

Academic Program Review
Department of Information Systems

College of Engineering and Information Technology
University of Maryland Baltimore County
April 6-8, 2025

An Academic Program Review (APR) was conducted for UMBC's Department of Information Systems (IS), College of Engineering and Information Technology, from Sunday, April 6, to Tuesday, April 8, 2025. The purpose of this review was to provide input on the program's effectiveness and consultation on its needs, priorities, and future directions. Several materials were provided in advance of the APR visit, including a comprehensive review report prepared by the Department. The APR visit included meetings with different stakeholders including department faculty members, department staff, graduate and undergraduate students, and university Vice Provost administrators. At the conclusion of the review visit, a debrief discussion was held with the IS faculty and Department Chair, as well as University administrators including the College's Dean and the University's Vice Provosts. This report summarizes the considerations and recommendations of the external reviewers.

Responses to Review Questions

The reviewers were asked to respond to specific questions for the review. The report is organized by the set of questions.

a. Please comment on the appropriateness of general goals and specific objectives of the program. How are they being met?

The reviewers assess that the general goals and objectives of IS are appropriate. The Department is generally meeting their goals; the reviewers believe that the overall direction is excellent, and the Department is making outstanding progress toward their goals.

Specifically, the Department has a growing` research mission including increased interdisciplinary and use-inspired research, which is fundamental to information related areas at the intersection of society and technology. The Department has an impressive growth in research expenditures in the last few years (more than \$11M in FY23), surpassing other similarly sized departments. The increased expenditures appear to rely on a couple of large-scale federal grants, which brings stature to the Department. This may introduce some risk to the research portfolio in case these projects are not able to continue or change over time. The average before these large grants in FY22 and FY23 averages a respectable \$3M over the preceding 5 years. Consideration may be given to how to mitigate the reliance on a few large grants in the currently changing funding environment.

The Department is successfully executing on its educational mission. The Department is teaching a growing number of students across its programs, and it has launched several new programs that are responsive to workforce needs. The Department's academic programs are attractive to students and employers, appropriately delivered, and well designed. Some risk is noted with fluctuations in enrollment, particularly at the graduate (masters) level. There are many academic program types, e.g., undergraduate (2), masters (3), professional masters (2), doctoral (2), minors (3) and certificates (14), for the faculty size of the Department. In turn, this may spread instructional effort thinly and put undue effort on more junior faculty to take leadership roles. A number of the certificates and minors have very small enrollments, so the Department may want to consider the value of having such offerings compared to the overhead of offering them.

b. What is the students' perception of the quality of the program and their evaluations of the faculty's teaching and mentoring?

Discussion with the students attending the meetings indicated they value the programs and the instructional support that they received. While the number of students in the meetings was small compared to total enrollment, the attending students said they were getting high value toward their future needs including employment. They spoke positively of the faculty and staff in supporting their educational and research journeys. The reviewers particularly noted that the students called out high-quality instruction by adjunct faculty. They felt these faculty brought a "real world" perspective to instruction.

At the undergraduate level, the students noted an issue with advising. While the number of attending undergraduates was relatively small, all these students sought stronger connections with their advisors, beyond course planning. The students felt the teaching faculty advisors were overloaded and could not fully attend to their advising needs. As a result, the faculty were primarily focused on course planning and were not able to advise as much on co-curricular experiences or career placement. One possible approach is to adopt a "holistic advising" model that uses professional advisors (see NACADA's recommendations and best practices, for example). This could provide an opportunity to better support student success, personal development, co-curricular experiences, and professional career development. This could be combined with faculty advising and supported by the College. Our understanding is that other departments in the College are moving towards this model.

The doctoral students reported struggling with financial uncertainty, and at times, a lack of connection to their advisors. This appeared to be primarily an issue with students as they first entered their doctoral program. Once a match was made between a doctoral student and an advisor, who could provide financial support on grants, the students felt more supported and better connected to their advisors and program. Until this match was solidified with stable funding, the doctoral students expressed challenges with financial issues from semester to semester, leading to a loss of confidence, substantial anxiety, and reduced ability to focus on their academic program and research. The Department may want to consider alternative ways to match students earlier and demonstrate a firmer commitment as part of the admissions process. Identifying an advisor at the outset may help mitigate financial considerations, although it would require a way

to balance admission yield and student-advisor mismatches, which may become apparent later after a student starts. Using teaching assistantships primarily for incoming doctoral students might be another way to provide a “runway” for doctoral students to find advisors who can make longer-term financial commitments.

c. Are the proposed directions of growth of the program consistent with the nature, mission, and overall plans and priorities of the College and the University? Please comment on the overall quality of the program relative to its aspirational peers.

The directions of growth of IS are consistent with the College and the University. In particular, the Department has excellent Master of Professional Studies in Health IT and Software Engineering and online Master of Science in Information Systems (which is moving up the US News and World Report rankings), that are doing well. Enrollment across all of these are strong, with the online degree enrollment bouncing back from a drop during the pandemic. Particularly given the local and national demand for capable graduates in these areas, the newly added programs are consistent with the mission to educate and contribute to the workforce. The steady growth of the bachelors degrees is consistent with the national growth in interest in Information Systems, and with the College and University.

There is also a strong focus on interdisciplinary research and education, both appropriate to the information systems field and aligned to the University and College directions. The Department is actively leading and participating in multiple university and school centers, which demonstrates excellent alignment with the R1 directions of UMBC and capability to advance UMBC. The Department's research portfolio is impressive, and they've had excellent success with pre-tenure/new faculty members including multiple NSF CAREER awards. It was unclear to the reviewers who the Department views as their aspirational peers, although the University of Maryland College Park was mentioned in several conversations as a point of reference. A recommendation is to identify a set of national peers beyond the University of Maryland Systems that include similar and aspirational peers. This would be beneficial for long-term planning in giving broader context about trends and benchmarking.

d. What is the quality of the curriculum? Do teaching materials and pedagogical methods reflect state of the art within particular areas?

In discussing the Department's programs with students, they generally expressed satisfaction with the instruction and quality of the curriculum. As noted earlier, the students appreciated the involvement of adjunct faculty. Likewise, discussion with the full-time faculty and administrators noted that adjuncts stay for several years and are dedicated to high quality instruction. The adjuncts often come from area employers, bringing timely practice-based experience to their courses, which benefits students, including potential employer connections. The annual faculty review helps ensure instructional quality, and this includes both full-time and adjunct faculty.

We are unable to comment on the quality of the teaching materials and pedagogical methods employed in the Department. However, the use and adaptation of the University of California at Berkeley's Data 8 curriculum for IS 296 was seen as a highlight.

- e. *Considering the program's assessment of student learning outcomes, discuss ways the faculty might most effectively "close the loop" by enhancing its use of the outcomes of assessment to improve teaching and learning.*

The Department has an excellent process for assessing student learning outcomes, analyzing the assessment, and incorporating it to improve the curriculum. Several examples were noted in how the Department has enhanced their curriculum over time to ensure quality and timeliness of the instructional material, especially in the fast-moving information field. The reviewers laud the Department for their proactive, systematic assessment and improvement practices.

To close the loop, career placement rates may be one way to continue monitoring progress. In addition, the Department may want to consider "outcome" measures, i.e., how have the skills and knowledge acquired by the students led to career impacts beyond placement rate. For instance, the Department may want to consider surveys of graduates two to N years beyond graduation to get feedback about what was learned and its relevance to current roles. This may also include the value of the degree over time. A survey instrument could also consider employer perspective about the preparation, advancement, and contribution to IS graduates at their organizations. There may also be opportunities to more systematically involve employer perspective in academic program design in addition to individual course design taught by adjuncts. The industrial advisory board could be one source of this input, and it appears that this board is already being utilized for some of the curriculum.

Related to closing the loop, students reported lack of discipline-specific career services support and connection to an alumni network. They indicated this consideration as barriers to finding internships and jobs. There may be an opportunity to enrich relationships with Department alumni, especially with UMBC's anchoring in the Baltimore-Washington area.

- f. *Is the level of scholarly work by faculty members in the program suitable for this program? Does the program as operating or planned provide sufficient opportunities for continued growth in quality of scholarship, creativity of faculty, and research opportunities for students?*

The level of productivity for all levels of faculty is commendable with demonstrated outcomes in grants, publications, and other products. While faculty retention is a challenge, many institutions face a similar issue considering broad opportunities and demand in information systems, AI, and computing areas in academia, government, and corporate sectors. With the high quality of the Department's research and academic efforts, the IS faculty will be in demand and will be recruited by other institutions. Continuing to build staff, research and faculty infrastructure, including mentoring, will help faculty excel even more, further strengthen an already productive and positive department culture, attract more faculty and staff, and mitigate retention considerations.

Faculty seem to be well-supported in managing the balance of research and teaching responsibilities. Junior faculty receive a reduced courseload pre-tenure. Highly productive researchers are given additional course releases. The Department is adopted a workload policy that will also help with this.

IS faces some current issues with infrastructure, which may hinder productivity. Resource support for pre- and post-award grants is limited; there may be opportunity to bolster staffing and service supports for research development (e.g., grant writing and research staff) in pursuing, attracting, and maintaining a larger, more diversified research portfolio, especially in support of interdisciplinary activities. A few faculty said that they chose not to pursue particular grant opportunities because they did not believe they would have the support necessary for those submissions.

With more infrastructure support, more grants may be received, furthering opportunities for PhD students. The doctoral students talked about significant uncertainties in paid research positions, which inevitably impacts them personally and their productivity. More grants would help alleviate this issue. Master students is another opportunity; several master's students indicated that they want to engage in research. Similarly, undergraduate students are eager to participate in research, but they did not know how to go about finding research projects other than word of mouth. The Department may want to consider enhancing its research outreach specific to master's and undergraduate students, e.g., hold an annual research fair for these groups to share research projects and positions.

A longer-term challenge is facility space. Currently, the faculty indicated that space is spread across multiple locations, which fragments not only the Department but also individual research efforts and academic programs. This fragmentation can limit interdisciplinary programs, as faculty and students from different areas may not build as much cross-group community that can spark new research directions and innovations. As a result, some students and faculty spoke to current disconnects due to space issues. Physical proximity is vital to building community. Addressing space, in combination with bolstering other infrastructure, could help the Department to take its research and academics to the next level, increasing impact, visibility, and reputation.

g. Please comment on the adequacy of the program's facilities for fulfilling its goals.

The Department is at limits of growth for research labs, faculty hiring, and doctoral students. It may be necessary to realign goals for program size, number of programs, and research growth unless space utilization is improved, or the space footprint of the Department is increased. Taking over student spaces to create labs/offices will only go so far to solving this issue, and it's a challenge with a growing student population. An interdisciplinary faculty that has space spread over different parts of campus is a substantial challenge to collaboration, as noted above.

h. Given your review, do you think the program resources are being used effectively? Are there other ways you can suggest for them to be used? Are there additional ways the program might generate revenue?

Generally, resources are effectively used, although limited, as noted above, which hinders future growth. As a result, it may be necessary to regulate growth to manage resourcing, unless new resources can be brought to bear. With several successful academic and research programs and limited resources to maintain or grow them further, it's important to ask the strategic question of 'why this program, why now, and what resources can be prioritized for it' as new programs are considered, and existing ones are reviewed. The desire to grow was articulated a number of times, but the impetus for that desire was not always clear. Incorporating strategy into decision making will be necessary to help regulate and manage planned growth over time. Further, there was a lack of understanding of how resources flowed from central campus to the College and then to the Department. Greater financial transparency and understanding could help engage more faculty in strategic discussions of growth and managing resources. One "resource" the Department is using effectively is its staff. A number of the staff have been at UMBC for several years, and appreciate the flexibility they have in doing their work, and the community the Department provides. As the Department has grown, the staff have felt more stretched.

i. To what extent does or should the program collaborate with other units of the University?

The Department is a strong contributor to the University. The faculty and students participate in multiple center activities for the University, College, and Department. Use-inspired research and education, foundational to information systems, is a strong basis for interdisciplinary collaboration across UMBC.

Students noted seeking opportunities for taking courses from other departments, and a desire for streamlining the approval process. Through student engagement with other Departments inside and outside of the College, this can be a basis for more collaboration.

j. With regard to any resources identified as needed in the self-study or the external evaluation, which one is most urgent and/or most likely to benefit the program and how?

The most pressing resource needs to relate to faculty, teaching assistantships, and space. The student to faculty ratio is high and there is a high reliance on a large adjunct pool. Nearly 50% of instruction is delivered by adjuncts. While this provides agility with the ever-changing IS field and offers important real-world experience to students, there is concern about overall sustainment, management overhead, and educational quality with the current balance of full-time to adjunct faculty relative to enrollment. There is risk to overtaxing the full-time faculty. More full-time faculty would support increased research, fulfill teaching needs, and reduce risk with a large adjunct pool. As noted above, the Department is growing its student enrollment, but faculty expansion may not be commensurate with that growth.

While the adjunct pool is high quality, the Department may want to consider larger-course sections typical of other information and computing programs. There is a trade-off of instruction, the use of adjuncts, and class size. As classroom space allows, the Department may consider reducing course sections, increasing class size, and reallocating freed resources to instructional support.

The number of teaching assistantships (TAs) is low compared to total enrollment and the Department noted that the TA allocation has not changed with enrollment growth. There would be significant benefit from providing more TA support to improving instructional quality, while also providing more opportunity and increased certainty for doctoral students. The College is encouraged to examine how the allocation of TAs is made to provide the much-needed teaching assistantship resources to IS to manage its enrollment growth.

As noted above, space is at a premium. The Department is effectively at full capacity. Working with the College and the University, the Department needs to either rethink how space is being used or expand their footprint to support growth aspirations. Without addressing the facility space challenge, it will be difficult to continue growing the Department at the current rate while maintaining impact, quality, and productivity.

Additional Recommendations

In addition to the answers above, the reviewers noted additional recommendations.

The reviewers had the sense that the Department has been under pressure (internal or external) to increase student enrollment, although it is not clear where this pressuring is coming from and how that translates into resources to support the increases. There were different responses and some opaqueness about the connection between enrollment and resources. The Department and the College may have to be more effective in managing and limiting enrollment to achieve a more sustainable balance relative to available resources. Alternatively, the resources need to be increased. In either case, a longer-term documented growth plan may be beneficial. It could also be useful to clarify for the Department how resources are allocated relative to enrollment.

With support of the College and University, the Department may want to develop a strategic plan to guide their development, growth/non-growth of academic programs, expansion of inter- and transdisciplinary research, and the building of cross-college and cross-university collaborations. As the Department has grown and expanded its outcomes over the last several years, it is reaching the scale where a clear articulation of future goals, strategies, actions, and assessments (metrics/targets) could be beneficial in taking next steps toward even greater impact.

A key component toward a strategic planned approach, is leadership development. The Department and the College could expand their efforts to build leadership interest, capacity, and knowledge. This would support longer-term growth for the University through a culture of strategy and administrative support. It may also help clarify some areas of confusion, e.g., budgeting and resourcing connected to enrollment and research productivity.

Part of strategy is also organizational design. For its size, the Department has a broad range of academic and research programs, all of which require leadership and management. There may be opportunity to rethink the current organizational design to streamline and simplify it. For

example, some program director roles might be combined. A reorganization may allow recouping effort that could be applied in strategic directions, e.g., leadership development.

In summary, as part of a strategic approach, the current changes in local, state, and national conditions, show that it is increasingly important to be intentional about assessing risk and opportunities, investing resources, and developing resilience. This does not have to mean retrenchment, but simplification and intentional strategic thinking may be called for, in the face of limited state resources, an uncertain federal funding landscape, a more challenging job market, and an increasingly displaced workforce (who could be looking for up- or re-skilling opportunities).

Questions provided by Department

The Department provided several questions for the reviewers to consider.

- 1. The widespread use of generative AI tools has affected all aspects of teaching and learning. The majority of students have used generative AI tools to complete assessments as evidenced in a national survey of about 1000 college students. The plagiarism is rampant. What suggestions do you have for the IS department to utilize generative AI as part of teaching without hindering student learning?*
- 2. Assessment is based on data collected through variable methods, such as indirect and direct ones. If the data does not reflect reality due to use of genAI tools, what suggestions would you provide to the IS department for assessing student learning?*
- 3. Which resources should be given to the IS department to combat this issue and restore student learning?*

In addressing these items, the Department could lead development of departmental, college, and institutional policy on guidance of AI use. Students indicated that they were confused and uncertain about AI usage policy; it varied among instructors. The Department may want to consider standardizing AI adoption choices, while preserving flexibility of faculty. For instance, a simplified set of options might be created from which faculty could choose their AI policy. This would help develop consistency and practice across the Department's full academic portfolio while ensuring faculty agency and clarifying expectations to students.

Employers increasingly indicated that students who can use AI tools in collaborative ways are more desirable and specifically sought out for employment. Some employers [have reported](#) that they'd prefer to hire employees with AI skills who have less experience than more experienced employees without these skills. This suggests embracing and adopting the use of current and future AI will be important rather than restricting the usage. Wherever possible, lead, embrace, and accept use of AI in classes to position students for career opportunities, where AI use will be common (e.g., Spotify includes AI skills in their annual employee performance review).

This is an opportunity for the Department to be campus leader in how AI is integrated and used in learning. Given departmental strengths, the Department could lead changing the cross-campus conversation from one of "combating" plagiarism and cheating to one of measuring student

learning outcomes, skills development, and knowledge through innovative changes in curriculum, assignments, and assessments that integrate AI. Additionally, there may be opportunities in considering how AI can enhance faculty and staff work to uncover efficiency and shift effort to pursue other desired objectives and initiatives where it hasn't been possible before.

4. *UMBC recently achieved R1 status. What research infrastructure support should be provided to the IS department and, by extension, to other departments in UMBC to make UMBC more competitive in the national research arena?*

With increasing proposal submissions and a larger grant portfolio, the College should monitor effort and ensure that pre- and post-award can meet increasing needs and responsiveness. Dedicated support could be expanded by the College for research development to proactively identify opportunities, form teams to triage and consider the opportunities, manage and develop responsive proposals, and initiate funded opportunities could bolster center-scale activities.

While there is potential to expand the computational infrastructure within the Department and individual faculty areas, an independent approach is increasingly difficult. There are new challenges with independent servers and data sources that lead to silos, challenges with security and compliance, difficulty of provisioning sufficient power/cooling/electrical/noise, lost opportunities to collaborate and share through resources including data integration, and large costs to duplicate major resources like large-scale GPUs. An effective and responsive shared infrastructure model within the department, college, and/or the university could help alleviate some of these emerging issues, which may limit research in the future. The shared infrastructure needs to be sufficiently provisioned to provide timely response and flexibility to maintain and accommodate a variety of research demands.

5. *Given the recent increase in the number of large centers what are the pros and cons of having a large number of small centers versus a few large centers?*

Advantages of a few large centers (may be better for the department)

- Require larger physical footprint, preferably contiguous, and take more time of a small number of individuals to administer.
- Can engage a larger number of faculty and students (more people benefit per center), from both within and outside the department, and tend to be more interdisciplinary.
- Can allow the department to focus on a number of strategic areas, rather than spreading too thin, which has reputational and identity-construction value, along with benefits to how resources are deployed.
- Can be used to attract new faculty and support junior faculty.
- May have opportunities for greater visibility from funders, upper administration; and may position faculty better for larger competitive grants.
- May experience some efficiencies from shared administrative staff or facilities.

Advantages of many small centers: (may be better for the individual faculty)

- Offer more opportunities for junior/mid-career faculty to take on leadership.

- Suggests a nimbleness and spirit of entrepreneurship, in allowing faculty to follow and grow their passions, and respond to emerging research trends or new funding opportunities (bottom up growth vs. top down control).
- Allow for incubation of smaller ideas that can grow to strategic priorities
- Are simpler to run and govern (requires less overhead), but possibly leadership training for more people.
- May lead to more diffuse identify and require increased attention to sharing a collective cohesive external presentation for the department.

Summary Recommendations

1. Develop, adopt, monitor, and assess strategic directions, department organization, and capacity for academic programs, research, service, and external engagement outside department at the College, University and partners including corporate and alumni.
2. Align student enrollment, teaching, service, and research with resources, especially faculty lines, teaching assistantships, and facility space. This may be done through an increase in resource allocation, including TAs, faculty lines and research infrastructure, from the College and University; managing growth to avoid outpacing available resources; and, seeking more fundraising and engagement to develop alternative resources for faculty, students, and staff.
3. Continue to expand relationships with other campus units, alumni, and employers to partner in maintaining momentum in interdisciplinary research and employer aligned education.
4. Consider deepening relationships with area employers in undergraduate and MPS degree programs for work-based learning, curricular design and assessment informed by employers, student career outcomes, and intentional pipelines to employers.
5. Consider a holistic advising model supported by full-time dedicated professional advising team following national best practice and standards (NACADA).
6. Reconsider approach to commitments for PhD applicants and current students. Consider an improved matching process between PhD students and advisors to ensure stability in funding, which supports the Department's growing research mission
7. Offer more training and mentoring of TAs, adjunct faculty, and core faculty.