

Minutes *

**Senate Research Committee
Monday, January 24, 2011
2:15 - 4:00
238A Morrill Hall**

- Present: Melissa Anderson (chair), Mustafa al'Absi, Breanne Byiers, Margaret Catambay, Anna Clark, Paul Cleary, Marc Dunham, Greg Haugstad, Seung-Ho Joo, Frances Lawrenz, Timothy Mulcahy, Kola Okuyemi, Federico Ponce de Leon, April Rose, LaDora Thompson, Thomas Vaughan, Lynn Zentner
- Absent: Arlene Carney, Jerry Cohen, Donald Dengel, Robin Dittman, Tucker LeBien, Jennifer Linde, Toni Leeth, Karen Williams
- Guests: Vice Provost and Dean Henning Schroeder
- Other: None

[In these minutes: (1) report of the chair; (2) funding graduate students; (3) annual research report]

1. Report of the Chair

Professor Anderson convened the meeting at 2:15 and welcomed everyone back to the new semester. She made several announcements.

- The Office of International Programs (OIP) has announced that the Global Spotlight biennial focus on a region of the world and a pressing global issue is, for 2010-2012, on Latin America and the Caribbean and the issue of the Impact of Urbanization.
- There is a series of listening sessions on the Enterprise Financial System.
- The sessions are not open to everyone but she wanted Committee members to be aware that SIRC (Solutions for Integrate Research Compliance) is pulling together items related to compliance; the company (Key Solutions, Inc.) is developing a system and will be on campus on February 9-11 for meetings. This issue may come back to the Committee.
- There have been discussions at the Faculty Consultative Committee about the *Chronicle of Higher Education* article "Scientists Fault Universities as Favoring Research Over Teaching" and related articles in *Science* and in *Nature*. The Committee could take up the articles as well, if it wishes; Committee members voted unanimously that they wanted the articles on the agenda of an upcoming meeting.
- Professor Anderson welcomed Mr. Dunham, a new graduate-student member of the Committee.

* These minutes reflect discussion and debate at a meeting of a committee of the University of Minnesota Senate; none of the comments, conclusions, or actions reported in these minutes represents the views of, nor are they binding on, the Senate, the Administration, or the Board of Regents.

2. Funding Graduate Students

Professor Anderson now welcomed Vice Provost and Dean Henning Schroeder to discuss the funding of graduate students.

Dean Schroeder explained that there is a task force on funding graduate students currently at work, and it has two goals, one short-term and one long-term. The short-term goal is to deal with the problem that graduate students on federal grants cannot always be funded adequately because of a federal limit (the NIH compensation cap). This cap requires that any graduate-student compensation must be less than the stipend of an entry-level postdoc on the campus. The cap for graduate assistants is set at the stipend limit for post-doctoral candidates with 0 years of experience (currently at \$37,740/year). Graduate assistant compensation includes not only the stipend but also the tuition benefit and health insurance benefit. The result is that there is a shortfall of anywhere from \$0 to about \$11,000/year for a graduate assistant on a 50% appointment. The shortfall is the difference between the NIH compensation cap and the total compensation cost for graduate assistants. The shortfall or gap is growing due to a faster increase in the tuition and health insurance fringe rates than that of the NIH compensation cap. The second goal, linked to the first, is to begin exploring ways of aligning tuition models with educational goals—rather than adapting educational practices to the budget model.

The first two years of the education of Ph.D. students is usually course-heavy; once they have completed their preliminary oral examination, they take thesis credits. They take the thesis credits as quickly as possible so that they become less expensive to support/fund, because of a much lower tuition fringe rate, and therefore more attractive to be supported on NIH-funded grants. Is that approach the best for graduate education? Dean Schroeder suggested it would be better for graduate students to enter a program and begin doing research early, and take coursework along with the research and as needed. They would then get an early taste of what it means to do research (and might drop out when they find out it is not for them), and they would have greater flexibility in taking courses. The task force has run a model of a five-year student and evened out the tuition fringe rate over five years, rather than the high tuition fringe rate in the first two to three years (making the student very expensive for grant purposes and the expense for whom runs over the NIH cap). Evening out the costs to support graduate assistants would provide a temporary solution to the problem of them being so expensive in the beginning and less expensive at the end of their graduate-student careers. The task force will talk about this idea in more detail at its next meeting.

They have looked at a number of peer institutions that use flat-rate tuition pricing for Ph.D. students, Dean Schroeder related (e.g., Washington, Berkeley, Cornell, Duke, and Texas-Austin). Graduate students are charged by the semester or year a fee that includes tuition; the students can take courses whenever they wish, and it allows for entering graduate students who are research-ready to begin doing research right away. At the University of Minnesota, the budget model creates an incentive for departments to have students to take as many courses as possible. The other institutions also give credit to faculty for one-on-one interactions with students, or small group tutorials, or independent study, the University only counts courses that have a minimum of 5 or 10 students (as an example) and none of the other interactions. The question is how to measure advising and other faculty interactions with students that occur outside of classes.

The task force will have a preliminary report at the end of March and a final report by the end of the academic year.

Professor Clark observed that the humanities have a different model. In order to teach, graduate students first have to learn a great deal, so they have to take quite a few courses, and they are not usually research-ready. Dean Schroeder said that the NIH cap applies to students on grants and that he knows the humanities are different. He reported that he has had discussions with humanities departments about why Ph.D. students cannot start research earlier; there are models, he said, where students in the humanities are visible in their field before they have three years of classes. They may not have publications but they might present a paper at a conference, for example. There are ways for students to be in a scholarly mode early in their program so they can weave independent thinking and instruction together.

Teaching is still a problem, Professor Clark responded. They do not want first-year graduate students, effectively with only an undergraduate education, teaching undergraduates. They must have the information, and it takes them awhile to acquire it. Dean Schroeder agreed but asked if the students must take courses. If the question is getting facts to the students, there are ways to do so beyond courses and lectures. There are hybrid models that programs need to look at. He has an upcoming meeting with the deans to identify a mechanism to allocate money to graduate programs, so they need measures of good graduate programs. In his view, good graduate programs make students visible early and they quickly get students out of the undergraduate mode of learning. Professor Clark agreed that one-on-one teaching is a great approach.

Dean Schroeder's view makes sense, Ms. Catambay said, because students are starting to do research in high school and there are undergraduate research programs (e.g., UROP). The current practice could set graduate students back if they do not start with research. Dean Schroeder recalled seeing in one department a bulletin board for undergraduates on how to do research, and the first bullet on the list advised students to stop thinking that they do not know enough to do research.

Professor Anderson said it is important to consider the impact of the budget model if charges are a fixed amount: Students in the sciences take about four years to a Ph.D. while students in the humanities may take ten years. The humanities students would pay a lot more. Dean Schroeder said they would look at the cost of the degree and divide it over the number of years it takes to get a degree, so the charges might not be the same in every field. There could be two tiers of graduate tuition, for example, which would be one way to address those needs.

Dean Schroeder related that he was at a meeting of the AAU graduate deans, and dean from Stony Brook compared costs of graduate programs in the United States and Europe; his point was that U.S. programs are more expensive and have long times to degree because, in many cases, Ph.D. students are required to take or re-take courses even if they enter at a master's level. There should be more of a continuum and better coordination as well as financial incentives for students to finish earlier and still develop the skills and get the training they need.

Professor Cleary asked if the idea is dollar-neutral for the student or for the person/agency paying. Dean Schroeder took the example of the five-year student, who might be a research assistant for five years and would incur three years of the high-tuition fringe rate and two years of a low-tuition fringe rate. The total cost would be about \$190,000 (which includes health insurance). The annual package cost is about the same as the NIH cap if one divides \$190,000 by 5 years. He said he could not provide any additional details pending further discussion by the task force. Professor Cleary said he asked the question because he has seen, over the last 15 years, a tremendous increase in cost of hiring graduate

students; most assistant professors now can afford only one student instead of three, as was the case in years past. This cost increase has had a detrimental effect on graduate education—and it isn't tuition, it's the other costs. Dean Schroeder agreed that it is the fringe-benefit costs that have gone up and reported that the task force will have data from other institutions and will focus on all aspects of funding graduate students. They can use the tuition element to model curricular changes; fringe benefits are a separate discussion. He agreed that it is more attractive to hire postdocs in a number of areas because they are cheaper, but a graduate student may be in a program longer than a postdoc will be around.

Dean Ponce de Leon said that with regards to overall graduate student costs the institution only has control over the tuition component and not over all of the fringe benefits. The stipend component of the cost varies with the market while all other costs are fixed and only increase year to year with inflation. The Graduate School is proposing to set a minimum and a maximum number of credits for Ph.D. and M.S. degrees, so this could generate a long list of tuition rates depending on specific program requirements. That is why they are looking at other institutions where flat-rate models circumvent variation in tuition across programs, Dean Schroeder said.

Dr. Lawrenz inquired whether it would be possible to continue to charge costs to an NIH grant if tuition is not linked to fringe benefits. The reason they are linked is so that students could get the benefit and the cost could be charged to grants. She said she was not sure that would work with flat rates; if it is a fee, could NIH say that it will not pay tuition, only the salary? There are other factors that come into play as well, such as time to degree. Dean Schroeder said that tuition was coupled to the stipend and fringe benefits for that reason; could they be uncoupled? Dr. Lawrenz agreed that that is the question but expressed concern that it might not be possible for them to be uncoupled.

Dean Schroeder said that are two aspects to flat-rate tuition at other institutions. It is a way to remedy the NIH-cap problem and it provides flexibility to align educational goals with the budget model. Flat fees get rid of the incentive to put students in courses to generate revenue; students can take courses if they need them, and there is an obligation on the faculty doing the advising to provide what is needed.

Professor Anderson asked two questions. First, what about part-time students? With flat-rate tuition, how would one tell if students are doing early-career research or just doing nothing (that is, attending on a part-time basis)? Also, the current budget model pays departments on the basis of courses taught, with some of the money going to the student's department and some to the department that teaches the course. With a flat-rate tuition system not tied to course-taking, how would departments get money for teaching students outside the department? A part-time student would be the responsibility of the adviser, Dean Schroeder suggested. Could the student do nothing? Professor Anderson said there are students who take perhaps two courses per year—and that is all they intend to do. The problem may be that the advisor is not expecting any scholarly activity, Dean Schroeder said. Professor Anderson reported that some of the faculty in her department have 30 doctoral students, most of whom work full time. Dean Schroeder said that Minnesota is not the same as institutions with flat-rate tuition, so it will be necessary to see what works here, but he likes a model that gets students out of the undergraduate mode of learning quickly. Graduate students, Ph.D. students in particular, can and should take charge of their education, since they no longer receive all the information they need in textbooks or classes.

Dr. Lawrenz took exception to Dean Schroeder's characterization, saying that it conflates an undergraduate mode with taking courses. She said that she teaches courses that are NOT undergraduate, and courses can be structured for graduate work. Dean Schroeder's comments make it sound like taking a

course is like being an undergraduate. Dean Schroeder said his comments are not about the nature or level of the course or about taking courses at all but rather about providing flexibility in the course requirements for graduate students based on their existing knowledge and skill set as incoming students. A more flexible scheme of coursework and instruction that uncouples tuition from the amount of credits may also help solving the NIH question. There are ways to do a research tutorial and count it in a faculty member's workload; identifying a way to count it could foster those interactions. It is possible to foster research work and also take courses, Dr. Lawrenz responded. Professor Clark agreed that the courses in her department ARE graduate courses.

Professor Clark expressed concern about the six-year problem. Her department funds students for five years but not after; it typically takes at least six or seven years to complete a Ph.D. Currently, sixth year students can enroll for a one-credit option or Grad 999, which is quite cheap. If, under the new proposal, students are required to pay the same tuition in the sixth and seventh years as in the first year, this will cost them (the students) much more, and they may drop out and not finish. Dean Schroeder said he was not saying the limits would be the same in the humanities as they are in the sciences.

Dean Ponce de Leon said that a student could pay in two years or in six, and the average cost per course should go down across six years. Dean Schroeder agreed that if the University stayed with a credit model and the tuition fringe rate does not fluctuate so widely between the two rates, it is evened out. Which would be independent of when a student takes a course. If the University were to go in that direction, there must be a provision for the transition.

Professor Thompson asked if they had considered Training Grants (e.g., NIH T32s). In a training grant from NIH, the grant receives 60% of the tuition and fees costs for the predoctoral fellows. Currently the dollars are received as a bulk allotment based on students needing full tuition reimbursement no matter which year of study they are in. Last, it is possible for the PI of the training grant to use his/her discretion when spending the tuition and fees. The question is whether the proposed model will decrease the amount of dollars that are requested from the agency, especially if later years of training require less.

Dean Ponce de Leon said what will happen is that high tuition for the first years will be reduced by spreading the total cost across years.

Professor Anderson thanked Dean Schroeder for his report.

3. Annual Research Report

Professor Anderson turned now to Vice President Mulcahy to present to the Committee the report he provides annually to the Board of Regents.

By Board of Regents' policy, Dr. Mulcahy related, he is expected to make an annual report to the Board on the state of research at the University. He distributed copies of a set of slides containing the information he spoke about, and began with sponsored awards in 2010. He commented that there are three numbers that are most commonly talked about when it comes to institutions and research: Awards (the dollar amount agencies provide to the university), sponsored expenditures, and NSF R&D data.

The dollar amount of awards increased by 36% over 2009, to \$823 million, the largest increase in volume the University has ever captured, Dr. Mulcahy reported. In the ten-year trend, it is apparent that 2009 was a low point, but the awards nonetheless increased to a level above that of 2008—which had been the year with the highest dollar amount of awards in the ten-year period.

Of the awards in 2009, \$691 million were "regular" awards, a 23% increase over the previous year; when the federal stimulus funds are included, the total rises to \$823 million and the 36% increase. The University's faculty filed 963 applications for stimulus funding and has received 348 awards to date for a total of \$208 million (for both years of stimulus funding). That represents tremendous faculty productivity, Dr. Mulcahy said: Nearly 1000 additional grant applications, an increase of nearly one-third that was handled by Sponsored Projects Administration (SPA) without additional support, and sometimes handled very quickly. Dr. Mulcahy offered high praise to both the faculty and to the staff in SPA.

Sponsored expenditures totaled \$654 million in 2010, a 6.5% increase over the preceding year. The NSF is required by law to report all research expenditures by universities (NOT just NSF-funded spending). Dr. Mulcahy explained that these numbers carry great weight; while institutions may have many ways to define research, NSF uses a common definition, so the NSF data compares apples to apples. Right or wrong, the NSF data are the one research statistic that research universities rely on to evaluate themselves. (The NSF uses slightly different definitions than the University does to track research expenditures, but the two numbers track together and are proportional.) The NSF R&D data for 2009 (the most recent year available) show the University of Minnesota spending \$741 million, an 8.5% increase over the previous year—which is a significant increase, Dr. Mulcahy commented.

Dr. Mulcahy next noted the 10-year trend for the University in NSF R&D expenditures; the bar graph has ever-higher bars. The RATE of increase has improved since 2005. In terms of comparisons with peers, the University ranks 10th among all universities and 8th among public universities in research funding. With the increase in the RATE of spending came an increase in rank since 2005, up from 10th among public institutions. This is an important and useful metric used by many, Dr. Mulcahy said, and demonstrates pretty significant accomplishments by University faculty, but it only measures the dollars spent, not the impact.

Professor Cleary said it would be nice to see the metric divided by the number of PIs at an institution. That has been done, Dr. Mulcahy said, but the results are reminiscent of Mark Twain's comment that there are lies, damn lies, and statistics, because it is not easy to define an FTE in research. One institution might be heavily focused on the liberal arts and not expected to receive large amounts of external research funding, so the FTEs would not be equivalent with another institution that focused more on research. Some institutions do not have a medical school or a school of agriculture, so it is difficult to make direct comparisons. The most important use of the data, he concluded, is for the University to measure its own progress.

Dr. Mulcahy looked next at growth in R&D expenditures from 2005-2009. The University, according to the NSF data, has seen a 41% increase since 2004, which is the third-largest increase among the top-20 research universities, the second-largest growth rate among the public institution (only UNC-Chapel Hill grew faster), and 150% of the average growth rate among all top-20 research universities.

Another measure of research, to go from dollars to impact, is citation frequency, Dr. Mulcahy said, and on that score, Minnesota is in the top 10 among public research universities in 14 of the 20

fields included in "Essential Science Indicators." The numbers would change dramatically if the private institutions were included.

Dr. Mulcahy reported on technology commercialization. Disclosures were up 8% in 2010, new license agreements were up 50%, revenue-generating agreements were up 30%, and eight start-ups were launched. There is growing state and federal expectation that universities will translate their research into commercial products. The University overhauled the Office of Technology Commercialization about four years ago, Dr. Mulcahy recalled, and by the normal measures of accomplishment the Office is doing well. There are some who question whether the University should be engaged in this kind of activity and suggest that it does not benefit the University as a whole (e.g., not the humanities). Nothing could be further from the truth, he maintained. One-third of the revenue goes to an inventor, one-third to the department and college, and one-third to the Office of the Vice President for Research to support commercialization activities and to invest on the campuses to support research.

Over the last five years, technology-transfer revenue has been a valuable asset for the University, Dr. Mulcahy said. The money has been invested as follows (in millions of dollars):

54.1 fellowships, 21st Century endowment

21.0 academic research support (grant-in-aid, Imagine Fund, research investments, coordinate campuses)

29.0 investments in the research infrastructure (Infrastructure Investment Initiative or I3, informatics, NMR facility relocation)

The fellowships and endowment are used for students across the University. The research investments include small grants as well as a lot of matching and equipment dollars. The I3 includes \$3 million to the Minnesota Supercomputer Institute to double its computing power, putting the University back among the top research universities in this field. These are the ways in which most of the University's one-third of the revenue has been spent. This has been, Dr. Mulcahy concluded, a very valuable resource for the University. There is very little state investment in the research infrastructure and these funds have made a significant contribution to the University's margin of excellence.

The policy does provide a lot of money for the faculty member/inventor, but the University's policy is in the mainstream when compared to similar policies at peer institutions. The idea is to motivate people to be creative, and if an invention generates a lot of profit, why should not the inventor receive some of that revenue?

Professor Cleary said it would be helpful for the Committee to see the data normalized by total revenues and amounts taken for commercialization activities. The Committee "needs to know how efficient you guys are" and be informed about the increased costs of commercialization. Dr. Mulcahy said that he has provided that information to the Committee in the past and can do so again. He noted that the Faculty Senate had voted overwhelmingly in favor of a change in the policy that provides 15% of the royalties to the Office of Technology Commercialization, to support its efforts, and the remainder divided as before. That 15% "fee" covers the cost of patents and helps finance the office. The previous arrangements only covered out-of-pocket costs to the University, and it didn't matter too much with a blockbuster revenue producer (Ziagen), that revenue will be decreasing, so they need to be sure they can maintain the activities of the office. They looked to see how other institutions do it and adapted the mainstream practices to the University. When the University works to patent and license technology, it holds all the risk; if it works, the gain exceeds the cost and everyone receives a share of the revenue. The

majority do not generate more than it costs to patent and license them, however, so the University pays. There are cases where nothing is sold, but the University still bears all the cost.

Professor Cleary inquired what happens when the revenues from the 15% are not sufficient to cover the costs of the Office of Technology Commercialization. If it cannot pay for itself, it will need to be reduced, Dr. Mulcahy said, but he would find it difficult to cut the office when the state and federal governments want to see how universities are commercializing their research. That would not be wise. They will be financially responsible, but if the effort does not work, it will have to be cut back.

Professor Vaughan said he wondered about the incentives to start a company; have they changed? They are working with the conflict-of-interest committees to respect the need for technology commercialization while also managing conflicts, Dr. Mulcahy responded. He noted that when the tenure code was changed in 2007, language was added to include technology commercialization as an activity that should be recognized for promotion, tenure, and merit. They have also set up an innovation fund, \$1 million per year for five years, that the Office of Technology Commercialization can invest in faculty-developed technologies in order to take them from paper to potential license (often it is early-stage research that just needs a few more dollars to make it attractive for licensing).

Do they encourage inventors to stay in a leadership role, Professor Vaughan asked? They are talking with the conflict-of-interest committees about that question, Dr. Mulcahy said.

Professor Anderson observed that the 15% of royalty revenues does not cover all the expenses of the Office of Technology Commercialization.

Professor Joo asked which units are the most successful in commercializing intellectual property. Dr. Mulcahy said the Medical School, engineering, and CFANS.

Dr. Mulcahy returned to the subject of impact. While he provides data to the Board of Regents, he emphasizes the need to think about impact. There is, however, no single measure of impact, so he provides examples, and provided a list of six such examples.

The keys to success are the creativity, productive, and competitiveness of the faculty, supported by strategic planning and decision-making, Dr. Mulcahy said. The latter includes setting priorities (that are critical to the mission, align with the strategic plan, and reflect a comparative advantage), the alignment of resources with priorities, prudent resource management, assessment of outcomes, and review, refinement, and reinvestment. Dr. Mulcahy provided an example of how that approach works with respect to interdisciplinary research. He reviewed what the University has done since 2005 and the 2010 assessment of effectiveness; in this case, \$2 million in investments yielded \$17 million in new interdisciplinary grants and another \$6 million pending review; it also led to 200 performances and 3 large commissioned works.

Dr. Mulcahy concluded his report to the Regents, and to the Committee, with this statement: "The notable accomplishments summarized in this report provide indisputable evidence that the University has not only retained a position among the elite research universities in the country, it has improved its standings among this esteemed cohort. Despite the many challenges, the research enterprise remains healthy and productive."

Professor Cleary noted that the Obama administration has started reviewing every department for efficiency and is asking for views of stakeholders. Presumably NSF and NIH will be included in that review; does the University have someone who will provide its views to NIH- and NSF-mandated regulations? It does, Dr. Mulcahy said, through its federal representatives. There are things on the horizon that may require a response from the University. (1) The federal stimulus bill called for a great deal of accountability and universities were asked to increase reporting about the use of the funds. The federal government has never seen a regulatory burden it did not like, so has decided to generalize from the stimulus funds to requiring a similar accountability for the use of all federal funds (jobs, companies started, etc.). That will force a lot more reporting from the institutions. The Obama administration is interested in productivity. (2) There is a change in the landscape in Washington, with calls for federal funding to be reduced to their 2008 levels. That is a huge problem for universities. But Dr. Mulcahy said he was more concerned about many comments in some quarters questioning the value of social-science research, so there is a call out for key impact research in the social sciences. There is a move in Congress to dramatically cut social-science and NSF funding. Even worse, it could take things one step further, with a call to the public to notify Congress when people identify grants they believe are ridiculous; Congress could "un-fund" grants. The whole research landscape at the national level is in trouble, in his opinion, Dr. Mulcahy said.

Professor Anderson thanked Dr. Mulcahy for a great report.

One positive point, Dr. Mulcahy added, if it happens: There may be an executive order from the White House directing all government agencies to review and get rid of policies that increase inefficiencies. He said he hopes that trickles down to universities. He has made statements about risk management and asked all units to review policies and procedures to get rid of what is not needed to try to reduce the burden on faculty members.

Professor Anderson adjourned the meeting at 3:50.

-- Gary Engstrand

University of Minnesota