

**To:** Dr. Janie Fouke, Provost and Senior Vice President, University of Florida  
Dr. Neil Sullivan, Dean, College of Liberal Arts and Sciences

**From:** Mathematics Department External Review Committee:  
Dr. Ronald Douglas, Texas A&M University  
Dr. Jonathan Hall, Michigan State University  
Dr. Steven Ferry, Rutgers University  
Dr. Peter March, The Ohio State University

**Re:** Report of the April 2006 Department Review

**Date:** May 17, 2006

**1. Overview.** The review committee met with Provost Fouke, Dean Sullivan, Dr. Krishna Alladi, Chair of Mathematics, faculty representatives from engineering, business, statistics and education, as well as mathematics faculty members, staff and students. We were also provided access to background information, planning documents and data that were helpful in forming a clear picture of the university context, the current state of the department and developments since the last department review.

The mood of the department is friendly and collegial and the faculty is appropriately ambitious about building a stronger, more highly ranked department. The department has achieved a significant increase in national and international visibility over the last five years through its special years program, named lectures and colloquia, and the recently created Thompson postdoctoral program.

In general, students, both graduate and undergraduate, regard the University of Florida as a good place to learn mathematics. They report that, on balance, they have been advised and mentored well and are pleased with their placements in graduate school, postdoctoral positions and jobs in industry.

The department's office staff report that they feel respected by the faculty, postdocs and students and that their work is valued. While the staff is highly competent it seems to us to be too small for the department's overall workload and also to be small by comparison with mathematics departments at peer institutions. Adjunct lecturers, on whom the department depends for the bulk of its instruction up through first year calculus, are competent, effective and appear to be doing an outstanding job. However, they are poorly compensated and lack appropriate faculty oversight and support.

The department is seen in a mixed light by fellow departments across campus. On one hand, numerous individual collaborations have been forged that resulted in publications, joint grant proposals and curriculum development projects. On the other hand, there seems to be a lack of clear communication channels with partner departments - for example engineering - by means of which curricular, pedagogical and interdisciplinary

research issues can be discussed and resolved. While the Mathematical Sciences Committee is one possible means by which the department can extend its reach across campus, we feel the department has not exercised sufficient leadership in this group.

It became clear to the review committee that the department exists in a resource poor environment leading to (a) inadequate and compressed salaries for faculty, lecturers and staff that lag seriously behind national averages for the University of Florida's peer institutions; (b) higher faculty teaching loads and greater dependence on non-faculty lecturers compared with peer institutions; (c) non-competitive startup packages for new faculty and; (d) inadequate research and computing support for existing faculty. These factors are having a negative effect on faculty morale and represent a potentially serious faculty retention problem.

It also became clear that the budgeting system at the college and university levels is not very transparent. The budget seems a mystery to everyone with whom we spoke and the lack of transparency has had several negative consequences for the department and the university. Chief among these is a practical difficulty of following through on curricular innovation and improvement. Specifically, while marginal costs for these projects can be clearly identified, marginal income in the form of tuition and state subsidy for teaching a new course cannot. As a result, it is difficult or impossible for the department to determine the net marginal cost of curriculum development. This puts the department in the untenable position of having to shoulder costs for new initiatives out of an already inadequate operating budget or to cut existing critical programs. This state of affairs inhibits project development and is a strong dis-incentive to innovation. The inscrutable budgeting process has a similarly discouraging effect on interdisciplinary research because the faculty sees no mechanism for fostering or continuing such research beyond serendipitous collaboration of individuals.

Despite these difficulties, the department has done a good job of handling its many teaching and service responsibilities and has recently increased its research stature and visibility. However, the department seems stretched to the limit by its existing responsibilities and does not have the capacity, as things stand now, to undertake new projects or initiatives. Still, we were encouraged to see that the faculty remains optimistic about the future and eager to build on its recent successes. We believe that given appropriate additional investment of resources by the college and university, the department is poised to make a significant increase in rank and reputation.

**2. Recommendations.** The department is in a transitional state. We make a number of recommendations aimed at building on its recent successes, creating the conditions that would make possible a jump to the next level.

**Research.** The department has organized itself into research groups. We refrain from making recommendations about hiring by group or area. Rather we urge the department to incorporate into its strategic planning the following principles: (1) build on existing strengths and strive to preserve excellence, (2) maintain a balance among the different areas of mathematics, and (3) foster and encourage connectivity both within mathematics

and with science and engineering. We believe, given the current faculty size and the current fiscal environment, it is a reasonable goal for the department to sustain, develop or establish the reputation of at least two or three groups of national or international stature over the next 5-10 years.

Currently there is a delicate dependence of the department's research reputation on a handful of faculty of international distinction. Care should be taken to build on the strength and reputation of these individuals, making them a focus of research and graduate program activity. The committee notes that the department's initiative to build in the emerging area of mathematical biology is a good example of how investment in a new area can promote connectivity with research groups across campus and around the country. The committee also strongly endorses the plan to build a center in Algebra, Number Theory and Combinatorics viewing it as a good example of building on strength.

We understand that there is a possible statewide program to "hire the stars" which is being watched closely at the university. We believe the Mathematics Department could attract such a star in one of its areas of strength. Success here would have enormous impact in elevating a national center of strength to a robust international center of excellence.

As was mentioned in the opening section, the opacity of the budget process at the university has negative consequences for the research program, particularly in interdisciplinary areas involving faculty from other departments and colleges. Faculty engaged in successful collaborations seem to have no idea how to gain resources or support to tap external funding to continue their research. Hence, most collaborations are short-lived usually not outlasting a single project. The same is true for larger initiatives that involve several faculty including some from outside the department. The faculty do not understand any mechanism for securing the support necessary to proceed.

**RECOMMENDATION 1:** The administration and the department should work to identify and clarify mechanisms for the support of interdisciplinary research involving faculty from other departments or colleges.

**RECOMMENDATION 2:** The department should work with the administration to make the Mathematical Sciences Committee an effective forum for fostering interdisciplinary research across the university, developing new educational opportunities for students in the mathematical sciences, and resolving the current budgetary conundrum.

**Faculty.** **RECOMMENDATION 3:** The administration should work to balance better the departmental workload, both existing and that connected with new initiatives, with departmental resources.

After its review, the committee concluded that the time and energy of the faculty are already fully committed and little, if anything, is being done that is of low priority for a mathematics department in a land-grant university aspiring to top rank. However, the committee believes that there are research and education projects that the department

wants and ought to undertake. Examples are an Honors program, and courses requested by other departments and colleges for their programs, both undergraduate and graduate. Moreover, faculty numbers seem small when compared with those at the reviewers' universities. While the appropriate size for the department depends on a number of factors, we believe the current size is inadequate if growth in the mathematical sciences in both the research and educational programs, is to be centered in the Mathematics Department.

**RECOMMENDATION 4:** The administration should work with the department to address the most egregious instances of faculty salary compression and salaries out-of-line with those in peer departments.

Given the financial environment of the university over the last few years, it is not surprising that there is serious compression of faculty salaries in the department. If one doesn't offer a competitive starting salary, then the department would be unable to hire the quality individuals it has. However, when starting faculty and postdocs make as much or more than some of the young "stars-to-be," then the university risks losing the very people on whom its future reputation rests. The same is true for faculty whose current salaries are way below their market value. Although the committee greatly admires the collegiality with which the department approaches decisions, it will need to become more aggressive in seeking salary adjustments if it wants to retain some of the strong middle-level people it has hired during the past decade. Finally, the committee was led to believe that mechanisms exist at the college level for addressing such salary matters on a differential basis.

**Postdocs.** **RECOMMENDATION 5:** We encourage the administration to continue and to grow the Thompson Postdoctoral Program, increasing from six a year, or two new three-year appointments a year, to nine and then twelve a year.

One of the challenges in a mathematics department is keeping up with new developments and fostering an environment that encourages the faculty to stay active in research, to direct graduate students and to convey enthusiasm as well as knowledge to undergraduates. While it is critical that new regular faculty be hired, their numbers are often insufficient for all these purposes. Most large departments supplement new tenure-track faculty with a corps of postdocs.

The teaching capacity of additional Thompson postdocs can be used to differentially lower the teaching loads of research active faculty or faculty engaged in important curriculum or grant development activities. This recommendation is made on the assumption that funding for the program comes from the college and does not detract from current plans to hire tenured or tenure track faculty.

Also, while a postdoctoral program may seem to be expensive, it is less expensive than hiring the corresponding number of permanent faculty. In addition, the time commitment to a postdoc of three years is significantly less than the time commitment to a tenured faculty member, giving the department and the college useful flexibility. On the other

hand, postdocs in mathematics teach an amount comparable to a regular faculty member. At a minimum, we urge the college to permanently fund the Thompson program at some level to be agreed upon. In this way, Thompson positions can be filled regularly and predictably without the uncertainties and damage to the department's reputation that the recent lack of funding inflicted. Put positively, as alumni of the Thompson program take up positions in the national mathematics community, the department's reputation as a trainer and supplier of future faculty is established and its visibility as a research department is enhanced.

**Graduate Program.** RECOMMENDATION 6: The department and college work together to determine a size for the graduate program appropriate to meet the department's research and teaching needs and then fully fund the program at that level.

On balance, the graduate program seems to be in good shape. The students are in good humor and are enthusiastic about the program. We were concerned, however, that the department have the flexibility and budget authority both to recruit incoming classes of students and to retain present students so that the graduate program is maintained at least at its current level. This entails the college agreeing to backstop the department during the hiring season and not cut back funds for the graduate program from agreed upon levels.

Stable funding encourages aggressive recruiting, continuity in the size of annual cohorts of graduate students, and coherence in the program. However, good recruiting is useless if students are not retained. The current stipends are adequate but not exceptional; and the current level of benefits, particularly health benefits, is non-competitive. We were told that an improved benefit package is now under discussion, which would be a positive development, but we caution that stipend level should not be ignored either. One way to enhance the flexibility and attraction of the program is to increase the number and types of fellowships available. At present, there are only a few fellowships, those that exist being long term and rigidly established. Faculty should also be encouraged to ask for graduate student funding in grant proposals. In our conversations with graduate students, other "quality of life" difficulties were mentioned. Office space is in some cases cramped, and computer facilities are not good. Addressing space problems is difficult, but good quality equipment is relatively inexpensive. While the work load for graduate students appears reasonable, additional grading support (in the form of undergraduates) would allow more effective and creative use of graduate students' time.

In the present reporting period, the size of the graduate program increased, bringing it closer to a size consistent with a large public research university. Correspondingly the rate of doctorates produced increased to an appropriate level for mathematics. Further increase would be desirable in the push to become a Group I department. Placement of graduating PhD's has been good, with a healthy mixture of academic and industrial placement. Several recent graduates have tenure stream or postdoctoral appointments in research universities. Others have tenure stream appointments at institutions that are largely teaching oriented. There are graduates working in government at NSA and Fannie Mae and others in financial and engineering positions.

**Undergraduate Program.** RECOMMENDATION 7: The department should think carefully about steps it could take to build community among its undergraduate majors. Important steps include introducing a research experience program for undergraduates, improving mentoring and advising, creating an undergraduate student lounge, and establishing an undergraduate math club endowed with a modest budget and the authority to promote social and scientific events.

These steps have modest costs attached to them but will have a strong and invigorating effect on students.

The committee was impressed by the quality and enthusiasm of the undergraduate mathematics majors. The only consistent complaint that we heard was of a “lack of community” among the students. Unlike many peer institutions, the University of Florida does not have an Honors program in mathematics and the department should consider developing one. An Honors program ensures that beginning students meet other students with similar interests. An Honors program also allows early mentoring of interested students by professors. Establishing an Honors program will necessitate the creation of advanced undergraduate level courses appropriate for an Honors track.

RECOMMENDATION 8: The department should develop, in conjunction with the lecturers, a plan for greater faculty oversight of and involvement in this important part of the department’s educational mission.

The committee was impressed by the quality and quantity of calculus and pre-calculus instruction carried out by the cadre of lecturers. We are concerned, however, that to a great extent they are working independently of the faculty. The lecturers, on whom the department relies heavily to deliver instruction at the freshman and sophomore levels, deserve stronger support from the department as well as deeper involvement with and greater respect of the faculty. This is especially appropriate when one considers the extent to which they have taken over faculty responsibilities for curriculum development and course coordination.

It seems likely that over-reliance on lecturers to deliver instruction is at least in part due to the department’s strained fiscal, faculty, and space resources. However, we recommend some steps be taken to remediate lecturer salaries. The lecturers are over-worked and under-paid in an environment where there are no opportunities for the kinds of reflection, professional development and validation that are necessary for the service teaching mission to maintain its freshness and vitality.

RECOMMENDATION 9: The department should take the initiative to establish appropriate lines of communication with other departments and colleges, perhaps in the form of liaison committees.

As noted above in section 1, the department is seen in a mixed light by client departments across campus. This seems largely due to a lack of channels of communication with

partners and colleagues in engineering, business and education. Liaison committees would allow the department not only to follow up on the inevitable teaching complaints, but also to communicate teaching compliments, steer curriculum development projects, and exchange information.

**Staff, space and infrastructure.** RECOMMENDATION 10: The department should consider additional staff positions to provide support to the department's operation.

RECOMMENDATION 11: The salary compression we noted in faculty and lecturers is also present in the staff and some steps should be taken to remediate staff salaries.

The committee was struck by the degree to which the department's staff struggled with large workloads and difficult conditions. In recent years, the staff has supported 5-6 conferences per year, increased paperwork related to HR, graduate recruitment, and grants, and covering the work left undone by unfilled staff positions all without corresponding increases in personnel. Also the staff has remained constant in size while undergraduate enrollments, and hence workloads, have increased. Our impression was that virtually all the staff's time and energy is expended just keeping the department's head above water and putting out fires (to mix metaphors). Some additional capacity is clearly needed as the staff are currently working nights and weekends just to maintain the status quo.

Currently there is one FTE staff member providing computer support to the entire department. Unless there is some central or college level computer support that we are not aware of, this seems inadequate for the needs of a department of this size and certainly, is less computer support than is common in peer institutions. Computing needs in mathematics are comparable to those in the sciences and engineering. However, mathematics departments typically do not have access to grant sources that support computing staff that those disciplines enjoy and this puts additional stress on department budgets.

RECOMMENDATION 12: The department should develop in cooperation with the college a space plan to adequately house the department.

The quality of the department's space seems adequate but the quantity is not. For example, office space for graduate students seems cramped by comparison with peer institutions. Many faculty/lecturer offices are quite small – less than 100 square feet in some cases and typically staff members share offices. If the department is to expand its capacity for research, curriculum development, and its graduate and postdoctoral programs, then additional contiguous space will be required.

**3. Summary.** The Mathematics Department has enjoyed a recent increase in visibility, based on the quality of its research programs, special years and named colloquia. The committee feels very strongly that the department has used college investments in these programs effectively and demonstrated that it is capable of using future investments to equally good effect. The department has appropriately ambitious goals for continued

increase in rank and reputation and we strongly encourage the department to work in collaboration with the college and university to achieve those goals.