science, Physics and History), while three are research master's programs with thesis requirements (Biology, Chemistry, Psychology). The remaining two programs (Public Policy and Computational Operations Research) offer professional master's degrees. The first cohort of DSCI Ph.D. students, matriculating in Fall 2023, were admitted via a doctoral degree track in the APSC Department. Note: APSC has no undergraduate major but offers minors in Bioengineering and Material Science & Engineering, as well as undergraduate courses in support of the PHYS Department's EPAD undergraduate degree track.

The graduate programs in all these units are administered by the A&S Office of Graduate Studies (OGS), which is led by a Vice Dean who reports to the Dean of the Faculty of A&S. The OGS has five other staff members: an Assistant Dean, a Fiscal Administrator, a Graduate Registrar, an Administrative Coordinator, and a Graduate Center Director. As these job titles might suggest, the OGS has a broad role in overseeing all aspects of graduate studies in A&S, including, but not limited to, graduate admissions, oversight of course catalog regulations and curricular changes, student academic progress and record keeping from matriculation through degree conferral, graduate student financial support through graduate teaching assistantships, and academic and career development support through Graduate Center activities. The OGS has no budgetary role in determining A&S faculty lines or startup in the departments who grant graduate degrees; however, the Vice Dean for Research and Graduate Studies is one of four A&S Vice Deans based in Ewell Hall who participate equally in evaluating A&S search authorization requests and who advise the Dean of the Faculty of A&S regularly on matters related to strategic planning.

The Steering Committee considered models at numerous Virginia institutions which maintain stand-alone graduate schools. Virginia Tech, Virginia Commonwealth University, and Virginia State University report that the administrative responsibilities of their graduate schools are roughly the same as those of the OGS in William & Mary's A&S. These schools do not control faculty lines, startup funds, or other resources that would affect faculty research directly.

There is one significant difference, however: Unlike William & Mary's OGS, these other graduate schools are led by a dean (not a vice dean) who reports directly to the Provost, and who is treated as an equal to the deans from other schools at their respective universities. As one associate dean at Virginia Tech phrased it, their graduate dean has "a seat at the table" when there are discussions at the highest levels on resource allocations that impact graduate programs and graduate students. This model is one in which the graduate school serves as an administrative umbrella – one that exists in addition to, but not in place of, any schools with a particular disciplinary focus that might be created within the university. In other words, one option is to create a graduate school at William & Mary, with a graduate dean, regardless of whether there is an additional, separate school focused on data, computation, applied science and related areas in physics.

This option has some advantages. Among the advantages is a more efficient administrative framework. Under this administrative structure, there would be a direct line of communication between the Graduate Dean and the Provost, which would allow a more

efficient resolution of some of the serious resource problems that motivated the initial proposal from the CSCI, APSC and DSCI units (*e.g.*, those related to the number of funded graduate teaching assistantships). In addition, if a newly formed W&M Graduate School includes the graduate programs currently overseen by the A&S Office of Graduate Studies, then the existing administrative infrastructure of the OGS could be repurposed, minimizing additional administrative cost.

Two possible disadvantages of creating a Graduate School alone include (1) a lack of budgetary power in the Graduate School over faculty, start-up, and equipment to address obstacles experienced by Computer Science, Applied Science, Data Science, and Physics and (2) possible missed opportunities in fundraising given that the school name and function do not highlight these growing disciplines.

In light of (1), a different version of the graduate school model would be one in which the Graduate Dean is given autonomous control over some number of faculty lines, in addition to the student-focused responsibilities described earlier. Such a graduate school would include, but not be limited to, the departments who initially proposed the new school. With direct control over resources that affect the size and composition of the faculty, this Graduate Dean would be better able to address the specialized needs of the Ph.D.-granting units that have expressed interest in the creation of a new school. However, this variation on the Graduate School model introduces a number of significant complications. The faculty of the Computer Science, Applied Science, Data Science and Physics Departments regularly teach undergraduate and graduate classes, as well as mentor undergraduate and graduate research students. There is no clean distinction between "graduate faculty" and "undergraduate faculty" in these units, as they all hire faculty who value the education of both undergraduates and graduate students.[1] This fact makes it difficult to see how one could arrive at a sensible division of faculty lines between the Graduate Dean and the Dean of the Faculty of Arts & Sciences.

To address concerns (1) and (2), if the creation of the Graduate School is accompanied by an A&S reorganization to group these units together into a named, disciplinary school under a Vice Dean (within A&S) or Dean (outside of A&S), the Graduate School Dean could partner with this disciplinary dean in advocating for resources, including faculty lines, to cover graduate and related research needs. If the Graduate Dean reports directly to the Provost, this ensures that graduate and research concerns may be communicated directly, without needing first to compete with undergraduate program concerns in A&S.

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[1] Applied Science has no undergraduate major but offers minors in Bioengineering and Material Science & Engineering, as well as undergraduate courses in support of the Physics Department's Engineering Physics and Applied Design (EPAD) undergraduate degree track.

## VII. BUDGET

### A. Revenue & expenses

Revenue comes into A&S in a number of different ways. First, A&S receives base funding allocations from the Central Budget Office. The budget received is derived from the previous year, with additions to base funding provided through the annual Planning Budget Request process (e.g., to support increased COLL teaching due to increased undergraduate enrollment; to support graduate student health insurance premiums, etc.) Ninety-five percent of the A&S base budget is allocated to salaries.

Second, A&S receives overhead recovery funds, also known as Facilities & Administration funds (F&A). Third, funds come in through philanthropic donations (both private and local funds). Finally, there are grants from sources such as the Higher Education Equipment Trust Fund (HEETF), which supports purchase of instructional/research equipment such as scientific instruments.

CSCI, DSCI, APSC and PHYS, like other A&S units, are allocated base A&S funds for faculty and staff salaries and M&O, though both CSCI (through the Tech Talent Investment Program or TTIP) and DSCI have access to dedicated state funds that cannot be spent on any other unit. These dedicated funds are committed primarily to salary support, though unspent funds carry over and may be used for start-up and other one-time expenses.

All units also receive proportional allocations of the F&A that they generate via external grant funding (see section B below); they have access to private (philanthropic) restricted-use funds; and they can apply each year for HEETF funding to support equipment needs (HEETF funds are held outside A&S). New faculty hires are supported by start-up funds (part HEETF, part A&S), and like all other A&S units, CSCI, DSCI, APSC and PHYS faculty may request Faculty Grant Fund awards, special research and other allocations, and support for one-time purchases. The Office of Graduate Studies supports a certain allocation of TA-ships in the CSCI, APSC and PHYS PhD programs every year, and will do the same for the DSCI Ph.D. program beginning in Fall 2023; these funds are allocated via the OGS budget. In FY23, the Provost's Office also supported additional TAs in CSCI.

Because of the way the CSCI, DSCI, APSC and PHYS departments are funded, the impact on the general A&S budget - if these units move to a new school or have budgetary autonomy within A&S - will be felt primarily in the loss of the A&S portion of F&A (see below). That said, the Provost has committed to keeping the A&S budget "whole" if the new school is established.

## B. The potential impact of a new school on F&A funds

All grants, contracts and other agreements issued or awarded to William & Mary by federal agencies have an overhead recovery rate set by negotiation with the Office of Naval Research, which represents the interests of the federal government. The current on-campus rate is 50.7% of a grant or contract's Modified Total Direct Cost (MTDC). Awards from other sources (for example, private foundations) may set a different overhead rate; acceptance of that rate requires the approval of the Vice Provost for Research.

The overhead funds available to A&S exclusively represent a fraction of the total F&A amount. Before any F&A funds are distributed to any unit, over-the-top (OTT) expenses, representing **68.86%** of the total F&A funds in FY22, are subtracted. These expenses are not

specific to A&S. For example, operating costs of the Office of Sponsored Programs and the Technology Transfer Office represent 45% of the total OTT expenses in FY22; a more complete breakdown of OTT expenses can be found in the table below. Unless otherwise agreed upon, the remaining **31.14%** of F&A funds are usually allocated as follows: (1) 40% to the department or program in which the faculty who secured the grant resides; (2) 40% to the Vice Provost for Research; (3) 15% to the dean; and (4) 5% to the principal investigator.

This distribution formula has remained unaltered in recent years, though that could always change. Under the current formula, the 40% returned to a department or program and the 5% to the principal investigators within that department or program would be unaffected by the location of the unit (inside or outside A&S). The 40% returned to the Vice Provost for Research is similarly unaffected. ***Under the current formula, the only category that is affected by the departure of departments from A&S is the F&A allocation to the A&S Dean's Office.*** This amount represents 15% of 31.14% (or **4.67%**) of the total F&A funds received by W&M in FY22.

**Off-The-Top Research Expenses before F&A distribution (source: Office of the Vice Provost for Research).**

Table 4. Off-the-top research expenses before F&A distribution.

| |
|---|
| *Central Offices: OSP and Technology Transfer ~ 45%* |
| *E&G Contribution ~14%* |
| *FRC Faculty Research Grants ~7%* |
| *External Debt Service (Magnet Building) ~1%* |
| *Bandwidth, GIS, Computational and Visualization Support ~11%* |
| *Center Operating Agreements ~14%* |
| *Safety and Compliance Costs ~2%* |
| *Animal Care Services <1%* |
| *Consultant/Software for F&A Proposal Prep./Space Survey/Database Upgrades ~6%* |

To quantify the impact of departments/programs leaving A&S on the A&S Dean's Office allocation, we provide the breakdown of F&A by unit in the table below. The APSC and CSCI Departments contribute 30.63% of the total in FY22; these two departments and the PHYS Department make up 69.33% of the Dean's total F&A allocation. If all three departments leave for a new school, the Dean's allotment would decrease by roughly $78K per year, based on FY22 numbers. This amount is not large in relative terms, representing **0.07%** of the current Arts & Science $117 million operating budget. Moreover, as noted above, the Provost has indicated her willingness to increase Arts & Science funding by an amount that would more than compensate for this reduction.

**FY22 Facilities and Administrative (F&A) cost allocations. The departments highlighted in bold are those most likely to be part of the new academic unit (source: Office of Sponsored Programs). (Note: DSCI is not currently a department, but a semi-autonomous unit within CSCI, hence its F&A is assigned to CSCI).**

Table 5. F&A cost allocations.

| *Dept/School/Center* | *F&A* | *Remaining after OTT expenses* | *A&S Dean Allocation* | *Percent of Total* |
|---|---|---|---|---|
| ***Physics. Dept.*** | ***$934,717*** | ***$291,117*** | ***$43,668*** | ***38.7*** |
| ***Computer Science Dept.*** | ***$407,936*** | ***$127,051*** | ***$19,058*** | ***16.9*** |
| ***Applied Science Dept.*** | ***$331,713*** | ***$103,312*** | ***$15,497*** | ***13.7*** |
| *Biology Dept.* | *$320,643* | *$99,864* | *$14,980* | *13.3* |
| *Chemistry Dept.* | *$166,504* | *$51,858* | *$7,779* | *6.9* |
| *Geology Dept.* | *$66,526* | *$20,719* | *$3,108* | *2.8* |
| *Mathematics Dept.* | *$46,582* | *$14,508* | *$2,176* | *1.9* |
| *Anthropology Dept.* | *$31,215* | *$9,722* | *$1,458* | *1.3* |
| *Kinesiology Dept.* | *$31,050* | *$9,670* | *$1,451* | *1.3* |
| *English Dept.* | *$20,017* | *$6,234* | *$935* | *0.8* |
| *Environmental Science* | *$19,560* | *$6,092* | *$914* | *0.8* |
| *Modern Languages* | *$14,115* | *$4,396* | *$659* | *0.6* |
| *Psychology Dept.* | *$11,779* | *$3,669* | *$550* | *0.5* |
| *Economics Dept.* | *$8,680* | *$2,703* | *$406* | *0.4* |
| *Public Policy* | *$3,687* | *$1,148* | *$172* | *0.2* |
| *Charles Center* | *$337* | *$105* | *$16* | *0.01* |
| *Philosophy Dept.* | *$82* | *$25* | *$4* | *0.003* |
| *All other Depts./Programs* | *$0* | *$0* | *$0* | *0* |
| *Totals* | *$2,415,143* | *$752,193* | *$112,831* | *100* |

It is worth noting that the departments and programs that have the most interest in joining a new school would like to see the size of their faculty grow over time, at the very least to compensate for positions that were lost over the past decade and not replaced; this will impact F&A recovery over a longer term. For example, the chairs of CSCI, APSC and PHYS have indicated aspirational target sizes, motivated by the goal of competing more effectively with peer and aspirational peer institutions, which correspond roughly to a 39% increase in the total number of

their tenure and tenure-eligible faculty lines. If this vision were realized, one projects (by simple scaling) that there would be a corresponding increase in total F&A funds by roughly $650K per year; this does not account for the possible rapid growth of DSCI as a separate academic unit within a new school. Such additional F&A funds may be allocated in the way described earlier. However, the formula for how overhead funds are distributed internally is determined by William & Mary and can be changed at any time to optimize the benefits for the University as a whole.

## VIII. CONCLUSION

The original proposal from CSCI, DSCI and APSC described the following goals:

- Strengthen excellence in research in CSCI, DSCI and APSC through increased external funding (state, federal, foundations and philanthropy);
- Strengthen and expand graduate programs through increased external funding and recruitment of even stronger students;
- Respond to increasing undergraduate demand and interest from employers by growing the capacity of the units for undergraduate as well as graduate education.
- Facilitate the recruitment and the retaining of world class faculty to the aforementioned departments.

They believe a new school would increase the visibility of W&M in these academic fields, and that it would make W&M more attractive to external funders (state, federal, foundation etc.). Increased funding would in turn provide additional flexibility in recruiting and retaining faculty who typically command high resources in an extremely competitive market. Finally, increased funding would allow these units to expand to meet growing demand in both their undergraduate and their graduate programs. The proposal emphasizes the importance of maintaining (or enhancing) the excellence of the undergraduate program and strengthening interdisciplinary collaborations within and beyond the new school. Remaining within A&S - where these units would be subject to policies and procedures that are not always well adapted to the needs of PhD-granting departments producing world-class research – could well inhibit the ability of the units to grow and adapt quickly to a fast-changing environment.

The Steering Committee took the suggestions outlined in the proposal and explored a wide range of options for their implementation. First and foremost, the Steering Committee considered how well (or how badly) particular options were aligned with W&M's brand as a public liberal arts and sciences university. The W&M community is rightly proud of the inclusive, integrated nature of the education offered to its undergraduates, who apply undeclared and sample a range of different disciplines through the COLL curriculum before deciding on a major. The question before the Committee was how best to satisfy the needs of the three units proposing the new school and how to preserve – if not strengthen – all student offerings. [Note: when this conclusion refers to *three* units, it is in reference to the original proposal, which was signed by only three academic units. Physics' interest in joining a new school was a later development, which we also discuss in this report.]

When the Committee began its work, it already knew from town halls and other events that occurred in Fall 2022 that some A&S faculty were concerned about the potential damage to the current A&S model that might result from implementation of some of the suggestions in the

proposal. There were fears expressed that William & Mary's strengths in the liberal arts and sciences would be weakened if three significant departments were no longer part of A&S; there were also concerns raised that the A&S budget would suffer if resources were diverted to support an additional school. Some faculty lamented the potential creation of silos and were worried that the interdisciplinary potential of DSCI at W&M could be lost if DSCI was moved into another school. By contrast, other faculty felt just as strongly that CSCI, DSCI and APSC would be damaged by staying in A&S. They argued that resources in those three units were low because of equity concerns with other units in A&S. Low resources meant struggling to retain highly competitive faculty, and inadequate financial support in general meant the units could not admit enough graduate students to support faculty research and staff undergraduate courses as teaching assistants. Furthermore, A&S processes and procedures were poorly aligned with their needs and prevented them from developing to their full potential.

Faced with such a broad range of opinions – most of them strongly held – the Steering Committee took the approach of exploring ways to support the units that proposed the new school, while simultaneously paying attention to the concerns of those who were opposed. Accordingly, the Committee conducted its research as deeply and broadly as possible to see if it could find a way – or multiple ways – to build strength in the three units, while not weakening the rest of A&S at the same time. It analyzed a number of different models in existence at other universities (bearing in mind that what is right for them may not be right for W&M); it heard presentations on finance and budgets; and its members thought long and hard about the intellectual vision for the new school in relation to A&S. The Committee also analyzed a number of different models and variables for alignment with the W&M brand. The Steering Committee remained mindful throughout that William & Mary is not operating in an especially resource-rich environment, and that any potential model must be both effective in achieving its goals, and extremely efficient. Any new model would have to avoid the unnecessary duplication of administrative and operational functions wherever possible.

The Committee heard from many stakeholders: faculty, staff, students and others. Every comment mattered to the Committee. Committee members were especially mindful of the fact that change is always disruptive and often difficult; W&M is coming off three years of a pandemic, whose impact continues to be felt in a communal sense of vulnerability and mistrust. Resistance to change is natural, and anxiety often breeds insight. Those who were afraid that a new school would take something away found themselves able to articulate with remarkable clarity what they feel is so valuable and distinctive at W&M. Through this process of reflection, A&S in particular got to know itself better. On the other hand, change is also dynamic and exciting. Institutions need to change to meet the needs of changing eras. It was important for the Committee to assess the shifting environment around and within the institution as a whole in order to understand what changes might be necessary to keep W&M competitive and relevant.

The content of the feedback and the commentary received, along with other information, are described and analyzed exhaustively in this report. As the Committee progressed through the semester, it became increasingly clear that not everyone's opinions were set in stone. Some (not all) respondents to the survey noted that their ideas and opinions had changed significantly as they learned more. A central question was (1) whether a new entity should be a school within A&S; or (2) whether the units forming a new school (and A&S) might be better served by a new school outside A&S. The Committee was also aware that many universities have graduate schools that focus on the management of graduate education. The status quo was the baseline,

but the Committee welcomed the opportunity to consider whether or not the status quo was still the most effective option for A&S and W&M. A&S has never had a strategic plan; it has no stated mission or strategy for growth or development; it has the feeling of an assemblage of outstanding, relatively small academic units bound together by a common (COLL) curriculum, and a shared (if unstated) commitment to deliver the best education possible and expand knowledge across the disciplines. Exploring the possibility of a new school gave A&S the opportunity to reflect on its history and its future, a process that will continue as the A&S community starts to engage in a broader strategic visioning initiative.

In this report, the Steering Committee has presented the advantages and disadvantages of creating a new school within A&S; a new school outside of A&S; and the potential creation of a school for graduate programs only. There was strong consensus that wherever a new school is located, A&S must continue to offer integrated interdisciplinary programming with opportunities for collaboration between the new entity and all other units. From this perspective, creating a new school within A&S might seem attractive to many. But if the new school stays within A&S, it is also important to acknowledge the range of different needs and cultures across the dizzying variety of A&S units. Our research suggests that PhD-granting, highly productive STEM departments – like those that proposed a new school – may need more autonomy (budgetary, curricular and organizational) than they currently have to reach their goals. If the new school remains within A&S, William & Mary will need to find a way to recognize and support progress towards those goals, presumably by preserving a measure of autonomy for the new school.

If the new school operates outside A&S, it would presumably gain this autonomy. It will then be important to maintain the liberal arts character of the university; facilitate collaborations and interdisciplinary projects between A&S and the new entity; ensure that students can still easily declare any major they choose, including in the new entity; and make sure that double majoring is operationally easy. Currently, A&S operates as a loose federation with a unified brand and identity, in spite of their variety. This unique brand and identity should not be lost if the new school is outside A&S. Organizational structures must be created to encourage community and collaboration.

There was less enthusiasm generated for a graduate-only school. Graduate schools can operate very effectively, but they also encourage distance and even competition between undergraduate and graduate populations. Deep integration of graduate and undergraduate education is one of the hallmarks of A&S, with labs and other projects staffed by teams of undergraduates, graduates, faculty and staff. On the other hand, graduate schools nurture the growth of a distinctive culture in the units they serve, one focused on research, external grants and career preparation for scholars and future academics. This culture already exists at W&M, and one of the goals of the units' proposal is to strengthen it. The addition of Physics to the three units in the new school recognizes the existence of that culture, and signals that the Physics department feels it is better aligned with CSCI, DSCI and APSC than with primarily undergraduate departments.

The Steering Committee was never charged with providing a specific recommendation, and – in line with our charge – this report analyzes and discusses "options for moving forward." We hope it will be useful for the Provost and for the entire W&M community as decisions are made on the next steps.

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX A: Vision

## INTELLECTUAL/ACADEMIC VISION

### A shared belief in liberal arts and science education

We all share a commitment to the fundamental principle of liberal arts education at W&M. Liberal arts education does not exist in the absence of strong, diverse fields and disciplines. Instead, it thrives by recognizing and respecting their distinct features and by providing educational opportunities that blend their strengths.

Accordingly, our mission is to provide pathways to knowledge for our students by establishing bridges across such disciplines. But, in order for our liberal arts education to be on par with the reputation of William & Mary and the outstanding quality of our students, these pathways need to connect academic peaks that represent the leading edge of each field.

We must therefore be able to ensure that our individual units meet the standards of excellence that are defined in their respective fields. The faculty at William & Mary pride themselves as teacher-scholars and teacher-researchers. While scholarship and research come in different shapes *across* different fields, they are rather well-defined *within* each field. Exceptional professors in English tend to have similar profiles and exceptional professors in Computer Science tend to have similar profiles. However, these two sets of profiles are rather dissimilar.

Our goal therefore is to respect the distinctiveness of each field and to allow each member of our academic community to pursue excellence as defined within their disciplines while ensuring that we work together for the benefit of our academic offerings.

### The vertical dimension of graduate education

The principle of holistic education that is the driving force behind the liberal arts approach, is not applied only horizontally across fields, but also vertically within fields. Graduate education and graduate-level research are informing undergraduate offerings to keep them at the forefront of their respective fields. For academic fields that are undergoing rapid growth and change, a strong graduate program is a necessity and not an option for high-quality undergraduate education that is not inferior to other universities in Virginia. Typically, in such fields, the top teachers are also the top researchers.

The units that proposed the new school (Applied Science, Computer Science, Data Science) and the unit that has most recently expressed a desire to join (Physics) are prime examples of academic areas experiencing such rapid growth and change. Therefore, their faculty must be actively engaged with graduate-level research to ensure the quality of their undergraduate course offerings and research opportunities. From advances in cybersecurity, smart devices, and artificial intelligence and their implications on privacy and society, to developing new biomaterials and answering once intractable questions in nuclear, particle, condensed matter and

plasma physics via computational methods, faculty of these units individually and jointly are pursuing scientific breakthroughs that advance science and reshape their disciplines. And when all units work together their potential impact is even stronger, as is the case with quantum computing, with physics and applied science focused on hardware-related issues, and computer and data science focused on developing appropriate algorithms and applications. The excitement in these areas is driving more students to William & Mary and our programs. Students come to W&M expecting that their teachers be experts in these topics. In order for our student degrees to be passports to successful careers, the immense value of our students' liberal arts education must be complemented by an equally robust education within these four fields.

While these fields are advancing their essential body of knowledge, they are also impacting the broader academic community, and society at large. From Data Science research, generative artificial intelligence arrived to dominate the news with the emergence of ChatGPT, changing everyday life and even education. Computer science research in cybersecurity is guaranteeing the integrity of elections and safeguards our personal information. In the realm of applied science, biomolecular engineering has impacted nearly every aspect of our daily lives from developing RNA-based vaccines and "smart drugs" to providing novel bioinspired materials such as self-healing concrete and sustainable, "green" alternatives to plastics. Indeed, synthetic biology has engineered safe microorganisms that can degrade plastics polluting our oceans and bioremediate toxic chemicals poisoning our environment. In Physics, there has been great excitement and recent progress towards the development of quantum computers and fusion energy, where the latter depends both on experimental efforts and the application of high-performance computing to model plasma behavior and reactor design. Accordingly, interest in these fields exceeds the fields themselves, and we want to ensure the presence of pathways for interdisciplinary collaborations, ranging from the collaborative development of innovative COLL offerings and undergraduate student experiences, to the development of joint faculty collaborations across campus that can lead to innovative sponsored research projects.

**The need for a new administrative structure**

The units pursuing the establishment of the new school are driven by the need to remain at the forefront of their rapidly evolving domains. This requires agility in their pursuit of new academic offerings, whether they are COLL courses, certificates, or joint degrees (*e.g.* on cybersecurity, with the Business and Law Schools), and a level of financial autonomy that will facilitate targeted growth and the continued critical mass of research groups. A&S represents a heterogeneous collection of departments and programs, with differing goals and priorities; a single administrative structure can neither adequately represent nor provide optimal support for this range of constituents. Decisions made in the name of broader interests have often served to discount the specialized needs of the units who initially proposed the formation of a new school. The fact that Physics has expressed a willingness to join the Applied Science, Computer Science

and Data Science units in their effort is a reflection of the fact that Physics has experienced similar difficulties.

It is our conviction that administrative autonomy should not result in academic disconnect. Students should be able to take dual majors across the new School and A&S, or Business, or Education, or VIMS in the future, and there is no structural reason to limit this ability. There is also no structural reason for the establishment of a new school to limit the ability of these units to continue collaborating with other units, just like there is no structural mechanism within A&S to actually ensure interdisciplinary collaborations. In order to move from collaborations by happenstance to a programmatic support for them, the new school can be designed to include formal structures to foster interdisciplinary collaborations (e.g., in the form of thematic "collaboratories", or through formal affiliation models for individual faculty or programs).

The proposed new school will be a smaller unit with a shared mission and vision that will provide the administrative nimbleness that is desired by the engaged units. When designed with mechanisms in place to foster participation and collaboration, the new school could actually have the potential to expand interdisciplinary collaborations and opportunities beyond what is currently afforded within A&S.

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX B: CDSAS Steering Committee Membership

## Steering Committee for Computing, Data Science and Applied Science (CDSAS) Initiative

**Co-Chairs:** David Yalof, Vice Provost for Academic Affairs

Suzanne Raitt, Dean of the Faculty of Arts & Sciences

**Members:** Chon Abraham, Associate Professor, Mason School of Business

Elizabeth Barnes, Professor of English

Eric Bradley, Chair of Applied Science and Professor of Biology

Chris Carone, Vice Dean for Research and Graduate Studies and Professor of Physics

Jason Chen, Associate Professor, School of Education

Sarah Day, CAMS Director and Professor of Mathematics

Marjy Friedrichs, Research Professor of Marine Science

Iria Giuffrida, Professor of the Practice of Law

Matthias Leu, Director, Biology Graduate Program and Associate Professor of Biology

Rani Mullen, Associate Professor of Government

Evgenia Smirni, Chair of Computer Science and Sidney P. Chockley Professor of Computer Science

Matthew Smith, Assistant Provost for Institutional Accreditation and Effectiveness

Anthony Stefanidis, Director of Data Science Program and Professor of Computer Science

**Support Staff:** Adrienne Howard, Special Assistant and Project Manager, Office of the Provost

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX C: CDSAS Committee Charge

# MEMO

Date: January 23, 2023

To: Steering Committee for Computing, Data Science and Applied Science (CDS) Initiative

From: Peggy Agouris, Provost

Subj: Charge to Steering Committee

CC: Suzanne Raitt, Acting Dean of the Faculty of Arts & Sciences
David Yalof, Vice-Provost for Academic Affairs

Building on the work of the Design Team, which worked for several months in 2022 and produced a proposal on "Establishing a New School at W&M", the Steering Committee is tasked with exploring the possibilities for an autonomous academic entity for the computing, data and applied sciences at William & Mary. The goals as noted in the proposal are to "expand W&M's excellence in teaching and research in the rapidly evolving fields of computer science, data science and the applied sciences; provide world-class, well-funded graduate research programs", "increase ability in these programs to attract and retain exceptional faculty, staff, and students; expand the level of visibility, research, national attention, and external funding in these fields."

The Steering Committee will refine the model of the proposed new academic entity by considering implementational aspects and financial parameters, as well as relevant advantages and disadvantages of possible structures. It is important that a new unit for computing, data science and applied science supports the participating departments, while at the same time preserving the ability of W&M to continue to deliver an excellent liberal arts and sciences education to our students and to integrate undergraduate programs with world-class research and outstanding graduate programs.

To this end, the committee is charged with:

- Researching and analyzing the advantages and disadvantages of different models for an autonomous, more visible structure for computing, data science and applied science, and assessing suitability of these models for W&M;
- Working with the W&M Budget Office and the Associate Dean for Finance & Administration in A&S to generate financial models to support different structures;
- Examining the impact of a new unit on W&M by interacting with relevant constituency groups and addressing the opportunities and challenges that will be identified through this process.

The committee's report, which is due to the Provost by the end of the Spring 2023 semester, will provide data as described above, and will discuss options for moving forward.

The Steering Committee will comprise two subcommittees:

**Subcommittee I: Unit-Level Operational Considerations for the Proposed New School**
The task of Subcommittee I is to assess the operational requirements of the proposed new school, including possible structure(s), financial and HR needs, and corresponding academic and implementational implications.

Chair: David Yalof

Members: Chon Abraham, Chris Carone, Sarah Day, Evgenia Smirni, Matt Smith, Tony Stefanidis

**Subcommittee II: Campus-Wide Impact Analysis of Opportunities and Challenges**
The task of Subcommittee II is to assess how the new school is expected to function within the broader context of W&M's academic mission, collect feedback from departments and programs that are particularly interested in collaborating in more depth with the new school (opportunities), identify broader issues that may result from the establishment of a new school (challenges), and propose mechanisms to pursue these opportunities and address the challenges.

Chair: Suzanne Raitt

Members: Liz Barnes, Eric Bradley, Jason Chen, Marjy Friedrichs, Iria Giuffrida, Matthias Leu, Rani Mullen

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX D: CDSAS Steering Committee

## Subcommittee ONE Membership and Charge

**Steering Committee for Computing, Data Science and Applied Science (CDS) Initiative**

**Subcommittee I: Unit-Level Operational Considerations for the Proposed New School**

Extract from Steering Committee Charge:

The committee is charged with:

- Researching and analyzing the advantages and disadvantages of different models for an autonomous, more visible structure for computing, data science and applied science, and assessing suitability of these models for W&M;
- Working with the W&M Budget Office and the Associate Dean for Finance & Administration in A&S to generate financial models to support different structures;
- Examining the impact of a new unit on W&M by interacting with relevant constituency groups and addressing the opportunities and challenges that will be identified through this process.

The task of Subcommittee I is to assess the operational requirements of the proposed new school, including possible structure(s), financial and HR needs, and corresponding academic and implementational implications.

Chair: David Yalof

Members: Chon Abraham, Chris Carone, Sarah Day, Evgenia Smirni, Matt Smith, Tony Stefanidis, Adrienne Howard

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX E: CDSAS Steering Committee

## Subcommittee TWO Membership and Charge

**Steering Committee for Computing, Data Science and Applied Science (CDS) Initiative**

**Subcommittee II: Campus-Wide Impact Analysis of Opportunities and Challenges**

Extract from Steering Committee Charge:

The committee is charged with:

- Researching and analyzing the advantages and disadvantages of different models for an autonomous, more visible structure for computing, data science and applied science, and assessing suitability of these models for W&M;
- Working with the W&M Budget Office and the Associate Dean for Finance & Administration in A&S to generate financial models to support different structures;
- Examining the impact of a new unit on W&M by interacting with relevant constituency groups and addressing the opportunities and challenges that will be identified through this process.

The task of Subcommittee II is to assess how the new school is expected to function within the broader context of W&M's academic mission, collect feedback from departments and programs that are particularly interested in collaborating in more depth with the new school (opportunities), identify broader issues that may result from the establishment of a new school (challenges), and propose mechanisms to pursue these opportunities and address the challenges.

Chair: Suzanne Raitt

Members: Elizabeth Barnes, Eric Bradley, Jason Chen, Marjy Friedrichs, Iria Giuffrida, Matthias Leu, Rani Mullen

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX F: CDSAS Steering Committee

## Meeting Dates Full List

# Steering Committee for Computing, Data Science and Applied Science (CDSAS) Initiative Meeting Dates

| Date | Type |
|---|---|
| Jan. 25, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Feb. 1, 2023 | Subcommittee One meeting 3:30-4:30 pm, Blow Hall 201 |
| Feb. 1, 2023 | Subcommittee Two meeting 3:30-4:30, Ewell Hall |
| Feb. 8, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Feb. 15, 2023 | Subcommittee One meeting 3:30-4:30 pm, Blow Hall 201 |
| Feb. 15, 2023 | Subcommittee Two meeting, Ewell Hall |
| Feb. 22, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Mar. 1, 2023 | Subcommittee One meeting 3:30-4:30 pm, Blow Hall 201 |
| Mar. 1, 2023 | Subcommittee Two meeting, Ewell Hall |
| Mar. 8, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Mar. 29, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Apr. 5, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Apr. 12, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Apr. 19, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| Apr. 26, 2023 | Full Steering Committee meeting 3:30-4:30 pm, York Room, Sadler Center |
| May 3, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Zoom |
| May 10, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| May 17, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |
| May 24, 2023 | Full Steering Committee meeting 3:30-4:30 pm, Blow Hall 201 |

# Steering Committee for Computing, Data Science and Applied Science (CDSAS) Initiative Lists of Guests Attending Meetings

**Guests at Meetings of the Full Committee**

| *Meeting Date* | *Guest's Name* | *Guest's Title or Affiliation* |
|---|---|---|
| 2/8/2023 | Jacob Long | Assistant Vice President for Budget & Financial Planning; W&M |
| 3/29/2023 | Jacob Long | Assistant Vice President for Budget & Financial Planning; W&M |
| 5/3/2023 | Jacob Long | Assistant Vice President for Budget & Financial Planning; W&M |
| 5/3/2023 | Sherri Powers | Associate Dean of Finance and Administration, Faculty of Arts & Sciences |

**Guests at Meetings of Subcommittee 1**

| *Meeting Date* | *Guest's Name* | *Guest's Title or Affiliation* |
|---|---|---|

| | | |
|---|---|---|
| 2/15/2023 | Kim Smith | Senior Associate Dean, Mason School of Business, W&M |
| 2/15/2023 | Mindy Schuster | Chief Financial Officer, Mason School of Business; W&M |

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX G: Communications Plan

**CDSAS Steering Committee**
**Communication Plan**

Summary:
The committee is charged with gathering extensive feedback, and we are committed to consulting widely and frequently. All feedback will remain confidential within the steering committee, though it may eventually be shared with the Provost to provide context for the report.

Direct Solicitation of Feedback from:
Faculty Assembly, A&S Faculty Affairs Committee, A&S Council of Chairs & Program Directors

Open Solicitation of Feedback methods:
Town Halls, Surveys, Meetings with Members of the Committee, Anonymous online feedback form

Timeline:

- Feb. 1 – Anonymous online feedback form posted to W&M website
- Feb. 13 – Town Halls announced and survey forms linked on website
- Feb. 16 – Digest post – summary of all town hall dates (deadline Feb. 15)
- Feb. 17 – Digest post – summary of all ways to communicate (deadline Feb. 16)
- Feb. 17 – Digest post for Town Hall One (deadline Feb. 16)
- Feb. 20 – Digest post for Town Hall One (deadline Feb. 17)
- Feb. 20 – Digest post for Survey One reminder (deadline Feb. 17)
- Feb. 22 – Digest post for Town Hall One (deadline Feb. 21)
- Feb. 22 – Town Hall meeting 6-7:30 pm, Sadler Commonwealth auditorium
- Feb. 23 – Digest post for Survey One reminder (deadline Feb. 22)
- Feb. 24 - Digest post for Town Hall Two (deadline Feb. 23)
- Feb. 27 - Digest post for Town Hall Two (deadline Feb. 26)
- Feb. 28 – Digest post for Town Hall Two (deadline Feb. 27)
- Feb. 28 – Town Hall meeting 3:30 -5:00 pm, Virtual
- Mar. 3 – Digest post for Town Hall Three (deadline Mar. 2)
- Mar. 6 – Digest post for Town Hall Three (deadline Mar. 3)
- Mar. 7 – Digest post for Town Hall Three (deadline Mar. 6)
- Mar. 7 – Town Hall meeting 10-11:30 am, Sadler Commonwealth auditorium

Required Communications Resources:

- W&M Digest Announcements
    - Town Hall One – Feb. 16, 20, 22
    - Town Hall Two – Feb. 24, 27, 28
    - Town Hall Three – Mar. 3, 6, 7
    - Survey One Reminder – Feb. 20, 23, 24
    - Survey Two Reminder – Apr. 24, 27, 28, May 4
- Survey Two link shared in Provost's Five Things to Know This Week on May 1st
- Share feedback or survey results? TBD

Digest Verbiage:

Town Hall: Computing Data Science Applied Science

The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All are invited to attend one or more of the following three town halls: In-person sessions in the Sadler Auditorium on Feb. 22 & Mar. 7 and a virtual session Feb. 28th. These will be listening sessions for the Co-Chairs David Yalof and Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views among the wider community. Particulars for each Town Hall will follow in future Digest announcements.

Individual Town Hall Announcement (ONE):

The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All are invited to attend a Town Hall in the Sadler Commonwealth Auditorium on Feb. 22nd from 6-7:30 pm. No registration required. This will be a listening session for Co-Chairs David Yalof and Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views of the CDSAS initiative among the wider community. Please join us!

Virtual Town Hall Announcement:
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All are invited to attend a virtual Town Hall on Tuesday, Feb. 28th from 3:30-5:00 pm. Please email awhoward@wm.edu to request the Zoom link. This will be a listening session for Co-Chairs David Yalof and Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views of the CDSAS initiative among the wider community. Please join us!

Individual Town Hall Announcement (THREE):
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All are invited to attend a Town Hall in the Sadler Commonwealth Auditorium on Tuesday, March 7th from 10-11:30 am. No registration required. This will be a listening session for Co-Chairs David Yalof and Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views of the CDSAS initiative among the wider community. Please join us!

Virtual Town Hall Announcement for Undergraduate Students:
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All students are invited to attend a virtual Town Hall on Thursday, April 6th from 6:00 – 7:00 pm. The Zoom link is here and you may email questions/comments ahead of the session to Adrienne Howard at awhoward@wm.edu. This will be a listening session for Co-Chairs David Yalof and Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views of the CDSAS initiative among the student community. Please join us!

Virtual Town Hall Announcement for Graduate Students:
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. All students are invited to attend a virtual Town Hall on Monday, April 3rd from 6:00 - 6:45 pm. The Zoom link is here and you may email questions/comments ahead of the session to Adrienne Howard at awhoward@wm.edu. This will be a listening session for Steering Committee Co-Chair Suzanne Raitt, and other members of the steering committee, to learn more about opinions and views of the CDSAS initiative among the student community. Please join us!

All the ways to communicate:

The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. The following avenues of communication are open to everyone: town halls, surveys, meetings with members of the steering committee, anonymous online feedback form. More information can be found on our website: https://www.wm.edu/about/administration/provost/action-areas/new-programs/cds-initiative/steering-committee/index.php

Survey One:
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. We will be sending out two surveys to the W&M community. The first will invite respondents to identify up to three questions they would like the steering committee to answer. Please respond by February 27th, 2023. https://forms.office.com/pages/responsepage.aspx?id=Prw8uR1mWECGk6iXuSS41w-18_-VNVRKpdExfcSWhj1UN1g2Q0s2NEk3NTJOMzRaMzgyMVk3TVRRSS4u

Survey Two:
The Computing, Data Science, and Applied Science Initiative Steering Committee is charged with gathering extensive feedback from our community. Our second survey invites respondents to provide feedback on different features and aspects of the proposed new entity. Please respond by May 4, 2023. https://wmsas.qualtrics.com/jfe/form/SV_2fVIDC9Qo3j0QUm

Five Things:
Please be sure to share your opinion with the Computing, Data Science & Applied Science Initiative Steering Committee, which is gathering feedback via the (second) survey by midnight on May 4. The Steering Committee has begun to work on the final report, which will be submitted to me by May 31 and shared with the community soon after. Co-chairs David Yalof and Suzanne Raitt will provide an additional opportunity for feedback on the committee's report at that time. In September, I plan to attend the A&S faculty meeting to discuss the committee's report and my recommendation. I welcome all faculty to share thoughts and ideas, not only about possible concerns but also how we can address the expressed needs of our colleagues in computing, applied science, data science, and other adjacent areas.

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX H: Survey ONE Computing, Data, and Applied Sciences Initiative

# Survey 1: Computing, Data and Applied Sciences Initative

As you know, the Provost has constituted a Steering Committee for Computing, Data Science and Applied Sciences (CDSAS). The committee is charged with "exploring the possibilities for an autonomous academic entity for the computing, data and applied sciences at William & Mary." You can read more about the committee and its charge at www.wm.edu/provost/cds. We will be sending out two anonymous surveys to the W&M community over the course of this semester, as we research different forms such a unit might take. The first survey (this survey) is very short and simply asks you what unanswered questions you have about the initiative that you would like the steering committee to address in its report. The second survey will offer a series of different operational and institutional models, and ask for your assessment of the suitability of each one for W&M. We are eager to hear from as many people as possible. Please respond to this survey by February 27th, 2023.

1. Please list three questions you would like the committee to answer.

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

Microsoft Forms

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX I: Survey TWO Computing, Data, and Applied Sciences Initiative

## Default Question Block

The Computing, Data Science and Applied Science Initiative Steering Committee invites your feedback on various aspects of the proposed new academic entity. The information we receive from this survey will help us think about ways in which the new entity could reinforce the strengths of Arts & Sciences, and increase opportunities for students, faculty and staff not only in the three units that proposed the new structure, but across the board.

The questions that follow invite you to assess various potential features of a new entity so that we can try to understand your support (or lack of support) for each. ***We must emphasize here that no decisions have been made about the specifics of a future new entity (including which other units might join)***. That is why we are eager to see and analyze your responses to this survey.

In Questions 1 & 2, please choose all the features that you feel would be good choices for the entity referenced in the question. We encourage you to explain your thinking and rationale in the text box provided under each question. We are very eager to understand why you made the selections you did. The only required question in the survey is the demographics question at the beginning. Please know as well that you will have the opportunity to go back and change your answers to previous questions before they have been submitted.

Your response will be anonymous and will be shared only as part of an aggregate report on the results of the survey. This survey will take 5-10 minutes

to complete.

## About you

What is your affiliation with William & Mary? Please click all that apply.

- [ ] Administrator
- [ ] Faculty
- [ ] Faculty emeritus/emerita
- [ ] Staff
- [ ] _____ Other

What is your school affiliation (if applicable)?

- ○ Arts & Sciences
- ○ Law School
- ○ Mason School of Business
- ○ School of Education
- ○ VIMS
- ○ Other

**The next two questions ask you to consider various options for the new entity. We ask you to consider two scenarios. The first asks you to give us your views on the best organizational structure for an entity inside A&S; and the second asks about an entity outside A&S. You will also be given the chance to express your views on whether inside or outside A&S would be better. If there are any features in either list that you feel would be appropriate, please select them. Non-selection of a feature will be taken as a vote against that feature. Do not feel obliged to select a feature that you are uncomfortable with, even if it is the only option presented for that particular function. (For example, if you**

**do not think that undergraduates should have to apply to the new entity to major in a program within it, don't select that feature. We will assume if it is unselected that you prefer the way we currently manage admissions.) Neither question lists every possible permutation. Also, don't be confused by the list of features for an entity within A&S. Even if the new entity is in A&S, it could have different degrees of autonomy, which is what we seek to capture below.**

**Question 1: If the new academic entity is inside A&S, which of the following features do you feel should be incorporated into its organizational structure? You may select as many features as you want.**

- [ ] Undergraduates will apply as they do now to A&S, as undeclared majors. If they wish to declare a major or minor in one of the programs offered in the new entity (CSCI, DSCI, APSC), they will apply separately for admission to the entity. "Non-major" courses in CSCI, DSCI, and APSC are open to students who have not been admitted to the entity.
- [ ] The new entity should have an independent budget and control over all search authorizations and hiring decisions.
- [ ] The new entity should make independent recommendations on personnel issues such as tenure and promotion (ie it should have its own entity-wide committee on retention, promotion and tenure which will forward its recommendations directly to the Provost and by-pass the A&S retention, promotion and tenure committee).
- [ ] Faculty should be able to hold joint and affiliate appointments between a department or program in the new entity and a department or program outside the new entity.
- [ ] Faculty in the new entity should have curricular control of all courses taught within the new structure except COLL.
- [ ] It is important for departments and programs in the new entity to contribute courses to the COLL curriculum.
- [ ] It is important for the new entity to promote and facilitate interdisciplinary collaboration and programming.
- [ ] There should be no obstacles to students double-majoring, or majoring and minoring, in a department or program in the new entity and a department or program outside the new entity.

Please explain your selections. What are the advantages and disadvantages of the organizational model that would result? How might the disadvantages be addressed?

**In this question, you are asked to give us your views on the best organizational structure for an entity outside A&S. If there are any features in this list that you feel would be appropriate, please select them. Non-selection of a feature will be taken as a vote against that feature. Do not feel obliged to select a feature that you are uncomfortable with, even if it is the only option presented for that particular function.**

**If the new entity is outside A&S, which of the following features do you feel should be incorporated into its organizational structure? You may select as many features as you want.**

- [ ] Prospective students will apply directly to the new entity to major in one of its programs (CSCI, DSCI, APSC)
- [ ] Undergraduates will apply as they do now to A&S, as undeclared majors. If they wish to declare a major or minor in one of the programs offered in the new entity (CSCI, DSCI, APSC), they will apply separately for admission to the entity. "Non-major" courses in CSCI, DSCI, and APSC are open to students who have not been admitted to the entity.
- [ ] The Educational Policy Committee should control the COLL curriculum for all majors, regardless of any other specifics regarding structure of a new entity.
- [ ] The new entity should have an independent budget and control over all search authorizations and hiring decisions.
- [ ] The new entity should make independent recommendations on personnel issues such as tenure and promotion (ie it should have its own entity-wide committee on retention, promotion and tenure which will forward its recommendations directly to the Provost and by-pass the A&S retention, promotion and tenure committee).
- [ ] Faculty should be able to hold joint and affiliate appointments between a department or program in the new entity and a department or program outside the new entity.

- [ ] Faculty in the new entity should have curricular control of all courses taught within the new entity except COLL.
- [ ] It is important for departments and programs in the the new entity to contribute courses to the COLL curriculum.
- [ ] It is important for the new entity to promote and facilitate interdisciplinary collaboration and programming.
- [ ] There should be no obstacles to students double-majoring, or majoring and minoring, in a department or program in the new entity and a department or program outside the new entity.

Please explain your selections. What are the advantages and disadvantages of the organizational model that would result? How might the disadvantages be addressed?

Another option would be for the new academic entity to offer graduate programs only. What do you see as the advantages and disadvantages of such a structure? How might we address the disadvantages?
Note: the usual model in such cases is for faculty to be appointed to the department/program, which remains within A&S, but for the graduate school to have its own administrative and budgetary infrastructure for graduate program related issues only - similar to our Office of Graduate Studies.

If you have a strong preference for one or more of the models described on the previous pages (inside A&S, outside A&S, graduate-only), please identify and explain your preference here.

**I have read/heard about the Computing, Data & Applied Sciences Initiative in the following ways (select all that apply):**

- [ ] Attended a town hall or other meeting with members of the steering committee

- [ ] Heard the Acting Dean speak about it at a town hall or other meeting
- [ ] Heard the Provost speak about it at a town hall or other meeting
- [ ] Heard one of the authors of the original proposal speak about it at a town hall or other meeting
- [ ] Heard about it from a friend or colleague
- [ ] Read about it in a W&M email (for example, the W&M Digest, A&S Dean's Friday message, etc.)
- [ ] Read about the initiative on the W&M website (www.wm.edu/provost/cds)
- [ ] None of the above: I knew nothing about it until I received this survey

Please enter any final comments here.

*This is the last question. Once you click the forward arrow below, your responses will be submitted and you will not be able to go back. Thank you for your time!

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX J: Online Feedback Form

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The Steering Committee would like to hear from you! Please share any thoughts, comments, or concerns about the proposed academic unit in Computing, Data Science, and Applied Science.

Please leave your name and contact information so the steering committee can reach out to you for more details if needed.

→

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX K: Meeting Requests Tracker

| Group | Contact | Date/Time | SC member #1 | SC member #2 | SC member #3 | SC Chair | |
|---|---|---|---|---|---|---|---|
| John Gilmour - Pres. Fac Assembly | Rani Mullen | Feb. 6th | Rani Mullen | | | Suzanne Raitt | |
| Student Assembly | Matthias | Tues. Feb. 28th 7:00-7:20 pm, in SWEM G64 (STLI office) | Matthias | Tony | Iria | | |
| Government Dept | Rani Mullen | Wednesday March 29th 12:00-1:00 | Rani | Matthias | | Suzanne | *reschedule |
| IIC | John Swaddle | 4/4 9:30-10 (zoom) | Iria | Tony | Marjy | Evgenia | |
| CLA | Jon Parman | Feb. 27th | Iria | Liz | | | |
| SOE | Jason Chen | March 22nd 9-10am | David | Jason | Matthias Leu | | |
| ECON | Sarah Stafford | Friday, March 10 2:00 pm | Matthias | Iria | | | |
| History | Tuska Benes | Friday, March 31 in Blair 331; 3-4pm or 4-5pm | Jason | Liz | | | |
| Michael Gaines | Elizabeth Mead | March 24th 3:30 in the sculpture studio | Eric | Liz | | | |
| Biology | Lizabeth Allison | Wednesday March 22 4:15 PM, ISC 3020 | Rani | Eric | | | |
| Physics | Jeffrey Nelson | Monday 3/27 - 3:30 pm - whole dept, Small 122 | Iria | Matthias | Tony | | |
| Jaime Settle Group | Jaime | Friday 4/7 11:00-12:00 | Tony | Matthias | David | Suzanne | |
| Chemistry | Bob Pike | April 21, 2023, 3-4 pm in ISC 2280 | Iria | Eric | | | |
| Physics | Jeffrey Nelson | 3/20 4-4:50pm - dept chair Small Hall 126 | Suzanne Raitt | David Yalof | Matthias Leu | | |
| Faculty Assembly | John Gilmour | 3/21 4:00pm | David | | | | |
| Graduate Student Assembly | Justin Cammarota | April 3, 6-6:45 pm | | Marjy | Rani | Suzanne | |
| Student Assembly | John Cho | April 6, 6-7:00pm - virtual | Tony | Rani | Marjy | David and Suzanne | |

| |
|---|
| Completed |
| Scheduled |
| Pending |

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX L: Student Survey Report

# Student Assembly Omnibus Survey Steering Committee Report

John Willis, Sasan Faraj, Kimberly Sejas & Patrick North
Department of Data and Analytics
Spring 2023

## Introduction

The Student Assembly (SA) Omnibus Survey was designed to gauge the opinions of the student body on matters related to both current and future SA initiatives. In order to identify pertinent issues for investigation, we collaborated with numerous class presidents, senators, and department heads. These discussions provided valuable insights into the most pressing concerns for the SA.

In addition to SA-related topics, the survey also addressed the university's Vision 2026 plan and the recently established steering committee led by Provost Peggy Agouris. Vision 2026 emphasizes the prioritization of new facilities to enhance applied sciences, particularly data science and computer science. The steering committee's primary responsibility is to guide the development of a new academic unit dedicated to strengthening applied sciences. To ensure student input in this process, the committee requested the inclusion of a series of questions in our survey to assess students' perspectives on Vision 2026 and the steering committee's role.

Through concerted efforts by SA members, we successfully promoted the survey to the student body, ultimately garnering 1,465 responses. The survey was available from March 3, 2023, to April 2, 2023. All participating students who completed the survey and provided consent were entered into a raffle, with 15 lucky winners receiving a $20 credit to their express account.

*This is a shortened version of the main report made for the steering committee that does not include our analysis of the SA related survey questions.*

## Data and Analysis

The Omnibus Survey contained a mix of multiple choice and text response questions, so analyzing the data required us to utilize a wide range of techniques, especially for the text data. For the multiple choice data, we have created a series of stacked bar charts that show proportions of respondents answers broken down by class year. For the text data, we created models to analyze respondents' answers en masse. Before we go into the key findings of our analysis pertaining to the steering committee, we will briefly explain how we analyzed the text data.

Given that the survey was taken by nearly 1500 students, it would be difficult if not impossible to comprehensively review these text responses. So, we have employed a variety of machine learning and natural language processing (NLP) techniques to gain insights from the immense corpus of text data. To this end, we created two models to parse through the text data:

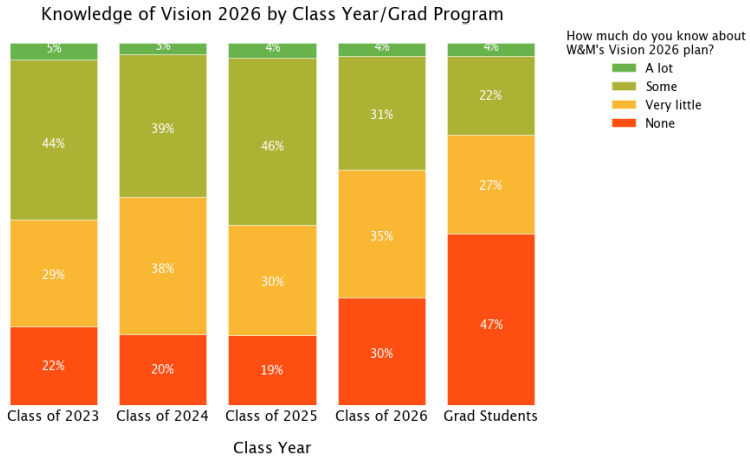
1. *Question Classification.* The first step we took was to classify all of the questions into five distinct categories, which we created based on our analysis of a random sample of questions. We manually sorted 300 student responses, then trained a ML model to categorize the rest. These results are graphed in the bar chart below.
2. *Word Weight Analysis*. The second technique we employed involved creating an index of "word weights", which essentially assigns an "importance" score to every word entered by students by how many times it was used. Then, with every word having a unique weight, we looked at entire responses to find which ones carried the most "weight". The table under the graph shows the top 10 questions based on our word weight analysis. Note that there is some spillover between the content of these questions, but that should only indicate that the content is even more important.

## Key Takeaways

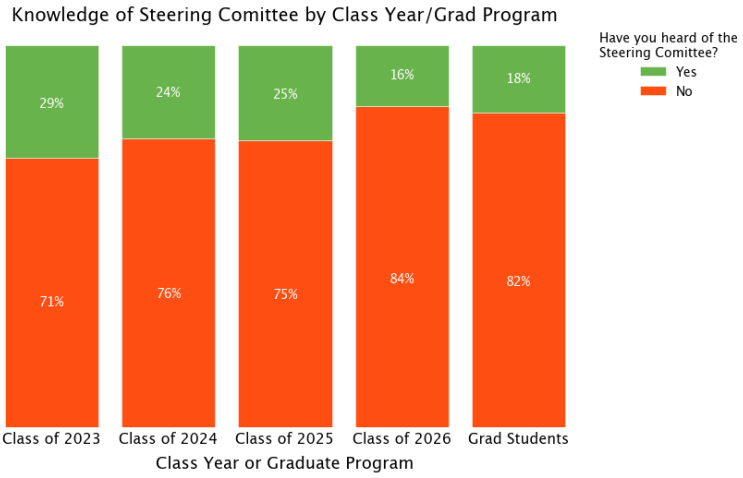
### **Finding 1:** Students are not widely aware of Vision 2026 or the Steering Committee, but they support the idea that Data Science is core to the liberal arts.

In January, Provost Agouris charged a steering committee with researching and analyzing various autonomous structures for computing, data science, and applied science at W&M, along with generating financial models and assessing the potential impact on the university by engaging with relevant groups. As the steering committee is responsible for gathering input from stakeholders, including students and faculty,

to facilitate the unit's creation, its success hinges on its ability to understand people's viewpoints comprehensively. To assist the committee in gauging student opinion, an Omnibus survey included a series of questions to assess students' knowledge of the steering committee and Vision 2026, and to solicit questions and feedback for the committee to consider.




Unfortunately, the survey results indicate that only a small percentage of respondents had heard of the steering committee, and only about half were familiar with Vision 2026. Although these findings may appear discouraging, it is important to note that students are supportive of the committee's objectives. The survey asked students to indicate their level of agreement with the statement that "Data science is core to a liberal arts degree in the 21st century...Statistical analysis is a mode of critical thinking, just like the other core modes of critical thinking our graduates cultivate at W&M," which was taken from an article by President Rowe. The chart of the survey responses reveals that the vast majority of students believe that data science is a crucial component of a modern liberal arts education. While approximately half of the students in each social class somewhat agreed, this may be due to their lack of knowledge, as previously noted.

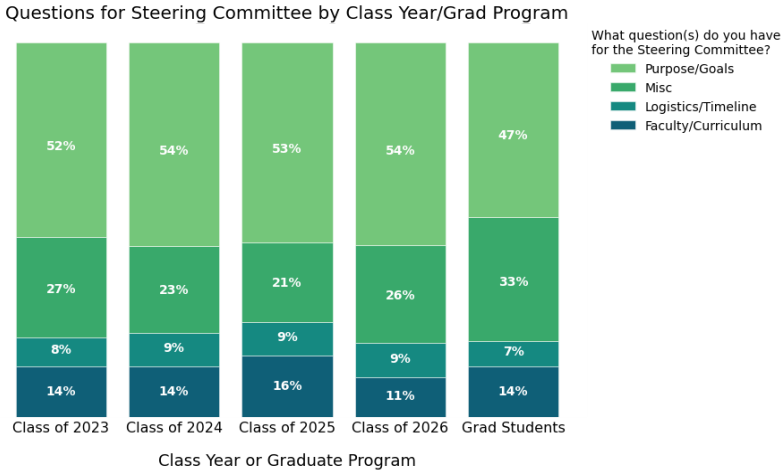



The next finding explores the reason behind students' mixed feelings towards the creation of a new unit and why some are strongly opposed.

## **Finding 2:** Students want to know more about how the new unit will impact their tuition rate, other departments, and the availability of courses.

Using the model that I described in the Data and Analysis section, we categorized all of the students' questions for the committee into four categories. Unsurprisingly, many people who took the survey took this opportunity to air their grievances on a variety of topics. Because of this, many of the questions were labeled “miscellaneous” across all classes. However, as we can see in the chart below, about half of all the

questions pertained to the purpose and goals of the committee. This is also not surprising, given that a vast majority of students had not heard of the committee prior to taking the survey.




| Top 10 Questions for the Steering Committee[1] | | | |
|---|---|---|---|
| **1** | *Will you be cutting funding from humanities departments to fund this new unit?* | **6** | *Will this new "academic entity" be comparable to existing academic departments, or will it be an entirely separate school?* |
| **2** | *Will this make it more difficult for students outside of the school to take computing classes?* | **7** | *Will this increase tuition costs for students who are not in the new unit?* |
| **3** | *Will this school be available to all students enrolled in the arts sciences?* | **8** | *Will this increase the number of seats in data science courses?* |
| **4** | *Will this change major requirements* | **9** | *Will this entity have its own building?* |
| **5** | *Will this new unit be a physically separate entity, like the business school and school of ed?* | **10** | *Will this affect what majors are offered in this field?* |

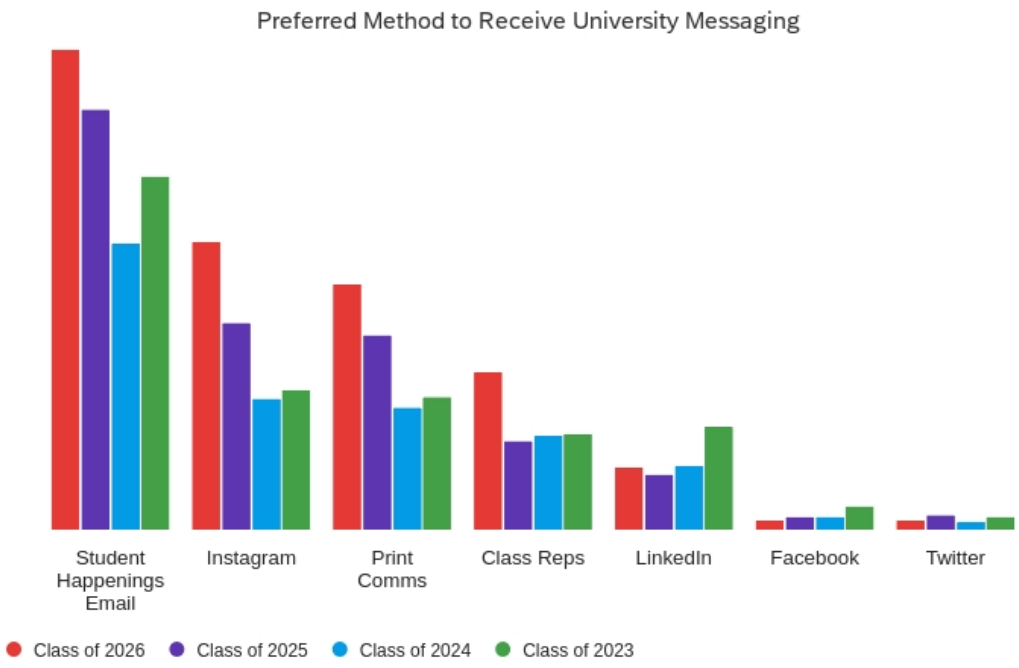
Lastly, looking at the table at the end of the previous page, we can see the top ten questions that students had for the committee based on the sentence weight method explained above. Adding more light to the question categorization chart, this table contains a variety of questions about the new unit that the steering committee should consider when crafting their messaging. Students are clearly concerned with how this will specifically impact their experience at William and Mary, which I believe explains some students' ambivalence toward the unit's creation. Aside from how this new unit will impact tuition, class offerings, and major requirements, students are clearly concerned about how this new unit will impact other areas,

[1]We had to manually look through the questions that got ranked top 10 to pick those that pertained to the steering committee. Full documentation of this code can be found on Sasan's GitHub page linked here.

especially in the humanities and language departments. The steering committee should keep this in mind and make a strong effort to answer these questions so that students understand the impact and purpose of the new academic unit.

## Conclusion

This analysis suggests that W&M students support the idea of creating new infrastructure to bolster applied science, but that they have important questions that must be answered. To answer these questions, W&M needs to make a strong effort to communicate plans to the student body. To figure out how to best reach the student body, we included a question in our survey asking students to indicate their preferred method of contact from W&M. The results, charted on the right side of this page, show that Student Happenings emails are students' most preferred method of contact. That's right…people still read emails! Additionally, Instagram is another powerful outreach tool that is widely used across the student body. Print Communications and Student Assembly representatives are also excellent ways to reach students, but they might prove to be more challenging to achieve at scale.



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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX M: PHYSICS: New-Unit Whitepaper

**08 MAR 2023**

# The Physics Department Position Paper on the Creation of a New Unit

March 8, 2023

The faculty of the W&M Physics Department equally values vigorous and quality research programs and excellence in teaching at the undergraduate and graduate levels. World-class research activity benefits the University through the relationships it fosters outside the institution and also promotes exposure both nationally and internationally. The vibrant research program also contributes to a valuable and exciting undergraduate experience. Faculty engaged in cutting-edge research bring that experience to bear in their classroom instruction and provide unique opportunities to undergraduates to engage in meaningful research projects. Collaboration among faculty, postdoctoral fellows, doctoral students, and undergraduate research students is commonplace within the W&M physics department. These undergraduate research opportunities are a requirement in a department that strives to provide the highest quality education to their physics majors.

The values and needs of the Physics Department are largely in line with those of the Computer Science and Applied Science departments and the Data Science program. As the only STEM PhD granting department that would remain within Arts & Sciences upon the creation of the proposed unit, the Physics Department has carefully considered the implications of joining the new unit or remaining in Arts & Sciences. Fundamentally, the staffing needs of a PhD-granting department that also maintains a strong research component for undergraduates are often in conflict with the staffing needs of the rest of Arts & Sciences. The specialized needs of a PhD program are often diluted among the needs of the much larger undergraduate program. We have identified two options that would address this fundamental conflict: the first, the creation of a new School of Computing, Data, Applied and Physical Sciences; the second, a reorganization of the PhD granting departments in A&S under a new dean. Both of our proposed options would reorganize the STEM PhD granting departments within a unit with a direct reporting line to the provost. In the following paragraphs, we first summarize the challenges the Physics Department faces, then describe our two proposed options and the opportunities they enable.

As in Computer Science, faculty staffing levels in Physics threaten to undermine our ability to maintain our research and education standards. Over the past decade, the number of undergraduate physics majors has more than doubled. However, retirements and attrition have reduced the number of tenure-track faculty members to 20, down from a high of 27. These two facts together have strained our ability to provide two ingredients crucial to the excellence of our undergraduate program: a rich set of electives and the high-touch mentorship of research students. We are currently at staffing levels where we are just able to provide coverage for the combined core classes of the major and the PhD program. Our COLL curriculum offerings have been limited and there have been semesters where we have been unable to offer any elective classes, limiting the breadth of subjects offered to our undergraduates relative to our peer institutions. Additionally, the demand for undergraduate research experiences has grown. Physics has long prided itself on ability to involve undergraduates in faculty mentored research.

Seniors are required to complete a research project, either an independent project in the case of the standard physics track, or a small-team project in the Engineering Physics and Applied Design (EPAD) track. Students are also able to work with research groups before their senior years. With fewer faculty members, it is becoming difficult to provide these essential and expected opportunities.

The vibrancy of the current W&M Physics research portfolio requires the deep inquiry and expertise only developed in a PhD program; our research programs cannot be sustained by shorter term Master's students. Our graduate program is also significantly hampered when faculty teaching assignments are saturated with core courses. The lack of graduate elective offerings also means we are unable to offer graduate-level introductory level courses in a student's chosen specialty. Either students have a slower start to their research, or a faculty member takes on a voluntary overload, impacting that member's availability for research mentorship. A smaller faculty also means fewer graduate research assistants can be supported. This in turn means a smaller cohort of physics graduate students, making it difficult to achieve the cohesion in the cohort necessary to provide a strong social network to support the individuals. It also means fewer teaching assistants to serve as lab instructors or graders, which again impacts the undergraduate program.

**As a first option to address these challenges, we propose the creation of a new School of Computing, Data, Applied and Physical Sciences**. The new school would strive to support world-class faculty and PhD scientific research while maintaining the high-touch undergraduate experience William & Mary prides itself on providing. The mission of the new school would include the advancement of computational methods and data analysis techniques necessary to understand the natural world and engineered systems, as well as fundamental physics inquiry, broadly construed, that forms the basis of our understanding of the Universe and of any future transformative developments in these areas.

While the goals of the Physics Department align with those of Computer, Data, and Applied science, we also have methodology and tools in common. Many of the subfields currently pursued within the Physics Department are highly computational. Our nuclear theory group specializes in Lattice QCD, which requires novel computational techniques to solve the equations that describe the Strong Nuclear force. Our experimental particle and nuclear groups use machine learning techniques to characterize particle interactions in massive data sets and to optimize experimental design. Our Plasma physicists require detailed simulations to understand the interaction of hot, high pressure, ionized gasses with electric and magnetic fields in the pursuit of developing practical fusion power sources. Condensed Matter theorists study the emergent properties of very large numbers of particles interacting with one another to design new materials. Our Atomic Molecular and Optical and Materials colleagues specialize in building new quantum sensors. We envision broadening the expertise of this group to quantum information science, potentially building the very devices that will perform the computations of the future. The new school would bring together expertise not only in the analysis, management, and exploitation of data, but in the collection and creation of data.

This new school will also offer opportunities for creating an interdisciplinary program in computational science. Already, many undergraduates double major in physics and computer science. Being joined in a new school opens new opportunities for both graduate and undergraduate students for integrated research projects and joint educational activities in the form of joint degrees, or computational science track degree in either physics or computer science. Integration in the same school is needed to better coordinate research, course work, and the creation of interdisciplinary tracks of study.

**As a second option, we propose a new factorization of Arts & Sciences, bringing the PhD granting departments in A&S under a new Dean who would report directly to the provost**. The Physics Department would benefit from being in a division with departments that have similar instructional and mentorship expectations of their faculty. The new Dean would be able to advocate for graduate support and for a different set of staffing priorities, beyond those of undergraduate seats, directly to the provost.

In either option, we expect that the departments involved in the new unit or division would be nimbler in responding to opportunities and would benefit from a more entrepreneurial mindset. Moreover, with more well-aligned priorities the departments of the new unit or division could be more proactive in longer term, strategic planning, rather than the yearly needs of the undergraduate body. With restructured overhead recovery, the new unit could also invest in shared resources and expert people to provide seed corn to new entrepreneurial ambitions of the faculty and the University.

Should a new unit be formed without Physics, the Physics Department is particularly concerned about the future of its Engineering Physics and Applied Design (EPAD) track for majors. Still in its growth phase, the offering has become a popular draw for students who want the breadth of education afforded at William & Mary coupled with a strong preparation in design and engineering. The track has been a shared responsibility of Physics and Applied Science; close relations between the two programs have been a key to its success. The program would not be as successful split across two schools with different priorities and missions. If the Physics and Applied Science Departments are separated, Physics would require three new faculty lines devoted to EPAD to fully take over the program and to be able to provide the courses required of the students. We also propose that the Director of the Arts & Science Makerspaces should remain in the school of Arts & Sciences, and the Physics Department would be happy to host that position.

*This position paper was prepared by an ad hoc committee of the physics faculty (P. Vahle-chair, D. Armstrong, M. Kordosky, J. Nelson, I. Novikova, and K. Orginos with C. Carone participating as an observer). It was unanimously approved by the faculty of the department of physics at their meeting on 10 March 2023 (15 – 0 with no abstentions).*

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX N: APSC Welcomes the Inclusion of Physics in the New School

**Applied Science welcomes Physics in the new school**

2023 May 20

From: The Faculty of Applied Science

To: The CDAS Steering Committee (via Co-chairs Suzanne Raitt & David Yalof)

Cc: Peggy Agouris, Provost

The Applied Science faculty at W&M unanimously agree that the unique requirements of the university's PhD-granting STEM departments call for a significant institutional change. Over the past two years, we have dedicated considerable resources towards developing a new School of Computing, Applied, and Data Science. Collaborating closely with our colleagues in Computer Science, these efforts have yielded promising results, with several options currently being discussed.

We are encouraged to see the Department of Physics express its desire to participate in this initiative. We recognize many commonalities between the needs of the Physics department and the potential opportunities a new school provides. We encourage the committee to explore ways Physics could benefit from joining this new unit without jeopardizing the School’s unique identity and focus.

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX O: Themes from Survey ONE and Listening Sessions

# Appendix O

# Summary of the themes emerging from the First Survey and from Listening Sessions

## Themes

# I. Summary of themes emerging from the First Survey

## A. Mandate of the Steering Committee and the Consultation Process

1. A question cutting across themes is whether the committee is open to recommending that the status quo is preferable to a proposed new school.

2. Some faculty expressed dissatisfaction about the composition of the Steering Committee and the fact that it was appointed directly by the Provost.

3. Some questions suggest that faculty affected by the creation of a new school should be involved in the decision-making process. In particular, some questioned whether A&S will vote or have its say in this decision.

## B. Overall issues that Faculty would like to see addressed in the final report

1. Two common questions are (i) whether there are universities comparable in size to W&M, without a School of Engineering, that have a separate unit/school housing CS/DS/AS, and (ii) how top R1 universities are organizing CS/DS entities.

2. Explanations were asked for the following categories of queries:
    a. The value statement/competitive advantage for the proposed new school: what value will this generate and for whose benefit? There is a concern that, since it is difficult to raise funds as a department, it will not be any easier to do so as a school.
    b. Why this is mission critical and what the largest potential benefit to W&M is flowing from the creation of a potential new school.
    c. What the best and worst case would be if a unit/school were to be realized.
    d. How this new entity will be outstanding—one of the best in the state—in such a competitive and crowded market.

3. Requests were also made to share evidence that an autonomous entity will in fact improve W&M's ability to attract and retain in-demand faculty.

4. Multiple faculty have requested that no decisions on any new entity be made over the summer while most faculty are away.

## C. Funding and finances

1. Faculty have inquired (through anonymous form and during face-to-face meetings) about the funding model. The following represent the most pressing questions:
    a. What resources W&M has to commit to this project, and what outside funding has already been committed to this project.

    b. Whether and to what extent a new entity would require cross-subsidies by other units, and, if so, for how long. The concerns are expressed in different ways.

i. Some worry that, since CS/DS/AS have much higher instructional costs because of salaries, equipment, etc., the answer to the cost issue will be to reduce the share of TE positions in other fields and/or to convert some departments to units that are almost entirely devoted to teaching and do very little research.

ii. Some worry that indirect cost rates on external grants will be cut, a practice that requires cross-subsidies either from the larger pool of IDC funds or from institutional funds such as tuition; or that institutional funds (e.g., tuition generated through undergraduate teaching, etc.) will be used to fund the large startup funds required of faculty in these fields.

iii. Some asked whether this is the opportunity to implement a more rational, equitable, and transparent process of fair distribution of funding and overhead allocation, such that A&S no longer subsidizes the other schools.

c. It was asked whether this move is likely to result in more support from the state and/or federal government. Along similar lines, a query wondered whether there is a minimum and a reasonable maximum amount W&M could receive from the Commonwealth Tech Talent Fund under the current model vs. a model where Computer Science and Data Science are in a Graduate School.

2. A question looking at the funding issue, but from another lens, was to address how the proposed new school will "share the wealth" with other units, especially those that will likely serve as feeder programs. Since majors account for, typically, 35-40% of student's program, the administration will need to ensure that the funding for the remaining 60-65% of course work, taken in A&S, will in fact flow to A&S.

3. It was asked how the new school would contribute to the general education of W&M undergraduate students and how does that compare to the share of revenues that the new school would receive from undergraduate tuition.

4. Administrative costs:

a. Some asked whether this initiative would imply additional administrative costs. If so, the question is where the funds to cover those costs will be coming from.

b. Some worry that the new entity may “poach” existing experienced administrators.

c. Some want to avoid duplication of administrative support.

d. Some asked whether the benefits of a separate school would outweigh the added costs of a dean and dean's staff.

5. In order to justify the creation of the potential new school, faculty asked the distinction between the (valid) concerns of STEM Ph.D. programs and a department's productivity as quantified through recovered overhead.

6. Overall, there is discontent that:

    a. a new school is being considered when some existing departments/units have been neglected by lack of investments; and

    b. a new school would cause funds being diverted to additional administrative functions rather than faculty.

## D. Faculty & Staff

Questions under this headings focus on:

1. Whether, if the model employed in the Bachelor of Business Administration is used, the faculty of the potential new school will contribute to the COLL curriculum. This comment was motivated by the fact that, at present, the CS department does not contribute intro-level COLL courses. An assessment of how the faculty at the Business School contributes may assist in determining how the COLL curriculum can be supported by more faculty.

2. Whether faculty in the departments/units that are likely to move to the proposed school can choose whether to stay in A&S or move.

3. Whether joint appointments will be possible between A&S departments and the proposed school. If so, whether those will be different from joint appointments across departments and programs within A&S (for both faculty and majors). If not, whether this will impact A&S departments who need to hire faculty with expertise in data science in order to keep up with trends within their disciplines.

## E. Interdisciplinary impact

1. There is a concern that creating a new school may reduce the opportunities for collaboration and interdisciplinary work. This has been often called the "silo effect." Explanations were asked on:

    a. how this new entity might expand research and applied opportunities for students and faculty; and

    b. how A&S majors in other degree programs can be provided the opportunity to use the methodology of data science in their disciplines.

2. Faculty noted that W&M's comparative advantage is that it offers a liberal arts curriculum and that students and faculty choose to come to W&M because of the liberal arts focus. Faculty asked whether it is possible, and if so, how, for W&M to preserve its liberal arts mission and integrate data science and technology into that mission if CS/DS/AS are spun off into a separate and competing school.

3. Other STEM questions pertained:

    a. Whether Statistics and the professional community of Statisticians are properly represented in the visions and implementation of any proposed new school.

    b. Whether the new school will compete with Physics for resources and whether the new school will have an impact on the workload and responsibilities of faculty in departments like Physics.

    c. Whether there will be opportunities for Physics faculty to participate in or benefit from the new school's programs.

4. It was asked whether the new entity will be organized around a particular area of study (computing, data, and related topics) or a particular departmental structure (Ph.D. granting departments). Either way, it was recommended that the focus must be accurately communicated through the entity's name.

5. Other possible models were also put forward:
    a. One suggestion was to create separate schools for the other main departments in A&S (or, at least, to rename A&S and give it more budgetary control for strategic initiatives).

    b. Alternatively, if an A&S Graduate School could be created, including all graduate programs or all STEM graduate programs.

    c. Another model proposed is to take advantage of the increasing numbers of faculty whose work includes the digital or digital technologies to increase collaboration with the existing structure rather than creating a new entity. The concern is that separation is likely to make collaboration harder.

6. If the school were to go ahead, faculty asked for an explanation of the ways in which the new school would reach out to other units on campus to develop partnerships.

7. At a more granular level, a question was asked about what types of collaborative endeavors with other disciplines have the 3 units explored here at W&M and/or in national models.

## F. Academics

1. Some lamented that it is not clear what "data science" actually refers to. It is not clear whether statistics, physical and biological scientists will be included in the plan for a potential new school, and why CAMS and Mathematics majors are not included.

2. As noted above, faculty asked whether, and if so how, an autonomous academic entity would be integrated into Arts & Sciences coursework.

3. Thinking about the COLL curriculum:
    a. Questions were raised on whether there are plans for the potential new school to contribute to COLL 100 and COLL 150 courses.

    b. If the new school were to go ahead, faculty and students wanted to continue to advocate to incorporate data literacy into the liberal arts education/curriculum.

    c. Faculty queried whether there is a model for the proposed school to offer a wide range of coursework and research experiences for students who are not receiving a degree from that school, i.e. students who don't see themselves as "technically oriented" but who would like to develop some computational skills in the fields they might already have an interest in (for instance, public policy, economics, government, and IR). This is important if the goal of this initiative is to give W&M grads a leg-up in the job market.

4. The introductory CS undergraduate courses, in particular CSCI 140, 141, 241 and 243, serve many undergraduate students who are not computer science or data science majors. The question is whether there is a guarantee that the new school will maintain/expand the number of seats on these courses and make them freely available to undergraduate students in A&S. From a governance perspective, some asked how this can be assured if the new school no longer reports to the Dean of A&S.

5. In addition to CS/DS/AS, faculty asked whether other departments (like Physics) would be able to join the new entity and, if so, what impact that might have on the A&S/COLL/liberal arts curriculum.

6. On the other side of the coin, faculty asked whether any joint programs between the departments in the new school and ones that remain in A&S would be affected.

7. Faculty also wondered whether the new entity would require *uncompensated* service from A&S units, as the Business School currently does (e.g., Calculus, Statistics, Microeconomics, and Macroeconomics).

8. Assuming that W&M has a fixed capacity for students, by growing CS/DS/AS it is likely that future incoming classes will contain more students interested in these areas. If so, it seems almost inevitable that if faculty in a couple of areas grow substantially, this automatically means less demand for classes in the humanities and social sciences.

9. Questions specific to Applied Science (AS) were:
    a. Since its inception, AS has had a valuable role in providing a mechanism whereby faculty in non-PhD granting science departments at W&M can mentor PhD students in applied science. The question is whether AS will continue to play this role in the new school, and whether this can be part of the mission statement for the new school.

b. AS teaches three courses that are integral to the EPAD track in Physics: faculty asked assurances that the new school would commit to maintaining at least that level of support for EPAD—and perhaps expand it.

## G. Grad vs Undergrad

1. There was a concern that W&M may not be able to ensure that sufficient research infrastructure would be available to support this graduate-heavy school.

2. Since there has been a continuous drop in size of other successful graduate programs on campus (by reducing faculty lines, support of graduate program, and salary pool), there is a concern that creating a new school for CS/DS/AS will accelerate the demise of the remaining graduate programs in A&S.

3. If the goal is to "provide world-class, well-funded graduate research programs," it is not clear why this initiative is limited to CS/DS/AS since there are other outstanding graduate programs.

4. A question that was asked started from the premise that the reputation of PhD programs depends on academic placements of those doctoral graduates. If current PhD students from CS move to low-ranked schools, an explanation should be given for what a reasonable expectation is for PhD graduates from the proposed school to fare any better. This question also requests data on the academic placements of PhD students from our CS department.

5. W&M has always been ranked in the top 10 for undergraduate teaching. However, if for some reason (e.g., due to a shift in focus towards PhD programs), W&M is no longer known for undergraduate education, there is a question as to whether W&M is going to be able to manage the risk of change in reputation.

6. Some faculty asked how the proposed new school would fit and collaborate with other interdisciplinary research centers or labs, such as GRI and IIC.

## H. Students

1. Consulting firms pay a premium for students with majors in social sciences that have experience with machine learning, data visualization, and object oriented programming experience. The new school must ensure that non-computer/data science majors continue to have access to these valuable skills through courses, including introductory level COLL courses.

2. The tech market has shrunk by 20% in the last year, and this worries some that is an indication that this is not the right time to create a new school for CS/DS/AS.

3. It is important to articulate how students will benefit from this possible new school. Some examples would be very useful.

4. Some faculty asked whether having a separate entity:

a. Would a new entity reduce the ability to provide computational/data science education to all students; and

b. affect the availability of undergraduate classes for A&S students, e.g. whether the proposed emphasis on graduate student research would affect the priorities and availability of courses for "outside" students. This concerns links back to the offering of COLL courses by CS/DS, which are essential to the liberal arts curriculum.

## I. Impact on A&S

1. The steering committee was invited explain whether A&S will be better off or worse off if it is divided into a School of Arts and a School of Sciences. This would have many implications, including on the COLL curriculum.

2. In line with other questions on funding (see above), it was asked how any proposed funding model will impact the remainder of the A&S departments and whether A&S will be harmed by the loss of revenue.

3. A comprehensive analysis should cover the effects on the departments and programs "left behind" regarding resourcing in all areas--e.g., personnel, research, office/meeting/support facilities, expected teaching loads, support staff, etc.-- given that these new units will be filled with a larger share of grant money.

## J. Administration

1. During the listening meetings, some faculty raised concerns about the proliferation of administrative positions and related salaries and a new entity will contribute to this trend.

2. Some faculty was critical of the administration for its failure in obtaining a larger share of the Tech Funds for W&M.

## K. Logistics

Questions under this headings focus on:

1. Where the proposed school will be housed, and whether this is going to have an impact on W&M's existing capital plans.

2. How the administrative support for the proposed school will be organized (suggesting a staffing model that goes beyond the model found currently in A&S which is considered limited).

3. If a potential new school will cause a larger number of admitted students, whether there are plans to expand building dedicated to students (dorms, classroom, etc.).

4. Whether the growth of the proposed school will imply that other departments will lose their on-campus footprint.

## L. Cultural

1. W&M has over-enrolled undergraduate students two years in a row during a pandemic. Currently, it accepts around 1,600 undergraduate students a year. Leaving the concern about the demographic cliff aside, the question is whether there is a need to create a new school to attract students.

2. Faculty asked whether creating a new school would affect the W&M brand: students come to W&M for its broad liberal arts curriculum.

    a. Along similar lines, faculty inquired about what is distinctively W&M in the proposed new unit. The current materials are not particularly tailored to W&M and could come from almost any research university.

    b. On the question of diversity, faculty asked whether a potential new school may affect the current W&M diversity because, historically, W&M has not encouraged/supported underrepresented groups applying to a separate school.

3. Some asked for an explanation of what place data literacy has in a liberal arts and general education curriculum.

4. Several faculty stressed that the nature of the problems experienced by CS/DS/AS is felt across campus:

    a. Some queried whether there is any (improved) analysis suggesting that the problems the affected units face would be best addressed by a new school.

    b. Many noted that the issues that CS/DS/AS experience are actually issues with W&M bureaucracy and administration in general, including problems with purchasing, infrastructure, graduate student funding, uncompetitive salaries, etc. Creating a separate school would not solve these problems for anybody other than those moving to the new school.

5. Some were worried that there seems to be an intention to raise the profile of some departments and not others. This appears to indicate that some departments/units are more important than others, and that this focus comes at the expense of some departments that have historically been large revenue-generating departments at W&M.

6. Since W&M has limited space for students, is there any guarantee that the new school will not result in admitting fewer students interested in other disciplines, and ultimately change W&M's identity of being a premier liberal arts university.

# II. Summary of themes emerging from the Listening Sessions

To avoid repetition, this section includes themes or comments arising from the various Listening Sessions that members of Sub-committee II attended that are not already listed above.

## A. Feedback received directly from students

1. Most students did not know about the CDSAS Steering Committee. The Student Assembly requested that a strong effort be made by the administration to communicate plans with regard to the possible creation of a CDSAS entity to the student body.

2. The vast majority of students believe that Computer & Data Science are core to a modern liberal arts education.

3. Students are concerned about how the creation of a new school will change their overall experience at W&M (including tuition, class offerings and access to CS/DS/AS courses by the general student population, and course offerings in other departments in the humanities and social sciences).

4. The vast majority of Computer Science students signed a letter in support of the creation of a School of Computing and Data Science, which highlighted the "opportunities for interdisciplinary collaboration in technology, science, and humanities" that such a school would create.

5. A 2019 Student Data Literacy proposal highlighted the lack of a data literacy requirement in W&M's COLL curriculum. It also noted the absence of courses that introduce students to Computer & Data Science in the COLL curriculum, despite leading peer institutions including such requirements in their curriculum.

6. Graduate students asked how the introduction of the new school would affect the support for graduate students. Currently, all (and only) graduate students in A&S have access to conference travel funds administered by the OGS and the GSA (which many from Computer Science and Applied Science have taken advantage of over the past several years). The GSA also provides a mentoring program for students from underrepresented backgrounds to help their transition to W&M, while the GSAB provides a career focused mentoring program to help students prepare for life after graduation, both only available to students in A&S. Through the GSA, graduate students are connected to the other departments in A&S, including involvement in social events. Students are concerned about how the separation will limit their ability to interact with other graduate students across the disciplines. As many of the programs and events are funded by the GSAB (which is only connected to A&S) and the GSA (which is partially funded by student activity fees, which we would lose proportional to the students no longer part of A&S), it will be more difficult to provide support for students from outside A&S. The GSA also serves as a conduit for communication between the graduate students and administrative bodies on campus, which the new school would need to form their own versions for the new administrative sectors. Although there is another body, the Graduate Council, however, there is only occasional cross-school. The

administration should consider not only the impact of moving students into the new school, but also the impact of the loss of their input and resources on the students remaining in A&S.

## B. Untapped opportunities

1. Some faculty have commented on the many opportunities which could be tapped into by a new school. These opportunities would not only benefit the faculty in the new entity, but also other faculty across campus. For instance, participating in the MS Pathways to Computing Consortium could increase the revenues not only of the new school, but also of W&M. This led to a discussion about how tuition dollars are currently shared.

2. Faculty from across departments and schools expressed interest in research collaboration and in teaching courses such as the integration of ethical and equity issues into CS/SD curriculum.

## C. Interdisciplinary collaboration & Digital Humanities

1. Interdisciplinary collaboration faces challenges: insular thinking is difficult to counteract. Therefore, it is critical that, in designing this new entity, certain factors are addressed. For instance:
    a. Leadership has a significant influence on collaboration.
    b. The structure of the entity and the incentives need to be designed thoughtfully to encourage interdisciplinary collaboration rather than rewarding only traditional research.
    c. Fostering a more well-rounded liberal arts education through interdisciplinary collaboration should drive the trajectory of the new entity, not the other way around.

2. Data Science is so inherently interdisciplinary, that a model that puts it outside of A&S would not enable the delivery of the kind of research and education that is at the heart of DS.

3. Faculty engaged in digital humanities see great opportunity for collaboration with the new entity. However, since it is cumbersome for students to take courses for example in history and in data sciences, much less to double major in these two fields, there is a concern that a new school would make these possibilities even more difficult. Further, if a new school is created, and the DS faculty and research capabilities are moved to that new entity, faculty are concerned that their digital humanities capabilities will also vanish, diminishing both research and teaching capacities.

## D. Understaffing issues, lack of resources, and Tech Talent funding

1. In a number of different listening sessions, faculty from different departments lamented that, just like CS/DS/AS, they too have issues with regards to faculty hiring and retention, raising funds and other staffing issues that affect their teaching loads and lack resources and investments.

2. The Sustainable COLL Working Group shared a report identifying significant issues with the COLL curriculum and proposing some solutions. Although these issues predate the proposal for a new entity, the Working Group noted that if a new school were to be created, it is critical that COLL offerings are taken into consideration from the outset and a clear commitment to contributing to them is made. The Working Group also emphasized that data literacy should become an integral component of the COLL curriculum and/or a component of many departments and programs.

3. Some faculty have voiced a degree of frustration at the low Tech Talent funding that W&M was able to attract. These voices consider this a failure of the administration and the grants office, rather than a departmental one.

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX P: Demographics

**Appendix O**

**Demographics of respondents to Survey 2**

| | |
|---|---|
| *Administrator* | *46* |
| *Faculty* | *314* |
| *Staff* | *204* |
| *Other* | *66* |
| *Faculty emeritus/emerita* | *12* |

| | |
|---|---|
| *Arts & Sciences* | *380* |
| *Law School* | *17* |
| *Mason School of Business* | *32* |
| *School of Education* | *21* |
| *VIMS/SMS* | *39* |
| *Other* | *92* |

Respondents to Survey 2 were asked to disclose if/how they had previously heard about the proposed CDSAS Initiative. They were allowed to select multiple options if appropriate:

| | |
|---|---|
| *Attended a town hall or other meeting with members of the steering committee* | *165* |
| *Heard the A&S Dean speak about it at a town hall or other meeting* | *154* |
| *Heard the Provost speak about it at a town hall or other meeting* | *176* |
| *Heard one of the authors of original proposal speak about it at a town hall or other meeting* | *156* |
| *Heard about it from a friend or colleague* | *217* |
| *Reading about it in a W&M email (e.g., W&M Digest, A&S Dean's Friday message etc…)* | *259* |
| *Read about the initiative on the W&M website* | *183* |
| *None of the above: I knew nothing about it until I received this survey* | *10* |

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# REPORT OF THE STEERING COMMITTEE FOR THE COMPUTING, DATA SCIENCE & APPLIED SCIENCE INITIATIVE

**June 12, 2023**

## APPENDIX Q: Comparable School Models CDSAS

# COMPARABLE ADMINISTRATIVE MODELS IN COMPUTING


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# Three Tiers of Universities (+ 1)

- **Large R1 Universities:**

Boston University (18K), Georgia Tech (17.5K), University of Pittsburgh (20K)

- **Mid-Size Universities with standalone schools:**

Brandeis (3.6K), Case Western (5.8k), NJIT (9k), Drexel (12K), Northern Kentucky (10.8K)

- **Small Universities without separate schools:**

Mount Holyoke (2.2K), Denison (2.2K), Lafayette College (2.7K)

- **Virginia Colleges and Universities:**

Mason (26.8K), UVA (17K)

# Large R1 – Pitt School of Computing and Information

Depts: i) CS, ii) Informatics and Networked Systems, iii) Information Culture and Data Stewardship

Admin: Dean and Associate Deans (3-4), notable: Assoc Dean for External Relations

Degrees: Numerous degrees housed in, and *some developed jointly across schools (Digital Narratives)*

Noteworthy: *Sara Fine Institute* to promote social research in science and technology.

*I3 iSchool Inclusion Institute* prepares underrepresented undergrad students for graduate education.

(Note: split from Arts & Sciences)

# Mid-Size – NJIT College of Computing

Depts: i) CS, ii) Data Science, iii) Informatics

Admin: Dean and 3 Associate Deans (Academic Affairs, Research, Strategic Initiatives)

Degrees: Numerous degrees, graduate certificates

Noteworthy: *High School Outreach Programs*.

*Institute of Data Science* initiates collaborative inter-disciplinary research (big data, medical informatics, and cybersecurity).

Institute for Future Technologies (collab with Ben-Gurion University)

# Small – Lafayette College

Divisions: academic divisions in i) humanities, ii) social sciences, iii) natural sciences, iv) engineering, and v) interdisciplinary. CS is part of natural sciences (with Physics, Math, Neuroscience, Bio, Chem, etc). DS minor only.

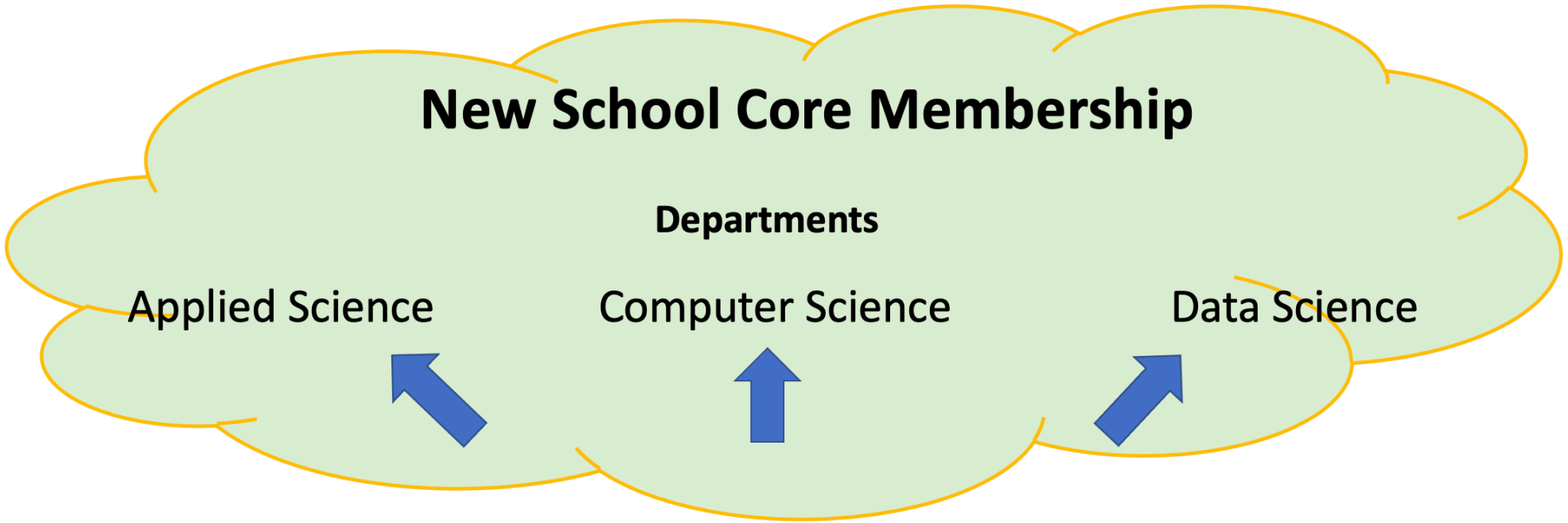
Degrees: AB and BS

Noteworthy: *"Our interdisciplinary curriculum offers a rare combination of degree programs in LIBERAL ARTS AND ENGINEERING Discover the power of 'AND.'"*

# Notable Nuggets at Large

- **BU –** Faculty of Computing & Data Sciences: Associate Provost for Comp and DS, mostly CS faculty, now adding CDS faculty.

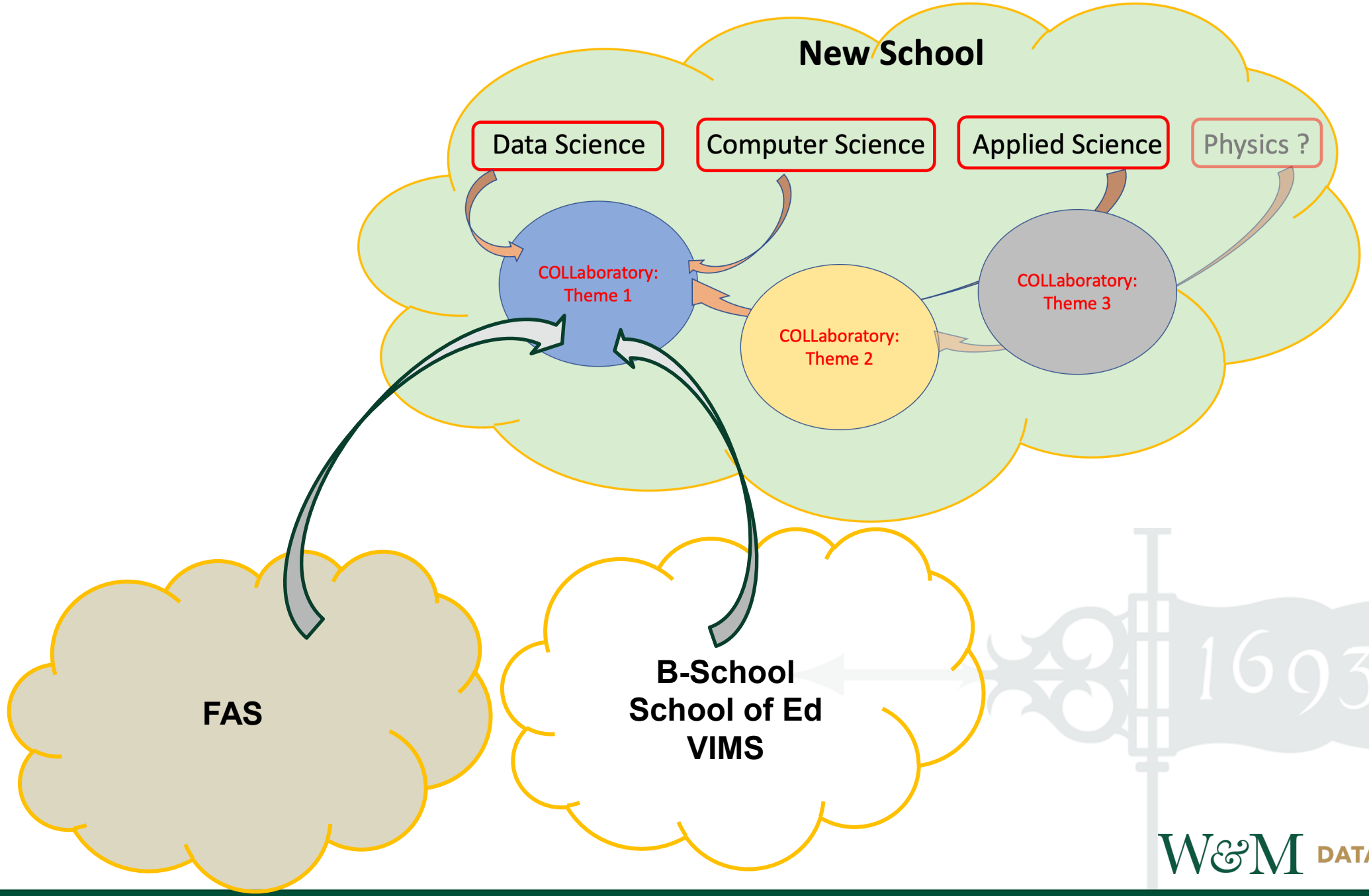
  *CDS Fellows. Civic Tech Fellows.*
- **Berkeley -** Computing, Data Science, and Society: Associate Provost, started as a division, applied to become a College in June 2022.
- **Mason –** School of Computing: One of two schools of the College of Engineering & Computing, each led by a Divisional Dean. Assoc. Dean for Strategic Initiatives and Community Engagement.
- **Brandeis –** Michtom School of Computer Science is just a Department of CS with some additional computational linguistcs expertise.

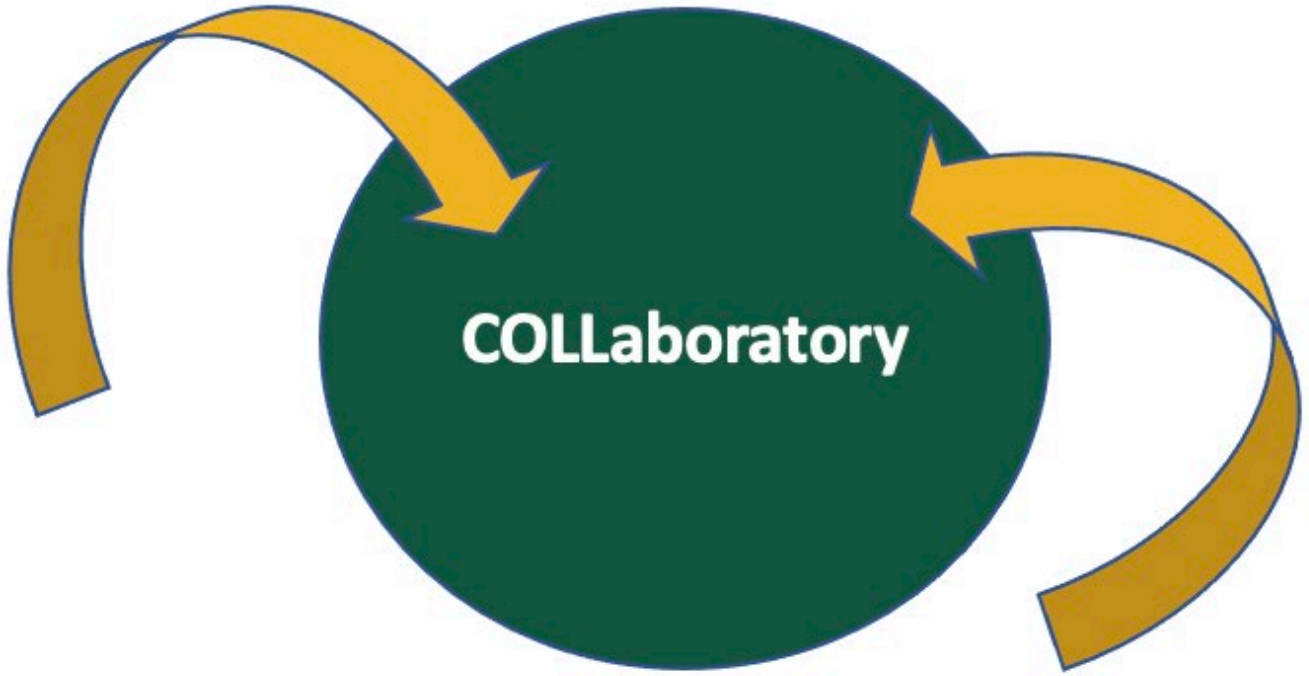



## Flexible Affiliate Membership

Research/Teaching

| Program Clusters | W&M Schools | A&S Departments | Partners |
|---|---|---|---|
| CAMS, EPAD<br>Business Analytics | Individual faculty from any W&M School | Individual faculty from any A&S department | Individuals from Government & private firms |


New School
Data Science
Computer Science
Applied Science
Physics ?
COLLaboratory: Theme 1
COLLaboratory: Theme 2
COLLaboratory: Theme 3
FAS
B-School
School of Ed
VIMS


COLLaboratory