

**ACADEMIC COUNCIL MEETING
UNIVERSITY OF NOTRE DAME
MEETING OF JANUARY 24, 2007**

Members Present: Rev. John I. Jenkins, C.S.C., Dennis Jacobs, Jean Ann Linney, Panos Antsaklis, Seth Brown, Steven Buechler, Austin Collins, James Collins, Tom Cosimano, Mary Rose D'Angelo, Neil Delaney, Stephen Fallon, Nicole Garnett, Nasir Ghiaseddin, Michael Jenuwine, Tara Johnson, Kelly Jordan, Joseph Marino, James McAdams, Jim Merz, Stephen Molvarec, Patrick Murren, Robert Nelson, Patricia O'Hara, Hugh Page, Ram Ramanan, Valerie Sayers, Scott Van Jacob, Jennifer Warlick, Jennifer Younger

Members Absent: Brian Claassen, Chris Harris, Tom Lamontagne, Susan Guise Sheridan, Richard Taylor, Bill Westfall

Members Excused: Thomas G. Burish, John Affleck-Graves, Chris Maziar, Rev. Mark Poorman, C.S.C., Don Pope-Davis, Charles Barber, Ken DeBoer, Umesh Garg, Graham Hammill, Colin Jessop, Michael Lykoudis, Mark Roche, Maura Ryan, Carolyn Woo

Observers Present: Kevin Barry, Mary Hendriksen, Harold Pace, Dan Saracino, Dennis Brown, Greg Sterling

Observers Absent: Capt. Mike Neller

Observers Excused: Brandon Roach, Don Wycliff

Guests: Stephen Batill, Professor, Dept. Chair, Aerospace and Mechanical Engineering

The Revered John Jenkins, CSC opened the meeting at 3:05 p.m. Prof. Garnett offered a prayer.

1. Minutes of the meeting of November 2, 2006: The minutes of the meeting of November 2, 2006, were approved without change.

2. Proposal for a Ph.D. in Bioengineering: Fr. Jenkins explained that the proposal for a Ph.D. in bioengineering was first approved by the Graduate Council in 2006, and then was sent to the Executive Committee of the Academic Council. The Executive Committee had a number of questions related to the anticipated size of the program,

resources, collaborations with the College of Science, and positioning within the College and the broader field of bioengineering. Following review of written responses from the College of Engineering, the Executive Committee voted to recommend approval of the proposal at its last meeting. Fr. Jenkins asked the interim dean of the College of Engineering, Prof. James Merz, to provide a fuller explanation of the proposal.

Prof. Merz first introduced Stephen Batill, professor and chair of aerospace and mechanical engineering, and Mark McCready, professor and chair of chemical and biomolecular engineering, and described both as the “authors” of the bioengineering proposal.

Prof. Merz then made some general remarks on the proposal, focusing on the importance of approval of this new degree to the College of Engineering. Bioengineering will eventually be a major program at the University, he said. Almost every college of engineering in the country has a program in either bioengineering or biomedical engineering. Notre Dame has a small program already, although it is not currently possible to earn a Ph.D. in bioengineering here. There are five faculty members working on bioengineering at Notre Dame—all with a particular focus on orthopedics. The students of these faculty members now graduate with a degree in aerospace and mechanical engineering. About 15 per cent of the Engineering faculty do research in some form of bioengineering, and there are ongoing, very promising discussions with faculty in the College of Science about collaborations and research activities. One example is the discussions occurring between Frank Collins, professor of biological sciences and director of Notre Dame’s Center for Global Health and Infectious Diseases,

and Engineering's computer science department about establishing a bioinformatics or computational biology program.

Prof. Merz explained that expectations for the proposed bioengineering degree are for it to:

- raise the profile of research in bioengineering as well as in the College of Engineering in general;
- improve the ability of the College to recruit graduate students and additional faculty in bioengineering;
- enhance opportunities in the College for funding; and
- serve as a catalyst for collaborations between Notre Dame's Colleges of Engineering and Science as well as between those colleges and the Indiana University Medical School in South Bend;

Prof. Merz then explained (and as set forth in more detail at pages 5-6 of the attachment) that all students admitted to the graduate program in bioengineering would have "dual citizenship." That is, while they would be members of the bioengineering program, they would also be members of one of the College's existing five departments. In fact, their "home base" would *be* one of the departments. Under this structure, he said, departments can provide administrative and financial support to students and remove the pressure for such support from the fledgling program. He added that the College has committed well over \$175,000 to launching the bioengineering program.

After informing Council members that Prof. McCready has agreed to serve as the first director of the bioengineering program, Prof. Merz went on to describe curriculum for the proposed degree, which would include courses in engineering, science,

bioscience, and bioengineering. Faculty in all five College of Engineering departments will teach and research in the program.

As for the impact and distinctiveness of the program, Prof. Merz expanded on his earlier statements on orthopedics. With three of the four or five major orthopedics companies in the world located in Warsaw, about one hour away from the Notre Dame campus, Indiana has assumed a position as the capital of the orthopedics world. Notre Dame has a strong interaction already with those companies. In fact, he spent last Friday at Purdue University talking about ways the state can build on its existing strength in orthopedics. He and others were asked at that time if the proposed doctoral program in bioengineering could come to be recognized as the best in the country. Their answer was that this is most definitely their hope. While Notre Dame would be starting small, the intent from the beginning is to construct a first-class program. There is already considerable talent at Notre Dame and some six million dollars in funding. Even without the benefit of a formal program, three orthopedics graduate students have already gone on to secure strong post-doctoral positions after leaving the University.

The bottom line, Prof. Merz declared, is that the absence of a Ph.D. degree in bioengineering could have a very negative impact on the College of Engineering. Not to have such a degree removes the opportunity for Notre Dame to achieve the same presence in this field as nearly every other college of engineering in the country. While there are still details in the proposal to be worked out—for example, the amount of start-up funding for publicity and seminar speakers that is expected from the Graduate School—it is a program that has been constructed with thought and care. Initially, support for the program comes from the Graduate School, but ultimately, primary support

is to come through research and extramural research support. The Graduate School would contribute on a one-to-two matching program. Prof. Merz concluded by strongly encouraging Academic Council members to approve the proposed degree program.

Prof. Brown asked for clarification: Is there currently *any* formal program in bioengineering at Notre Dame?

Prof. McCready answered that, now, the University has no formal program called “bio-engineering.” While there is considerable research activity that falls under the heading “bioengineering,” no University program exists at the Ph.D. level that takes that name.

Then, asked Prof. Brown, is it possible to imagine that a program in bioengineering could exist *without* a degree by that name—in other words, by way of a number of interdisciplinary programs that do not grant a degree?

Prof. Merz answered that while it is possible to imagine such a scenario, one could not imagine it being successful. Engineering is now attempting to hire very senior people in the field of bioengineering. If there is no bioengineering Ph.D., they are unlikely to join the University. The College is committing resources to the field already, but if students cannot walk away with a “Ph.D. in bioengineering,” he simply cannot believe that bioengineering could, in fact, grow to be anything significant here.

Prof. McCready clarified that a doctor of philosophy degree in bioengineering is a very standard degree throughout the country. Notre Dame is not creating a new degree by that title. The subject title “bioengineering” in the doctor of philosophy degree is a distinction that is truly important for students.

Prof. Batill added that research groups in bioengineering are typically very highly multidisciplinary. In the case of orthopedics, teams will have some members whose work is very much oriented towards biology—for example, because of their work with tissue—and others who would be considered almost classical solid mechanicians. This is true for a professor such as Glen Niebur, who is currently housed in the campus multidisciplinary research lab and has a number of NIH grants related to orthopedics. In his lab, while some students are earning a Ph.D. in aerospace and mechanical engineering, in order to build an appropriate research group that can span the disciplines and compete for funding within the National Institutes of Health, other students will want a degree called “bioengineering.” Thus, it is the ability for the College to provide *both* of those credentials in the context of an interdisciplinary program that is important.

While first thanking the proposal’s authors for considering the state of the library resources in the field of bioengineering, Dr. Younger acknowledged that current resources would not support the needs of new faculty in this area. This is usually the case, of course, any time a program is expanded. She supported the approach of using the library of the Indiana University School of Medicine to support the program because it makes good use of their resources, particularly in Notre Dame’s allied programs. Yet, it is also important, Dr. Younger said, to look at the research needs of faculty and students who do *not* have access to the medical library. She is not as confident as the proposal’s authors in the belief that there will be no demand on library resources at Notre Dame. While she does not want to delay the program, she simply asks that, down the road, the College of Engineering agree to work with the Library.

Prof. Merz said Dr. Younger’s remarks are well taken. The Library faces

a dilemma whenever a new program comes along, and the faculty can often overlook the fact that new programs put very real demands on it. He is sure that Engineering will be able to work with the Library and ensure that the new program is not jeopardizing library allocations. Faculty and students in the program will have access to considerable resources elsewhere.

Prof. Buechler asked about the structure of the program, particularly Prof. Merz's statement that students will have two "homes"—one within the bioengineering program and one in another academic department. He asked how this compares to other programs across the country.

Prof. Batill said that the structure proposed for Notre Dame may be somewhat different than those used elsewhere; but because of the administrative support the various Engineering departments can offer, it offers the most efficient way to get the program running. If more resources were available, perhaps an alternate structure would work; however, because the College is starting with finite numbers and the intent is to avoid students losing a departmental affiliation, the College has chosen the dual-home structure.

Prof. Merz added that many institutions have a department of bioengineering or biomedicine. The world of engineering is most definitely "going bio." He has no doubt that if all the engineers in the room were asked for their opinion, they would say that, some day, it would make sense for there to be a bioengineering or biomedical department at Notre Dame. This program is starting small, though, and at this stage, the dual-home structure is preferable.

Prof. Buechler asked: In terms of requirements for the Ph.D. in coursework and work supplementary to it, how does the proposed program compare to what is in place at other institutions?

Prof. McCready replied that the requirements for the degree proposed for Notre Dame are quite comparable to those of other institutions regarding types of courses, the amount of emphasis on research activities, and administrative structure. A good example would be Berkeley. While it has a biomedical program, it also has a bioengineering program with components similar to that proposed for Notre Dame. At Berkeley, too, faculty build their own research groups by collecting researchers with multidisciplinary interests. Prof. McCready continued that regarding administrative structure, at least three prominent institutions—M.I.T., Georgia Tech, and Berkeley—all have doctoral bioengineering programs that do not reside in a department.

Prof. Batill added that the authors of the proposal scoured the country looking at comparable models. They wanted to preserve the intensity of the coursework found at these institutions; thus, the total number of courses is very similar to that required elsewhere. And, the choices of courses reflects the interdisciplinary nature of biomedical engineering very well—in line with the best of the programs found elsewhere in the country.

Prof. Antsaklis first remarked that it is obvious that the proposal's authors have put much thought and work into constructing a new degree program. He has some concerns, though, that perhaps the venture is too modest. The investment asked of the University is really only a few graduate students and very little money. These resources pale when compared to what is in place at Stanford or Harvard, both of which are

investing hundreds of millions of dollars in their programs. Five years from now, he asked, what can Notre Dame's program hope to achieve? If the goal is simply to manage more effectively what is already undertaken and perhaps provide some visibility for Notre Dame, he thinks it will succeed; but why wait? Why not create a bioengineering *department* right now?

Prof. McCready answered that the total University investment in bioengineering is much more than is represented in this doctoral program. First, we have the new multidisciplinary research building at the University, which cost approximately ten million dollars. Then, the College has two endowed open chairs at the moment—both to be filled requiring additional University investment—each with start-up costs of \$500,000. In addition, a number of junior faculty positions are to follow. Thus, Notre Dame's total investment in bioengineering is substantially more than what is required on paper for this degree program. Initiation of this program is what is needed now to support what we have now. Otherwise, what we have may dwindle.

Prof. Antsaklis questioned if the cost of the new multidisciplinary building should be associated specifically with bioengineering.

Prof. McCready replied that one of the limitations on hiring has been space. When he is recruiting faculty members and brings them through that new building, it plays a critical role in their decision to join the faculty.

Prof. Antsaklis reiterated his full support of the program. His only criticism is that perhaps the vision should have been a bit larger. "Ask for more."

Prof. Merz said that there should be no mistake. The proposal's authors and the College have big plans and big dreams. They are currently trying to attract one of the

leading bioengineering/biomedical academics in the country to Notre Dame.

Conversations have been held between this individual and the College, as well as with the Provost, about what resources would be required for him to come to Notre Dame and build a program. Prof. Merz said he does not want to frighten the administration or the members of the Academic Council, but the program's backers are most definitely *not* thinking modestly. The proposed doctoral program in bioengineering is but one building block in an attempt to put Notre Dame on the map in terms of a substantial program in bioengineering. Quite simply, Notre Dame cannot hope to attract the people it needs in this field if it does *not* offer this degree.

Prof. Sterling, attending today's meeting on behalf of Dean Roche, said that while he was impressed by the proposal, he has two questions: First, when the University thinks about advancing its research agenda as a whole, how does the bioengineering proposal fit in a scale of priorities? That is, if the University invests what is asked in *this* program, which seems to make a good deal of sense, what is given up for the next few years? Is the bioengineering proposal competing against another program contemplated by the Graduate School or the Office of Research? Second, he asked if the program's supporters could be more explicit about the relationship between the College of Engineering and the orthopedic companies in Warsaw. Are the relationships formal or informal? Is it a matter of placing graduates at Medtronic, or Zimmer, or Biomet, or is it more a matter of engaging in collaborative research projects with these companies?

Prof. Merz replied that the relationship with the Warsaw companies is a strong one. In fact, it was clear when he was at Purdue last Friday that Notre Dame has the strongest relationship in the state with the orthopedic companies. The University has

received four to six million dollars of 21st Century funding from the three companies for several of its faculty members; thus, the orthopedic companies are definitely supporting research at Notre Dame. Prof. Merz added that there was serious thought on the part of Zimmer about constructing some sort of a building in the South Bend area to expand its activities—along with ongoing discussions about an innovation park or industrial research park. Had discussions about the park occurring now taken place three or four years ago, there probably would be a Zimmer building in South Bend. Nonetheless, Prof. Merz said, there is keen interest on the part of those companies in continuing interaction with Notre Dame. Yet, he said, Notre Dame does not want to confine itself just to these three companies. Industrial interactions are very important for engineers, but it is also important to receive funding from the National Institutes of Health, the National Science Foundation, and the Department of Defense—all of which Notre Dame has been successful doing. He would like to see more success with that funding, yet, without a doctoral program in bioengineering, it is difficult for others to take Notre Dame seriously about its commitment to the field.

On the subject of how this proposal falls into the general ranking of research priorities at Notre Dame, Prof. Merz said that a doctoral program in bioengineering would be high on the list. Other priorities he might identify would be programs related to energy and the environment—both research activities as well as broad interdisciplinary programs that link engineering with science, and that link science and engineering with theology, philosophy, economics, psychology, and law. Prof. Merz acknowledged that the University is now involved in a search for a vice president for research, and that person may rank priorities differently. He believes, however, that the initiatives he has

named would rank very highly in virtually any person's listing of the overarching interests of the University. They are all areas in which Notre Dame can have a significant impact.

Prof. O'Hara said that because the position of vice president for research is open at the University, she asked a question similar to that raised by Prof. Sterling at the executive committee of the Academic Council. While she does not purport to speak for the Provost [who was unable to attend today's meeting due to illness], she did ask him at that meeting how the proposed degree program fits within the University's overall research direction and the relative allocation of resources. Provost Burish answered her question indicating that he liked the interdisciplinarity of the proposal and the potential it has for faculty recruiting. Given the fact that Engineering had already put up some resources and that the Graduate School was willing to match that funding, it seemed within his mind to fit within the plan and vision for research at Notre Dame.

Prof. Jacobs said that he, too, supported the proposal, which he called long overdue in terms of the investment Notre Dame should be making in this area. One question he has, though, deals with the background and level of proficiency students entering the program are expected to have in biology—specifically, how rapidly they can develop the kinds of skills they need to be effective bioengineers. He noticed in supporting documentation that biology courses are *not* a requirement for entry into the program. Although that is perfectly acceptable, it seems that there should then be some understanding that students will take a number of courses to bring them up to speed. Biology has a very vertical curriculum. It builds up through introductory biology into cell biology, etc. Prof. Jacobs noted that the challenge in this case is not unlike that in

any interdisciplinary program—having enough expertise in the various disciplines to be effective in the cross-disciplinary area.

Prof. McCready responded that the proposal's authors discussed this question at considerable length. It was decided that students should have a background that would allow them to take cell biology, which is the only formal biology requirement for degree recipients. Any students who are not ready to take cell biology before entering the program must, somehow, get to this point—perhaps by taking remedial courses.

Prof. Jacobs asked for the prerequisites for cell biology.

Prof. McCready answered that there are two: General Biology (BIOS 20201 and 20202) and organic chemistry (CHEM20223.) Depending on each student's area of interest and expertise, there will be other areas of mastery. It was decided that if students could understand biology at a cellular level, that was the absolute minimum requirement. Those involved in the program hope and expect that nearly all students will go beyond that basic requirement.

Prof. Marino asked a follow-up question: Is it still true that the chemical engineering undergraduate takes two courses in organic chemistry but engineers in other departments take only one?

Prof. McCready said that while chemical engineers would have had two organic chemistry courses, other engineers might not have taken even one organic chemistry class. It depends on which degree track a student is in.

Prof. Marino said that the point of his question was to demonstrate that enough flexibility must be built into the program to know that students might not complete all their prerequisite work in two years.

Seeing no further questions, Fr. Jenkins asked for a motion to approve the proposed Ph.D. degree in bioengineering. After a motion was made and seconded, Fr. Jenkins called for a vote. It was unanimous in favor of the new degree.

3. Proposal to change the name of the Department of East Asian Languages and Literatures to the Department of East Asian Languages and Culture: Prof. Jenkins asked Prof. Sterling to introduce this topic.

Prof. Sterling explained that the proposal for the name change emerged from a recommendation of an interim report last spring of the task force on Asian studies. As a matter of “truth in advertising,” it was thought that the department should change its name to represent what actually occurs within it. For example, there are departmental courses that include a good bit of film study or religion. The term “Languages and Literatures” is simply too narrow and does not suggest to undergraduate students the offerings and preparation that the department offers them, especially to individuals who are interested in Asia more broadly.

Mr. Van Jacob asked whether this will open up a whole new area of courses so that an undergraduate could become a major without taking literature or language courses.

Prof. Sterling answered that while he does not know what is contemplated for the future, majors must now undergo intensive language study.

Fr. Jenkins asked for a vote on the proposal, which passed unanimously.

4. Committee reports:

(a) Undergraduate Studies: Prof. Sayers reported on the activities of various subcommittees:

(1) Grade Validity: This subcommittee, with Dennis Jacobs as chair, is continuing to study and prioritize issues related to grade validity and to discuss possible recommendations to the committee as a whole and then to the Academic Council.

(2) Faculty-Student Involvement: A second subcommittee, dealing with faculty/student involvement, was formed at the suggestion of undergraduate students. Its members are discussing issues involving communications, especially “e” communications between students and faculty but also questions of mentorship and how faculty might be better approached to act as mentors and then serve as good mentors. Prof. Warlick has circulated some background information on this topic. While members are not sure yet what will emerge as a final product, they have discussed possibilities such as a Web page or a brochure and are open to suggestions in that realm. In the meantime, they are compiling survey questions and thinking about focus groups, particularly with students.

(3) Drop-Add Deadlines: A third subcommittee is considering a proposal to change the University’s drop/add date. Now set at eight days after the start of classes, a proposal has been made to change it to five. Prof. DeBoer of the First Year of Studies Office and subcommittee members met with the associate and assistant deans of the colleges, who were in general agreement that the change should be approved. There are still a number of contentious issues surrounding the change. One is the potential effects of the change on first-year students, who can be less savvy about course selection. The second is the broader question of how students in general would respond to a change—and the subcommittee has no information on that yet. Thus, the plan is to move the entire question to a new committee, now in the planning stages in the Provost’s office, on the

academic calendar. Four members of the Undergraduate Studies Committee will join the new committee. The consensus is that more research is needed on the topic of drop/add dates before any kind of recommendation can be made.

(b) Faculty Affairs: A member reported that the committee is meeting this week to continue work on three agenda items: mentoring faculty, procedures for increasing the presence of Catholic faculty at the University, and developing a process for faculty involvement in reallocation of resources likely to be precipitated by forthcoming efforts to raise the standing of the University among research universities.

(c) Graduate Council: Prof. Garg, who had prepared a report of activity of the last Graduate Council, was unable to deliver it because he was teaching that hour.

There being no further business, Fr. Jenkins adjourned the meeting at 4:00 p.m.

Respectfully submitted,

Jean Ann Linney
Vice President and Associate Provost