I. Introduction

The goals for the college, and charges to the committee, were outlined in a letter from Dean Platz dated December 4, 2007. These are repeated here since they form the outline of our review:

**Overarching Goals:** world class undergraduate instruction in mathematics and physical science, and six top-twenty ranked doctoral programs with at least one or two programs ranked in the top ten.

**Specific charges:**

1. To suggest the optimum distribution of 220 faculty in the five departments and school.
2. To place the unit-identified priorities into 4 bands (A-B-C-D) in decreasing order of priority.
3. To analyze the functional budgets of the departments and to recommend ways to reallocate resources to fund unit priorities.
4. To propose metrics that we can use to measure the progress of each unit.

II. Quality of the programs and trends over the past 5-10 years

The committee believes that three departments/schools have markedly improved their national standing in recent years: Earth Sciences, Physics and Statistics. Two have been seriously degraded: Chemistry and Mathematics. (This is not to say that there aren’t real strengths in both of these departments- for example, the discrete mathematics group was ranked 7th, and the number theory group 13th, in the 2007 US News and World Report). One department, Astronomy, has become outstanding and is the only one we deem to be at or near “top 10” status. We do not believe any other unit is among the top 20 graduate programs in their discipline.
It is no coincidence that those units that have improved have also been the units that have hired actively and expanded. Those that have degraded are departments that have experienced significant shrinkage in faculty FTE. In fact, in the not so distant past the OSU Chemistry Department would have been ranked in the mid to upper teens nationally; now it is in danger of moving out of the top 30.

We believe that a realistic goal for all but the Astronomy Department is to retain/regain/attain top 20 status in the national rankings of academic programs. The Astronomy Department could break into the top ten, but to do so it will have to become a participant in one of the US large telescope projects (e.g. the Giant Magellan Telescope or the Thirty Meter Telescope).

III. Relative size of the academic units within the context of 220 total FTE for the College.

We approached this task with significant misgivings because we frankly believe that the College is undersized when one considers its high goals (see above) and the large sizes of its enrollments of both undergraduate and graduate students. This is most evident in Chemistry and Mathematics where, even if Ohio State follows the recommendations given below, both departments will be significantly undersized relative to those at other universities that teach a comparable number of undergraduates. Furthermore, because of the hiring freeze, staff sizes across the College may be even further reduced next year when one considers the numerous retirements and resignations that are anticipated. Thus, the College will have to hire actively “just to stand still”. In the sciences, that requires significant start-up funds and quality space. Finally, the hiring of young (and occasionally “star”) faculty as senior individuals retire is essential for the relatively continuous renewal required by all excellent programs.

With those comments in mind, we present below our recommendation for a “Faculty Count” distribution that might be attained over the next 5 years within the proscribed limitation of a total of 220. The values for the AY 07/08 are taken from the Table provided to the Committee entitled: “CMAPS Faculty Count for AY 07/08, Autumn Quarter Summary”. We note that in some cases the current faculty count includes personnel currently active outside the department (e.g. serving as the Graduate Dean or the Interim Dean of the College).
<table>
<thead>
<tr>
<th>Unit</th>
<th>Current Size</th>
<th>Target Size</th>
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</thead>
<tbody>
<tr>
<td>ASTRY</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>CHEM</td>
<td>34</td>
<td>36</td>
</tr>
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<td>SES</td>
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<td>PHYS</td>
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<td>52</td>
</tr>
<tr>
<td>STAT</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>226</strong></td>
<td><strong>220</strong></td>
</tr>
</tbody>
</table>

We recognize that the decreased size of the college’s faculty outlined above is necessary in times of difficult budgetary constraints. In our discussions with the departments we found this to be recognized by the faculty itself. However, we also strongly believe that, in the long run, decreasing the MAPS faculty size is not optimal for the College or the University. Loss of faculty produces a significant danger that the progress that has been made by some departments over these past several years will erode.

**IV. Highest Priorities- College level**

As we proceeded with our review it became obvious to us that there were College-level priorities that were overarching. Addressing these, before or concomitantly with the unit priorities, would be maximally beneficial to CMAPS. These are listed below with no prioritization intended.

a. **Transparency of the College finances.** The extent to which unit heads are ignorant of the past, present and projected future financial details of the College is surprising. We encourage the use of budgeting spread sheets at both the College and unit levels that look out 3-5 years. These should include the expected amounts of IDC recovery that might be available to both the College and the units and, if possible, the level of additional start-up support that the units can expect from all central sources. It is especially important that the University clarify how much, if any, of the current, large unit deficits might be “forgiven” so that the parameters governing their budgets in the out years are well-defined.

b. **Working within the RCM model.** Each department in the College is actively developing plans that are specifically designed to increase the allocation of funds to the College through the RCM (Responsibility Centered Management) model. The committee recognizes that the Office of the Provost has made known that financial support to the College involves multiple metrics. Nevertheless, we urge that these metrics be made more explicit. Our perception is that the current view within the departments is that the RCM model is very heavily weighted to one particular metric – the generation of student credit hours. This has led to a focus on courses that generate significant credit hours without the need for TAs – basically large-enrollment
courses without laboratories. We believe that this focus is inconsistent with the important overarching goals of the university and thus merits significant attention at high levels. Specifically, the visiting committee is concerned because:

- There are signs that the graduate programs and undergraduate majors across the College are suffering from the perception in the units that maximizing undergraduate general education credit hours is the key to the units’ financial viability. For example, we heard (but did not have the time to verify) that the numbers and frequency of graduate courses are suffering as a result. We heard from graduate students that the amount of interaction time with faculty advisors was decreasing. In addition, some programs had plans to reduce lab time in courses for the major in order to accommodate changes in teaching focus.

- There are a limited number of credits being generated across the University, and a limited set of prescribed science course requirements as a part of this overall pool. To a large degree, even intense efforts by the individual departments within MAPS are unlikely to alter significantly the total credit hours generated by the College. Therefore, despite the fact that these departments may invest considerable time and effort, the overall MAPS budget would not be significantly improved.

- The health and success of the College depends heavily on the University resource allocation model taking fully into account the cost of undergraduate laboratory courses, including the requirement for TAs, as well as the added expense of teaching science and math required by both safety and pedagogy. Though there are other models for teaching science to large numbers of undergraduates that do not use graduate TAs in large numbers, the peer institutions with which OSU compares itself have generally leveraged their heavy need for TAs to achieve high national standing. Issues here include the extent to which tuition is charged for graduate students who have essentially finished their course work (i.e. after ca. 2 years in the program), the diminishing level of such tuition being returned to the units from Federal grants, and the comparative cost of supporting an RA vs. a postdoctoral researcher.

In addition, we heard that some units are falling short of peer institutions in faculty salaries. If true, this does not bode well for the retention of key faculty. Further, we caution against using “soft” money (i.e. IDC recovery) for faculty raises.

In sum, we are concerned that the objective of reaching top 20 status for all MAPS departments, and top 10 status for some, and indeed the important overarching goals of the University, may well be at odds with the current
financial drivers for the departments, which have resulted in an overwhelming focus on general education credit hours.

c. Strategic Planning. Towards the end of our visit we learned that the College is in the midst of developing a strategic plan. We applaud this fact, feeling strongly that the units can not/should not proceed too far with their own plans until the College’s plan is in place. In fact, only one unit, the School of Earth Sciences, presented us with the elements of such a plan. If the College is able to replenish its ranks, it is critical that the faculty give considerable thought to how this should be accomplished. Should interdisciplinary hiring across units and even colleges be encouraged? Should “cluster hires” in key areas, again potentially involving multiple units, be planned? To what extent should the College utilize the “star” system by hiring faculty who have been honored nationally and would bring with them instant credibility in their field (noting that there are significant financial and possibly morale costs associated with this strategy)? Have one or more departments suffered such attrition so as to make “core hires” essential to their maintaining their ability to teach across their discipline? Should the College increase (or possibly decrease) its use of non-tenure track “teaching faculty” with long-term or unlimited term appointments? These questions become even more critical if the College is forced to downsize or even maintain the status quo.

d. Development Efforts. We believe there are significant, untapped opportunities for fund-raising from private sources, both at the College and at the unit levels. The fund-raising efforts within the College are far below those of peer institutions, with a single person (half-time) designated for development at the College level. A significant number of MAPS graduates have jobs within industry, and many corporations promote giving by their employees through matching programs. Chemistry is a prime example of a program whose alumni have the potential to significantly enrich the College and the department. The Earth Sciences program has produced a significant number of graduates who are working within the petroleum industry – an area of significant wealth. Yet, alumni giving rates are remarkably low and the total annual gifts received are a small fraction of that generated by peer institutions. Development requires dedicated professionals who are on the road meeting with alumni, corporate partners and foundations. Particularly in a case where state support is not strong, development becomes an essential part of the success of the College. We strongly encourage the formation of a MAPS development team. Peer colleges typically have development offices that have 2 to 4 individuals whose primary role is raising funds from alumni, corporations and foundations. Likewise, peer departments at other institutions often have “advisory” committees consisting of senior alumni who care deeply about those departments. These are commonly, but not universally, individuals with significant giving capacity and often include representatives from major corporations.
V. Highest Priorities- Unit Level

Though initially encouraged by Dean Platz to prioritize the multiple lists of items placed before us by the units, we did not feel we could do so comfortably in the absence of overarching strategic planning by the College and by the units themselves (see IV c. above). One stood out above all the rest (a. below) and several others were either sufficiently general or essential to warrant inclusion here. We do note, however, that all units seem to have been thinking creatively about new teaching and research opportunities. Examples include, but are not limited to, the creation of Financial Mathematics and graduate level Minor in Statistics programs, the development of two new programs for Earth Sciences undergraduate majors (B.A. in Earth Systems Science and B.Sc. in Earth Observation), and the introduction of interactive, introductory “step-up” courses in Physics.

a. There is little question in our minds that the replacement or complete renovation of Evans Hall has to be at the top of the list of priorities. Until that happens, this building will seriously inhibit the growth in quality of what in the past has been a highly rated chemistry department. We also caution that the building presents some significant safety issues with its current design.

The other high priority items are listed below with no prioritization in their sequence intended.

b. It appears that there has been a general attrition of infrastructure across the College. This is evident in the loss of key support personnel in ES and PHYS, the need for enhanced computational capability in STAT and MATH, and the need to replace (CHEM) or sustain (ASTRY) key equipment and facilities.

c. The need for significant help with start-up funds was highlighted during our visit. Though this has already been commented upon in IV. a above, the concerns expressed by the laboratory science units lead us to place this issue in this section as well.

d. We believe that the continued financial participation by the astronomy department in the LBT is a requirement for this department to maintain its high national ranking. This includes support for its instrumentation laboratory and the ancillary telescopes of the MDM Observatory.

e. Physics has an ambitious plan to improve its undergraduate introductory teaching and laboratory infrastructure within its existing budget combined with small investments in laboratory improvements. This should be encouraged.

VI. Other Issues Identified During the Review. For all three of the following, we strongly encourage exit interviews for faculty leaving the College.
a. The Committee had an informative meeting with the College’s female faculty. The intent of this meeting was to search for gender-related concerns or suggestions, rather than to evaluate the vita of the group members. That said, we were impressed by the quality of these faculty. Issues raised during this meeting included (i) a better understanding of, and utilization of, a faculty spousal hiring program (such programs, when flexible enough to seize on opportunities, are often excellent recruiting tools); (ii) the use of lightened teaching loads during and after pregnancies; (iii) regular annual, or semi-annual, meetings with the Dean to discuss gender-related issues.

b. We likewise had a meeting with the College’s Assistant Professors and again came away positively impressed with the group. The items discussed in other parts of this report not withstanding, the College has done some excellent hiring these past few years. Issues highlighted here were (i) a definite morale problem, general to the college, as a result of the financial uncertainties well-known to the CMAPS faculty, and (ii) some feeling (not universal) that members of this group are being asked to disproportionately shoulder the lower level undergraduate courses (at the expense of offering graduate level courses in their specialty).

c. We did not specifically meet with minority students or faculty during our visit. Our perception, based on conversations and impressions, is that the College needs to put considerably more emphasis on recruiting from pools of under-represented groups. At the faculty level a successful strategy at other institutions has been to have open searches across the discipline, rather than to conduct those that are narrowly defined. With the number of potential applicants already statistically limited in the CMAPS fields, one needs to seize on hires of opportunity rather than following the traditional academic practice of searching for a very specific sub-discipline expertise.

VII. Metrics

We did not have the time to give this area the attention it deserves. Certainly, metrics will have to be an integral part of the Strategic Planning now in progress. For research, we emphasize the need to choose an appropriate group of peer institutions - this is not always straightforward since the group to which e.g. Astronomy aspires to be compared will be quite different from that against which Chemistry might be measured. We also highlight the need to set a baseline and to search for trends, up or down.

The indicators we suggest for the graduate program include (but are not limited to): NRC rankings, faculty publications including citation/impact factors, grant expenditures/FTE (these offer more meaningful long-term data than grants received), faculty honors, the GRE scores of incoming graduate students, the percentage of grad admits choosing to come to OSU (with some sense of the major competitors for those turning down OSU offers and the nature of the other institution’s competitive advantage),
the percentage of completion and time to degree of doctoral candidates, and the quality of the placement of these students upon graduation.

For the Undergraduate Program, we would highlight the number of graduating majors, the percentage of incoming majors retained to graduation within the College and the quality of the placement of the majors upon leaving OSU. We know that student evaluations are limited in scope but they are a useful indicator of the level of satisfaction among majors and non-majors with the CMAPS courses. In general, we believe that smaller size undergraduate classes (for example, calculus) and a greater level of senior faculty involvement in teaching lower level classes correlate with a high quality of undergraduate instruction. An attractive, challenging Honors Program across the College will help to recruit from among the increasingly higher quality undergraduates now coming to OSU.

VIII. Reallocation of Unit Funds.

Several of the units identified areas for potential savings or earnings that they could put to good use in their programs. We do not, with one exception, list here the numerous proposals to increase the number of undergraduate SCHs. We are concerned that this is close to a zero sum game as long as the University’s required hours to graduation stay constant. It was not uncommon to hear suggestions that, at best, might redirect students from one part of the College’s programs to another. The result could be a significant investment of resources that does little to increase the College’s overall balances. Here are several meritorious proposals:

a. The Chemistry Department has a very large budget for undergraduate teaching, including significant funding for grad TAs. The Department indicated that there is room to modestly increase the grad TA teaching load and thus save an unspecified sum of dollars. We endorse this proposal as long as it is clear that the grad TAs are not being exploited nor their time to degree adversely affected.

b. The Mathematics Department is proposing a Financial Math M.S. professional degree. Such professional degrees often can justify a level of tuition significantly greater than traditional graduate programs. Business Schools have made good use of such professional opportunities to increase their income. The Department also proposes to expand the Actuarial Sciences program. This is a reasonable suggestion, especially with the proximity of the Nationwide Insurance Company, as long as the job market can absorb the additional number of graduates.

c. Statistics is proposing a Minor in Statistics for graduate students outside of CMAPS. Unlike the professional program noted in b., one would have to examine this proposal closely to assure that it is a net generator, rather than consumer, of human and financial resources.