

P U B L I C H E A R I N G
before
ASSEMBLY HIGHER EDUCATION AND REGULATED PROFESSIONS COMMITTEE
on
A-2093
"Jobs and Technology Bond Act"

Held:
February 16, 1983
Assembly Chamber
State House
Trenton, New Jersey

COMMITTEE MEMBERS PRESENT:

Assemblyman Joseph V. Doria (Chairman)
Assemblywoman Mildred Barry Garvin
Assemblyman Joseph L. Bocchini, Jr.

ALSO:

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ASSEMBLYMAN JOSEPH V. DORIA (Chairman): I would like to begin. I apologize for being late; unfortunately, I got held up on the road.

Assemblyman Bocchini will be coming around 11 o'clock, and Assemblywoman Garvin, unfortunately, is ill and at home. I spoke to her. Assemblyman Rocco also will be here. He had a previous commitment, so he will probably get here within the next hour.

What I would like to do is begin -- just to make you all aware, this is all going on the record. We have a court reporter here, and the record will be taken and made available to everyone who participated in this public hearing, as well as to the various people who would be interested in the future, and of course, all of the legislators.

I don't have much to say to begin with, except that I want to thank everyone who came this morning to this public hearing. I think we are dealing with an issue that has a great deal of importance for the State of New Jersey and for the higher education community, and also for the workers in the State of New Jersey and for the economy of the State of New Jersey. What we are talking about here is, providing the economic wherewithal to renovate facilities, and to improve the capabilities of our institutions of higher education, so that they can train people in the areas that will be growing over the next few years -- training both the professionals and the paraprofessionals, so that New Jersey can attract more of the types of businesses that will be growing over the next twenty years -- the beginning of the next century.

With those few comments on the bond issue, and with my comment that we're open, and the Committee has said it, and I think my colleagues in the Legislature have said it -- we're open to any changes or suggestions to improve this bill. We are not concerned here with turf; we are concerned here with providing the best possible bill for all of the citizens of the State of New Jersey and all of the institutions of higher education in the State of New Jersey. So, any suggestions that will improve this bill, I would greatly appreciate, and we will, of course, take them into consideration and amend the bill where necessary.

With those introductory comments, I would like, at this point, to call upon our first speaker, Dr. Edward Bloustein, President of Rutgers University. I would like to ask everyone to come to this front desk to testify, so that they can have the microphones before them.

Dr. Bloustein, thank you for coming.

D R. E D W A R D B L O U S T E I N: Mr. Chairman, thank you very, very much. As I look around this Assembly hall today, I have a sense that we are all inappropriately dressed. We should be in track suits, or even better, one of us perhaps in a multi-colored silk track steward's outfit with a horn to bugle an announcement of the upcoming race.

There is no doubt that New Jersey is in a race with almost every state in this nation to hold and attract the high technology industries on which our future prosperity may depend. It is a race that we can't refuse to run, and we can't afford to lose. Our only chance of being among the winners is to create the conditions which will make it possible for this State to compete effectively in the race for high technology industry and its long-range by-product, economic prosperity.

I don't, however, mean to raise any false expectations. I do not believe that high technology is a quick fix for our current economic problems, although some short-term employment gains are possible as a result of the retraining of segments of our work force. True economic growth, through science and technological development, is a long-term effort, and its benefits will accrue over the decades, not months or years.

Over the years, a number of my colleagues and I -- many of them here today -- have repeatedly said that, in an era of high technology, the long-range economic health and competitive industrial position of New Jersey are directly dependent upon the strengths of the State's system of higher education, particularly that of its senior research institutions, and I believe, especially that of its State University.

The Economic Policy Council of New Jersey has developed data clearly supporting that position, which I am submitting to the Committee, as an attachment to my testimony. I believe you have it, Mr. Chairman. It is right there.

ASSEMBLYMAN DORIA: Yes, I do.

DR. BLOUSTEIN: While it now seems to be almost a universal agreement that the development of a sound high technology economy rests on a partnership between government, business and higher education, this State has, for the past decade, kept higher education too lean to bear its fair share of the responsibilities of that partnership.

I am submitting, as part of this testimony, a study recently done by a committee under the leadership of one of the nation's most eminent mathematicians, a faculty member of our State University, Daniel Gorenstein. It is attachment #2 to my testimony, also provided to you, Mr. Chairman.

One of that study's major conclusions is, and I quote, "To restore the University to the research level of 1971, after a decade of underfunding, would take an annual budget increase of \$15 million to \$20 million each year over a three to five-year period." This is, obviously, not the occasion to make a case for the reexamination of Rutgers's annual funding levels, but the cumulative pattern of a decade of underfunding is, indeed, very relevant to the concerns of this Committee and to this State today.

One of the effects of that sad decade is that a large portion of our scientific facilities are obsolete or inadequate. One of the reasons the State University now so much needs a heavy infusion of money for its scientific facilities is that this State has consistently failed to recognize the important role that higher education must play in the development of a high technology economy. In other words, we are starting the race with a handicap of a decade of neglect of our University research base.

Obviously, however, New Jersey is not without some long-range advantages in this competition. A recent study by the New Jersey Research and Development Council noted that this State houses about 10% of the nation's entire research and development effort. That is an extraordinary base of support -- existing support. What this basically means is that we already have, in the State, a strong, private research industry, one with which the State University hopes to cooperate evermore closely.

I have said that we are in a race with our sister states. Let me give

you some evidence of the race, as many people may not realize it.

The National Governor's Association is currently surveying each of the states to determine its present interest in high technology development. The Association has recently received some 32 responses to its survey of various states, and every single state that it has received a response from so far, says it is in the race. Moreover, the North Carolina Research Triangle, which is a model for our State's efforts, and that of other states, has been visited, we have recently been informed, by 86 state delegations this past year. Unless my arithmetic fails, this means that many of our states have such an intense interest in this matter that they have sent several visiting teams.

As you may know, Mr. Chairman, and as you are, yourself, I am a member of the Governor's Commission on Science and Technology. Even before I was named to that group, however, I decided that it was necessary for the State University to take a hard look at itself, and to inventory its own abilities and strengths in the high technology field. To carry out this task, I created a faculty committee on Business, University Cooperation in High Technology Development. Although that committee is not scheduled to give its final report until June, it has already assembled an accurate current picture of the University's capabilities to take leadership in high technology areas. The committee I appointed undertook four tasks: First, it identified those high technology areas that the State University, which is strong enough to compete on a national scale, with high technology strengths at other universities in other states. In other words, we wanted to find out what we were doing at the State University, which was as good or better than any other state university in the nation. I can't overemphasize the importance of this national perspective. We are in a national race. In this instance, we must be nationally competitive. Any high technology effort, which we undertake in New Jersey, must ultimately be competitive in this national marketplace.

The committee, the University committee, went through a stringent process at looking at current University faculty strengths, and we identified four, where we contend, we can match anyone in the nation.

These are: First, Material of Science; second, Fundamental Biology and Biotechnology; third, Food Technology; and fourth, Computers, Computer-Assisted Design and Manufacture -- so called CAD-CAM and Communications. We have, in hand, proposals from each of these four areas, proposals which may serve as the basis of a high technology center at Rutgers.

It is difficult to summarize these proposals at all. It is especially difficult to do so in layman's language, but I'm sure, as you know, Mr. Chairman, and as the Committee is aware, innovative, complex, new scientific fields are often not easily understood. Let me make a fair attempt.

First, we have a proposal for a Computer CAD-CAM Communications Center, which would focus on research and education, involving computer and communication's technology, with special emphasis on computer-aided design, robotics, digital communications and networking, as well as artificial intelligence, a burgeoning field of computer development.

Second, we have a proposal for a Material of Science Research Division, which would focus on research and education in ceramic processing and properties, charge-transport and structure, the physical and mechanical properties of ~~metals~~

and alloys, microstructures, and polymer processing and properties.

Next, we have a proposal for an Advanced Food Technology Division, which would focus on such areas as food engineering, food biotechnology, and analytical chemistry.

Finally, we have a proposal for a Fundamental Biology and Biotechnology Division, which would, in cooperation with the faculty from the University of Medicine and Dentistry of New Jersey, with whom we have worked closely, focus on molecular genetics, biomedical and biochemical engineering, drug design and development, and environmental and industrial toxicology.

I said earlier that there were four tests on which the Rutgers faculty committee had worked, and that this identification of University areas of strength was the first. Let me briefly list the other things we have done.

Members of our faculty at the Graduate School of Management have begun to define systematically the research and training needs of New Jersey and national businesses, which match each of the State University's areas of strength. Although this work started only recently, we would hope by May that our Graduate School of Management Committee, which is working on this, would have a very clear sense of which University strengths are important to New Jersey's future technological development.

Secondly, the Rutgers Committee has also had the benefit of the first draft of a study done under the direction of Professor Joseph Seneca, who is also, by the way, Chairman of the New Jersey Economic Policy Council, and was the author of the study you already have before you. This study assesses the current health of New Jersey's technological economy. The draft of that highly technical study shows clearly that high technology industry in New Jersey is not growing -- I repeat, not growing and prospering as well as similar industries in other states. We should not, in other words, be lulled into complacency by the large area of development we already have. The fact is, that what we currently have is not growing at the same rate as other industrial bases and high technology bases in other states.

I expect the final report of Joe Seneca's study by the end of this semester.

Finally, the Rutgers Committee is also working to identify those policy changes, which the University must undertake, to enhance its ability to cooperate with industry and with other educational institutions in the State in high technology areas.

In anticipation of these hearings today, I asked the Rutgers Committee to provide me with a preliminary list of the University's scientific facilities' needs. In the four broad areas, which we have defined as those in which we are nationally competitive: Material of Science, Biology and Biotechnology, Computer CAD-CAM and Communications, and Food Technology -- our needs for laboratories and equipment total -- and it is good that we are all seated -- \$66 million -- \$39 million for construction and renovation, and \$27 million for improved, fixed, and moveable equipment. That \$66 million, which admittedly is a massive figure, would improve our science laboratories to enable us to meet the research and training needs of business in this State. Clearly, I know, however that sums of that magnitude are

beyond the ability of private fund raising or regular State appropriations,

and of the kind of major needs of which bond issues are made.

I would now like to turn to an examination of A-2093, the legislation under consideration by your Committee. First, I would like to suggest some minor changes in the language of the bill, and I assure you, I'll submit these shortly in the form of a draft of language changes, which I hope the Committee might consider. Let me make some general comments about the bill.

First, I want to congratulate you, in particular, Mr. Chairman, and the Committee generally, for recognizing the importance of the county colleges in addressing the high technology labor needs of the State. We realize the importance to business of the trained technicians who come directly from the county colleges. We, in connection with our sister research institutions, and the county colleges, are beginning to define ways in which the University and our other senior research institutions can meet the retraining and advancement needs of the county college faculty. We feel the need to work closely, however, with the county colleges in providing such faculty training.

Second, in terms of those funds in the proposed bond issue, now targeted specifically for the construction, renovation, and equipping of laboratories of the public colleges, I strongly believe that this Committee should mandate that funds be distributed through a peer-review system to centers of excellence or potential excellence, and that candidates for such funding should include independent, as well as private colleges -- that is public colleges.

I would much prefer to see the State's scarce resources be allocated on the basis of the ability to compete as determined by a peer-review process, rather than solely on the distinction between the public and the independent institutions.

Third, I deeply appreciate the legislative mandate that Rutgers serve as the New Jersey location for the Center for High Technology Training and Research. This assignment is completely in the tradition of the land-grant colleges and state universities of the nation, and I am extremely pleased that you have acknowledged Rutgers' unique potential and role in this high technology area.

Finally, let me conclude with an appeal to each and every member of the Committee to develop a bond issue plan that will secure broad, bipartisan support. The kind of bond issue you are proposing will be passed by the voters of this State, only if both political parties and the leadership of labor, business, and the higher education community can reach agreement on a sound proposal and then marshal their combined forces to explain it to the public. I strongly believe that any proposal, which does not start off with a wide bipartisan support, will be rejected at the polls and leave us worse off than we are now. The difficulty is that most of the benefits of newly developing high technology are, at best, hard to explain. They are complex, and for the most part, they offer long-range, rather than short-term, benefits.

If we do not have a proposal on which there is widely held general agreement among all the leadership groups in New Jersey, we risk being left standing at the starting gate by voters who do not understand the importance of the high technology race to their own future economic well-being.

Mr. Chairman, I conclude by congratulating this Committee, again, and by saying, I doubt that there has been another (inaudible) bill before this Legislature

in many, many decades.

ASSEMBLYMAN DORIA: I think it would help to clarify the situation. You mentioned the need to get a jump on other states, and both of us are aware that forty-one other states are looking into this high technology area and have commissioned some means of studying the problem.

By getting a jump, what do you mean in this instance time-wise?

DR. BLOUSTEIN: I think it is absolutely vital that this bond issue go to the voters of this State this fall -- that we cannot wait another year, that another year would put us so far behind as to make it not worthwhile undertaking the race.

ASSEMBLYMAN DORIA: So, basically, what we are saying is, if we don't get moving now, we are not going to be able to compete very effectively with those other states.

DR. BLOUSTEIN: My guess is that there won't be another chance.

ASSEMBLYMAN DORIA: Thank you. You mentioned \$66 million being needed at Rutgers by itself. Can we, through current expenses -- through the current budgets as they presently exist, provide the necessary funds to renovate these facilities to be able to do this?

DR. BLOUSTEIN: Our best estimate, Mr. Chairman, is that we are replacing equipment over -- if you took the rate we are replacing it at, we would replace it in a century where it needs to be replaced in a decade. In other words, we are ten times slower under current funding conditions than is required by the nature of the scientific demand of the resource itself.

ASSEMBLYMAN DORIA: One other thing that I think we should talk about is the question of peer review. How do you see this peer review functioning in the process of allocation of funds through the bond issue?

DR. BLOUSTEIN: Very much like peer review process of the National Institute of Health, of the National Science Foundation, and other such national agencies, which have been in the business of awarding such funds as we are talking about in this bond issue over a long, long period of time. The reason I stress its importance is that we are in national competition. If you were to speak to major leaders of industry in this State, they will tell you frankly, that they can pick up the phone and talk to Berkeley. They can pick up the phone and talk to M.I.T. The communication system is so good that they will only use us within the State -- that is, use the higher education system within the State, if we are able to compete with those people who they can get on the phone with and talk to. It would be wasteful to think of this in any other terms than to build a strength that is competitive nationally, and that can only be assured by a national peer-review process.

ASSEMBLYMAN DORIA: One final thing that I want to emphasize that you had emphasized is the question of bipartisan. This Committee is a bipartisan Committee, and we have support from both sides of the aisle -- both Republicans and Democrats, and I think that is the important thing here. We want support from everyone, because it is not meant to be a partisan issue. I want to emphasize that, as the sponsor of the bill and having been involved in the process. I think that is important to emphasize even amongst the college presidents -- that this is not a question of dividing or conquering or trying to split the pie evenly. I think it

is a question of trying to get the best quality for the State of New Jersey and provide the most that we can for the money that we are going to expend. I just want to reemphasize that point.

DR. BLOUSTEIN: Mr. Chairman, I have just been delighted to see in your own efforts and in the efforts of other leaders of the Legislature and the Executive -- serving as you do on that Governor's Commission -- that there is a bipartisan approach to this issue, and that no one is looking at it in terms of my turf or your turf, or my party or your party. It is the State's future that is at issue, and we all have the same stake in that development.

I congratulate you and the Committee in the very open character and quality of your inquiry into this need and your development of the bill.

ASSEMBLYMAN DORIA: Thank you very much. I want to thank you for coming.

Next, Dr. Kenneth Rogers, President of Stevens Institute of Technology? Dr. Rogers? I want to thank Dr. Rogers for being present. Dr. Rogers is the President of Stevens Institute of Technology, which is located in Hoboken in my home county of Hudson. Dr. Rogers, we appreciate your coming.

D R. K E N N E T H R O G E R S: All right, thank you very much, Assemblyman Doria.

I would like to start in by reinforcing some of the things that President Bloustein touched upon with respect to the competitive position of New Jersey, with respect to other states, and in fact, the competitive position of the United States with respect to other countries, because we, as a nation, are very much in an international competition for survival. That is very clear.

One of the highest returns has come to our country from our ability to market and develop a competitive edge with respect to technology and technological products.

In 1979, I was asked by the editor of Science Magazine to prepare a review article for the Centennial Issue of Science on "Engineering in the United States," and, as in the course of preparing that article, I visited with about fifty major corporations and engineering leaders in the United States to determine their view of where we stood with respect to engineering, our competitive position in the United States, what the problems were in engineering research, education, and so on and so forth.

Let me say that one of the very clear problems that emerged from those interviews was the growing gap between the ability of the engineering colleges of our nation -- not only our State -- to be able to prepare people for the important kinds of technological challenges that American industry was trying to face on an international basis. It was very clear that the equipment for research and education in virtually every engineering college in the United States, from the most affluent to the least affluent, had fallen into serious disrepair, that no institution had the funds to maintain the quality of their instructional and research equipment anywhere near the level that was required to maintain a close working relationship between the institutions and the industrial needs which had to be served by their graduates.

An early survey in 1979 of just the sixteen independent engineering colleges, which formed the Association of Independent Engineering Colleges, and

includes M.I.T. and Cal-Tech, and a number of other institutions of that character, showed that about, at that time, \$1500 per year should have been invested by each institution per engineering graduate at the bachelor's level, and considerably more than that at the master's and doctoral levels, just simply to maintain the quality of their -- or replace what they had in the way of instructional equipment. Those numbers have probably at least doubled today, and that means that for an institution such as Stevens, which graduates somewhere around 350 engineering undergraduates each year, and some graduate students at the doctoral and master's levels of about equal numbers, that we should be investing several million dollars a year in new equipment, just to replace what was already there -- not even to make any kind of an advancement on that basis.

We know that we need much more than that at Stevens. Each of our engineering departments is very heavily engaged in the use of computers in engineering design -- extremely important for the future. Each of our engineering departments requires at least a million-dollar investment in just partly hardware, partly software, merely to introduce to our undergraduate students alone the use of computers as they are being employed in industry today in the top-notch, technological industries. So, that, it is a serious national problem that we are talking about here, and a particularly serious problem in New Jersey, because New Jersey engineering programs have not had the kinds of support that many other institutions have enjoyed for various reasons.

I think that the notion of a fund to improve the facilities for engineering education and science, as well, because high technology, which is the subject of our discussion today, involves science and engineering in partnership, in many ways, and it is extremely important that the engineering and science activities of the institutions in New Jersey that are graduating the very important people who will be able to function in New Jersey to support the high technology industries -- in fact, any of the technological industries, which we wish to maintain in New Jersey, and which we wish to attract in New Jersey -- all of those people must be coming out of programs which are much better equipped and funded than they are today.

At Stevens, we have tried to approach this problem by developing very close ties with industry, and that is extremely important for several reasons. Engineering, one should recognize, is a little bit different from science in terms of its relationship to industry. Many of the major developments in engineering come out of American industry, rather than American universities. Somewhat the opposite is true in science, where many major developments in science come from the universities, and later move into industry. In fact, this kind of relationship between science and industry and industry and engineering is something of a closed loop that, for the maximum benefits, should be totally encouraged. I think when we talk about high technology, we should be talking about both science and engineering, but I will tend to talk more about engineering in my remarks, because I think the problem in engineering is even more serious than the problem in science, although the problem in science is serious, too, with respect to research equipment that is available for, particularly, graduate programs.

Engineering and engineers form the backbone of our technological industries. They not only do the technical work; they ultimately become the managers

of the corporations and the activities of those corporations. They are used in very large numbers.

New Jersey graduates quite a few engineers each year, but we are still a relatively small producer of engineering talent compared to some of the large states of our nation. However, the quality, particularly at the undergraduate level in New Jersey, is very good, and there are some very excellent strengths in graduate education in New Jersey, but relatively small. The sum total of all of the electrical engineering departments in all of the institutions in New Jersey, added together, does not equal in size one of the very large and top notch electrical engineering departments of public universities around the country. That is something that puts us in a frame of reference.

I think that we have to recognize that we probably are not going to match size, but I think we can more than match quality in engineering education and science education in New Jersey, if we take that as a State commitment. We know that it is a complex problem. We have to have the well-educated young people coming out of the high schools who are able to function in high-powered, very demanding science and engineering education programs. And, from those programs, come those people who go on for graduate study and research, who ultimately become the faculty members of the future.

I would like to simply come back and say that the kinds of funds that have been discussed here with respect to this bond issue, if employed very judiciously, I must agree that they should not be simply targeted to one sector. They should go to support the programs that can contribute the most to our State's development. If those funds are wisely used, I believe they could have an enormous effect on moving education in engineering and science in New Jersey to the forefront of the nation in a number of different areas. I would like to simply say that, of course, they must be distributed very carefully. A review process is absolutely essential. I would, myself, recommend that you consider a peer-review process as something that goes beyond just simply the University participants.

Engineering education and research, in particular, must be of interest to industry. There has to be a close-working relationship there. We have in New Jersey, this world center of the telecommunications industry. We have one of the world's centers in the pharmaceutical and, in some ways, the chemical industry in New Jersey. We have in New Jersey, research -- industrial research organizations, some of the top-notch people in the world. We do not have to go outside of New Jersey for excellent criticism of proposals for funding to improve engineering and science education and research within the institutions of New Jersey. I would very much urge that any disbursement of funds under a bond issue of this sort be one which brings in the very excellent talent that exists in the industrial research laboratories of our State, because we have many outstanding people who have outstanding qualifications. I would say the peer review -- they are really, in a sense, the peers that we have to be looking at, as well as peers from the university community outside of the State.

I would like to also point out that each institution in New Jersey has been trying to address this problem in its own way of coupling more closely to industry. At Stevens, one approach that we have taken that we think is a very useful way to go, is the formation of a separately incorporated institution that

is entirely supported by industry. It is called the Polymer Processing Institute. It has developed a research agenda by working very closely with all of the industry people in New Jersey and outside of New Jersey, as well, that are interested in the area of polymer processing. Stevens has an outstanding chemical engineering program in polymer processing and polymer processing research that has an international reputation.

We, however, have chosen to try to couple more directly with industry through the mechanism of a separately incorporated body that would provide a mechanism for university participation, industry participation, graduate students participation on problems that are of great and immediate interest to the polymer processing, and it turns out that New Jersey, as a matter of fact, has a number of small and medium-sized and some large corporations, which are extremely interested in the business of the processing of polymers. That is one reason why we chose to address that problem.

I would like to simply say that I think these funds, with bipartisan support, judiciously applied, could, in fact, move New Jersey institutions into the forefront in areas that we have quality, but perhaps are not quite to the strength that we would like to be, particularly because of the difficulties of equipment and for instruction and research in engineering and science.

ASSEMBLYMAN DORIA: Thank you very much, President Rogers. I have one or two questions. I think, obviously, you pointed out the financial need. Your experience in the rest of the country on their interest in science and technology, obviously, you have had an input from other sectors in other parts of the country. Where do you feel we stand right now in competition with these other sectors, and how important is it for us to be moving at the present time?

DR. ROGERS: I think we are talking really about a long-term benefit. I think that there is an immediacy to do something about it. I would agree on that. I think that we must be careful that we do not anticipate an immediate return upon the expenditure of these funds. It is a long, tough battle to try to bring us to a top, competitive position in the areas that we already have strengths in, in New Jersey industry. Strangely enough, New Jersey, while it is the center for the telecommunications industry of the world, does not have an outstanding collection of electrical engineering departments. So, really, it is very important to bring our electrical engineering, for example, activities in every one of the universities in New Jersey up to a level that can more effectively couple with the top-quality programs in telecommunications that exist in the three or four major corporations that are centered in New Jersey. I think what we are talking about is, we're late, we might be able to make it, but if we don't do something, we are certainly going to lose ground to the other states.

I think that we should not anticipate an immediate return, but we should anticipate a return within a decade.

ASSEMBLYMAN DORIA: Okay, one other question, Dr. Rogers, and that would deal with the private sector. You mentioned how Stevens has gone out and actively gained support from the private sector. I know a number of the other institutions are doing the same thing. This bill calls for providing -- when we set up these training centers -- the central one being at Rutgers, and then a network that would exist in the State in the various areas for training centers. We are talking about

fifty percent of that coming from private industry. Number one, what do you think of that idea, and number two, do you think it is realistic to expect that private industry would be willing to support operating these types of training and research centers at a 50% level?

DR. ROGERS: I think that the 50% is 50% of what? You know? I think that it is fair to think that industry would come in as a partner on programs that they feel are really going to produce a return to them in the foreseeable future, if not -- not necessarily the immediate future. I'll tell you one thing that concerns me. If we are not careful, that there won't be enough money to go around. For example, our institution has always enjoyed very strong industrial support. I would be a bit concerned that if these funds could not flow to high quality programs in the existing institutions, that those funds that would have come to an institution such as Stevens, might be diverted and go in another direction, because there is just so much money to go around.

For that reason, I would say that it must be considered in the allocation of these funds and the objective of this bond issue, what the overall impact is upon the institutions. It would be most unfortunate to have a negative impact on the independent institutions which have enjoyed very strong industry support in the past, because, to get the funds for matching purposes for this purpose, there wasn't anything left over to go along those traditional lines. I don't think that has to happen, by the way. I think that if the funds are administered in a way that is broadly directed towards improvements in education and research, along the lines that the institutions are trying to develop right now, and that high quality is insisted upon, that that problem can be minimized. But, I would say there is probably a question as to whether \$75 million could be matched by industry in New Jersey over a very short period of time. I don't know what kind of a time frame you have contemplated here, and to what extent individual corporations' commitments are being looked at, but I do think a partnership with industry is a very important aspect of such a program. I certainly applaud and support that concept.

ASSEMBLYMAN DORIA: One clarification, Dr. Rogers, and this, I think, is important. It would not be necessary for the private industry to match the \$75 million. Actually, that wouldn't be the matching part. The matching would be with the operating expenses -- whatever that would be. As you say, there is no defined figure to operate the various centers once they have been set up, so that, we are not asking -- the \$75 million, I think, would be too much to expect, and would drain the process that exists at the present time. I think the point that you just brought up is an excellent one, and that is, that if the industry sees some benefit themselves, and, actually the institutions taking some of the slack that they otherwise might have to be doing themselves -- that is, putting out money themselves, that they might see a definite self-benefit to participate. So, I think that your point is well taken.

DR. ROGERS: I would like to just say one thing, also, about this center's concept. The strength of education and research comes through the academic departments by and large, and that it is very important that essential funds not be diverted away from the strengthening of fruitful academic disciplines in engineering and science. So that, when one creates a center -- I am not quite sure what that means -- if it is a paper center, which coordinates and calls upon the strengths

of the existing academic departments, I am in favor of that. A center which represents a bricks and mortar type of center, I would, with a bureaucracy and a staff, and so on and so forth of its own -- I would ask that that be very carefully considered, because there is the possibility of weakening the strengths of the traditional engineering and science departments, which ultimately have to be the source of your real faculty strength and student education.

ASSEMBLYMAN DORIA: I think the intention here is to provide for the strengthening of the programs that do exist, and for the center or the networking of those centers to take advantage of the best programs that exist, and then try to work out from there. I think that the concept really is to take advantage of what already exists and to try to improve what already exists, while, at the same time, provide for that training. That is where the center comes in a little bit different than what presently exists.

DR. ROGERS: I would simply say that I think one of the things that a center can do is to establish new coupling mechanisms between industry and the universities. That is really a very desirable goal, and that will involve research and education, undoubtedly, at all levels.

ASSEMBLYMAN DORIA: I think that is very important. I agree with you 100%.

I just want to introduce and welcome my Vice Chairperson, Chairlady, Chairman -- we always try to work out whatever the word is, and this is Mildred Garvin. I know that she has been ill, and I want to thank her for coming.

ASSEMBLYWOMAN GARVIN: I apologize.

ASSEMBLYMAN DORIA: Thank you very much for being here. Joe Bocchini, the other member of the Committee, who is very actively involved and gives us our legal thing and so on -- I want to thank both of them for getting here. I know they both have busy schedules.

Dr. Rogers, unless there are any other questions from members of the Committee, I want to thank you for coming here and expressing your viewpoints and that of the independent sector. Thank you very much.

DR. ROGERS: Thank you. It was a pleasure to be here.

ASSEMBLYMAN DORIA: I just want to point out that we are going by a list that was set up basically by when people called, and, at times, we tried to set up the people who had to get out by a certain hour. I'll try to stay by this list, and we'll try to keep on moving.

Next, Dr. Saul Fenster, President of the New Jersey Institute of Technology? President Fenster?

D R. S A U L F E N S T E R: Thank you very much, Mr. Chairman and members of the Committee. I am delighted to speak with you this morning, and to support the bill in discussion.

I subscribe to so much of what the previous speakers have said that rather than go through a litany of statements of support of each of the measures supported by Dr. Bloustein and Dr. Rogers, I would like to skip about a bit and as briefly as I can, point out a number of issues associated with the bill.

I would like, if I may, to focus a bit on my institution, because so much of the technological manpower base of the State has been historically associated with NJIT, and the predecessor institution, Newark College of Engineering, because

the production or the graduation rate of engineers and associated professionals from my institution are so large, and because the enrollments are so large, I am going to focus a bit in terms of giving this some perspective in the context of the bill.

Certainly, there is no question but that additional funding for laboratory facilities, for laboratory modernization and renovation is desperately needed in our institutions in New Jersey and nationwide. I don't think anybody can doubt this. We are far behind, we fall further and further behind each year. To give you an example or two of this, the current operating budget, that is, the asking budget request of NJIT, called for some \$2.3 million in current laboratory and equipment at NJIT. Obviously-- I shouldn't say obviously. But, it doesn't appear that the \$2.3 million request for laboratory and facilities renovation and laboratory equipment is going to be funded. This represents a very, very current deficit. Clearly, when you talk about a deficit going out just a couple of years, and pursuant to our own planning efforts, you are talking about many, many millions of dollars in addition to that. I am talking about an annual deficit of \$2.3 million, not an accumulated deficit. Obviously, our inventory of accumulated problems in laboratories is much, much more extensive than that.

I want to point out to you that the problem is severe enough so that the student body at NJIT has understood and has been willing to pay something that we call an "academic facilities fee," recently instituted. That fee, within a couple of years, generated a \$1.5 million to do major renovations for our School of Architecture and for our Department of Computer and Information Sciences. So, the students are willing to pay a reasonable fee, over and above their other reasonable fees, to help foot the bill. This does not meet our needs, but it does move in the right direction.

Moreover, going back to cooperation with the private sector, we have had, ongoing, a capital fund drive, a \$12 million drive, about half subscribed to by the alumni and the corporate community. The first part of that is pledged to the construction of a mechanical engineering center, which was one of the projects on a capital bond issue, which was, as you recall, defeated. But, we can not sustain that sort of a defeat, so, quite appropriately, we have gone to our corporate colleagues and our foundation colleagues, and to our alumni asking for support, and that support has been forthcoming. I would want to make it clear that we have a long and deep association with the corporate community. We have an active alumni body which is very supportive. As a matter of fact, the institution was created in partial response to petition of the corporate community 102 years ago. That strong association has continued, I am very, very pleased to say.

With respect to the fact of a bond issue itself, and the fact of a bond issue directed toward science and technology, a suggestion -- as I am a member of the Governor's Commission on Science and Technology, as is Assemblyman Doria -- that perhaps some discussion might take place between representatives of the Committee and representatives of the Governor's Commission on Science and Technology, so that we appear to articulate more closely together, and so that we appear not to be moving in different directions, if that is the case -- I don't know that we are moving in different directions-- so that we appear to have more

of a united front dealing with a very, very serious problem for the State of New Jersey.

I would subscribe to Dr. Bloustein's notion of a peer review, or some element of peer review, either in a configuration discussed by Dr. Rogers, or in a configuration discussed by Dr. Bloustein. We have been successful in the peer-review process. As you know, grants to institutions for research in engineering science and in the health areas does meet the test of peer review. It is a rigorous test, it is a national test, and we certainly would subscribe to that notion as being a fair one.

I would like to very, very briefly cite some-- I mentioned earlier that I would speak principally from the viewpoint of NJIT. I would like to cite some statistics or, very briefly, some numbers which would argue that perhaps the State would benefit greatly from two centers, or multiple centers, along the lines of what is discussed in the bill - a northern center, perhaps, and a central center.

We now have at NJIT, all time high enrollments of some 7,000 students engaged in baccalaureate, master's and doctoral programs in engineering, engineering technology, management, computer and information science, and related areas. This is a very large technological university. We are, in fact, New Jersey's public technology university, and, we are the largest such institution in the metropolitan area. We just celebrated, a couple of years ago, our centennial.

In addition to that 7,000 student body engaged in professional studies of one kind or another, we have 3,000 students throughout the State engaged in professional continuing education activity, and to a large extent, this, in fact, represents a vast array of training arrangements with industry at the baccalaureate level, but principally at the graduate and post-graduate levels. Some of these programs are the typical programs you read about in catalogs, where people sign into programs already packaged and designed. Increasingly, many of these programs are offered to corporations on a design basis to meet specific corporate needs, and more often than not, offered on site, at the corporate site, for institutions or corporations such as Bendix, and the various military facilities and the like -- 3,000 students.

In addition to this, we have some 1300 students in a center for pre-college programs, 1000 pre-college youngsters, several hundred schoolteachers engaged in a variety of pre-college exercises, students derived principally from the inner-city, high potential students without the appropriate role models, in many cases, but with the potential -- these students, involved in programs designed from seventh grade to twelfth grade, have an enormously high college going rate and have a very high success rate -- this to complement a variety of activities ranging, if you will, from the seventh grade to post-doctoral -- to meet a complement of requirements of the State of New Jersey and to improve the representation of minority and other under-represented groups in technical and managerial occupations and professions, which offer such possibility for mobility.

In addition to the 1300 in the pre-school center, we have a very active summer session for professional education, which involves yet, another 2½ thousand. So, while we have 7,000 involved in regular, academic degree programs, we have a total cadre of some 12,000 people involved in one aspect or another in technological, managerial, scientific, and architectural education, representing a rather extensive enterprise -- beyond that, a very extensive program of research.

We subscribe heartily to the notion of assisting the county colleges in their efforts to improve and modify laboratories and technological facilities. The county colleges produce a product critically important in a high technology society -- that very, very sophisticated technician, as well as that person transferring to the senior institution for professional studies. In that regard, I would point out that we have a variety of arrangements, each of which is specially designed to meet certain county college needs, a variety of arrangements between NJIT and county colleges. Examples of the institutions with which we have assigned protocols are Bergen Community College, Mercer, Essex, Hudson, and at least three or four more are in the process now of design. These may involve the delivery of an upper-division program -- for example, in engineering technology, on the site of Mercer County College. They may involve a special articulation arrangement for transfer in which our faculty administrators work with a county college on a curriculum committee to design the curriculum, to make our facilities available, and in some cases, our faculty available, to expedite and facilitate a curriculum generation, and delivery of a program. Colleges there would involve Essex County College, Bergen, and Hudson. We are very actively engaged with the community colleges to encourage a quality enrollment, encourage a quality program delivery, to encourage their success, and in their success, our success as well.

I would point out that despite the very, I think, excellent objectives of the bill and the subsequent bond issue, as has been said by previous speakers, I think we all recognize that there cannot be a substitute for adequate annual appropriation for higher education.

Dr. Rogers, I think, spoke of the total electrical engineering faculty of all of the institutions not being equal to, perhaps, the size of an electrical engineering faculty in one of the large, mid-west, or western technological institutions. I believe NJIT has the largest engineering faculty in the State, and I believe you will find in some electrical engineering departments in other parts of the country, a size faculty equal to our total engineering faculty in five engineering disciplines. So, that would underscore what, I believe, it was that Dr. Rogers said earlier -- that we do have the need for size of faculty, as well as equipment, and facilities renewal.

The reason that the faculty size is important, not directed to the bill, and I won't dwell on it, is because you have diversity of faculty talents and the ability of faculty members in groups that are critical in size to interact and develop some of the creative ideas needed for the State's economy.

Finally, in terms of the production of engineers and scientists -- computer scientists and the like -- in terms of meeting a statewide need, and how critical this need is for the State, and how important the bill is as a consequence, we have within the State some 13,000 engineering alumni of our total alumni body. This represents the largest cohort of engineering professionals and technological professionals in the State -- among the total number in the State. We graduate close to 900 a year in engineering, in technology, in computer science, from the baccalaureate through the doctoral level, a very large number of graduates into the State's economy -- principally into the State's economy. Of 19,000 alumni, 13,000 are here in the State.

Another reason this bill is critically important to us, is the work

of the Governor's Commission on Science and Technology.

Finally, in terms of our working with the corporate community, we have at NJIT -- I think we are blessed at NJIT -- with a foundation, working very closely with the interests of the University -- the foundation called, "The Foundation at NJIT," which supports the research function to a large extent to augment State support, to augment the support realized through a foundation. NSF typically would be our largest foundation there. Under the foundation at NJIT, we have such institutions or agencies as Center for Information-Age Technology, an Institute for Toxic and Hazardous Waste Management. That, by the way, has been in existence in various other incarnations for some time, but that Institute for Toxic and Hazardous Waste Management, dealing so vitally as it does with the needs of this State, has already enjoyed pledges of support from the corporate community of roughly \$1 million.

We operate an Electronic Information Exchange System, operating one of the most advanced telecommunication systems in the country, with about 1,000 subscribers at NJIT, a Center for Law and Technology, a Center for Technology Assessment, and a Micro-Electronic Center. We feel that we have critical masses of faculty and critical masses of corporate support to, in fact, work with and reinforce the technological needs of the State. We have, for many years, worked in close cooperation with the corporate community, and by the way, have received fine support from the corporate community, as manifested to at least one extent, by the Corporate Foundation Board, called the Board of Overseers, with some 30 or 35 of the highest level corporate executives in the State of New Jersey.

Again, I thank you very much for this opportunity to address you today. I wish you good speed and God speed with your efforts. I do hope there would be an opportunity for closer or close articulation between the Governor's Commission and the Committee, and I thank you again.

ASSEMBLYMAN DORIA: Thank you very much, Dr. Fenster. Do the members of the Committee have any questions?

I have one or two. You had mentioned at the beginning of your presentation the \$2.3 million annual allocation for renovation of facilities that is not being funded and has not been funded in the past. How do you see this impacted upon the ability of NJIT, in this instance, fulfill the needs of the State to train the type of professionals in the area of science and technology that we would need to attract business and jobs eventually?

DR. FENSTER: It impacts very negatively. We fall, as has been said by other people, and in that many national forums, we fall further and further behind. I provided some evidence that we are making a valiant effort, but a valiant effort, I think, will not be adequate to the needs of my institution, nor the other engineering colleges in the State -- at least most of the other engineering colleges in the State. We will fall further and further behind. The equipment does become obsolete very, very quickly, whereas -- Well, let me just leave it at that. We will undoubtedly, notwithstanding any efforts on the part of the State -- we will undoubtedly have to continually look at our fee structure, to augment the State's support, because we cannot afford to fall further and further behind. We simply cannot afford to do that.

ASSEMBLYMAN DORIA: So, what we are basically saying is that current expenses will not adequately provide the types of funds you need to catch up to where you should be at the present time, and to maintain where you should go in the future.

DR. FENSTER: The request of this year's budget for equipment and minor modification of laboratories was \$2.3 million. That was not funded. We are doing some of that, as I pointed out, through assessing the students, and we have, within the last couple of years, invested \$1.5 million in facilities renewal, paid for 100% -- that aspect of it for architecture and computer science -- paid for 100% by our student assessment. But, while it is a valiant effort, and perhaps it is immodest of me to say, on the part of our student body, a courageous effort, it is not going to meet the competition of the other institutions with which we do, in fact, compete. There is a "catch-22" in all of this. As these other institutions compete so effectively in their ability to marshal research resources, and to keep their facilities up-to-date, they will attract more and more corporate support as they become designated and recognized widely as centers of excellence.

So, State support will help us garner private support. It is also true that when we go to the private community, we point out to them the measure of State support that we have gotten where it is positive to do so, and we find that that helps to garner corporate support, and the third leg of the triangle, of course, is our alumni. It is that triad, if you will, which is the triad that will help us make significant progress.

ASSEMBLYMAN DORIA: Okay, I have an important purpose to this because basically what I am trying to determine is the need for the bond issue. There have been some segments of the community in the State that feel that a bond issue is not necessary; current expenses can do it. I think that --

DR. FENSTER: Current expenses are not adequate by probably an order of magnitude to meet our needs, and I know that the needs of the other engineering colleges are great, as well. I might point out that we also have the largest, if not the largest, close to the largest computer science program. It also develops very, very rapidly obsolete equipment. We have close to 800 or 900 computer science majors at various levels at NJIT. I don't have to tell you how quickly the computer science faculty and researchers start to look wistfully at equipment which they require to support research in computer-aided design and manufacturing, computer graphics, and all the rest.

ASSEMBLYMAN DORIA: Mrs. Garvin?

ASSEMBLYWOMAN GARVIN: I have one point to make, and it has to do with the additional student fees that you spoke of that you exercise now. My question is, or my thought is, if this kind of a bond issue were to pass, and I guess I am thinking in terms of an amendment already -- I wouldn't want to see our young people overburdened, one, with a bond issue, and two, with those additional fees. As this bill progresses, would you have any problem if the bill would have an amendment to the fact that additional student fees for that purpose would not be used if this bond issue passed?

DR. FENSTER: Our fees are very modest, I feel, Mrs. Garvin, and I would not like to see a limiting amendment or modification of that character. We

would try to keep our fees modest. What I am talking about -- just to put in perspective -- an assessment of \$100 a year. Our total fee right now is probably on a par with Rutgers' heaviest fee, perhaps a little larger. I would not think about moving that dramatically, notwithstanding the bond issue, because of the ability of the students to pay, and because of the looming tuition fees. I am speaking of fees, not tuition. But, I would not like to see an additional restriction as we try very heavily, mightily to meet the needs of the students through facilities, through laboratory equipment, and so on.

I think that we might want to look to the administrations of the institutions to be reasonable in the exercise of their ability to fee. I think they will be reasonable. Beyond that, there is a Board of Education protocol, which limits the fee to 30% of tuition, and we would stay within that protocol in any event. So, we would not go wildly in the direction of increased fees, notwithstanding the dire need.

ASSEMBLYMAN DORIA: Thank you very much, Dr. Fenster.

DR. FENSTER: Thank you very much.

ASSEMBLYMAN DORIA: We appreciate your coming.

At this point, I would like to call Dr. Stanley Bergen, the President of UMDNJ, The University of Medicine and Dentistry, and ask him for his comments. Thank you for coming and for waiting.

D R. S T A N L E Y B E R G E N: Thank you very much, Assemblyman Doria. I am very pleased to be here today, and to speak in support of A-2093. Incidentally, I like your tie, and the tie that I see around here on a few people. I noticed that Dr. Rogers also had a New Jersey tie, although he didn't keep in the format of the daywearing the "I Love New Jersey" tie.

I also want to take notice, other speakers have of our pleasure in seeing your leadership of this bill and this entire concept, and the Committee efforts behind this legislation. I am heartened to hear that there is an attempt to gain bipartisan and multiple constituencies' support. I would also urge that the Committee and the Legislative Branch of our government try to work as close as they can with the Commission created by the Executive Branch, so that we do not get into any conflicts.

There is no doubt, as other speakers have said, that we are losing our edge as a nation and as a State, and it is important because today, we are truly one world -- communications, computers have made us one world. I recently heard an address by a gentleman who pointed out the fact that there was a period of time when, for example, the stock market really only was open eight to twelve hours a day.--the stock markets in Europe, in Paris and London, and the stock markets in the United States, and therefore, you had about half of the day when no trading was going on.

With computers, with communications the way they are today, it is a twenty-four hour business. You can go to sleep at night, and wake up in the morning and be a millionaire, or wake up broke, and companies find that happening to them. I think it is just a sample of what we are dealing with in high technology, but also how we are really all one world now, and we can't be isolationists. We have to realize the competition is out there, and the competition is out to beat us for economic and for nationalistic reasons.

Each year brings a new catch word or a new phrase. Last year, 1982, was the year of the infrastructure, and I am confident that this year is going to -- as we look back on it -- 1983 will be the year of high technology. Everywhere we turn we hear about high technology -- everything from the computer chip to a means of transforming the economy of our nation in a high employment economy. The fact, of course, is that high technology is both of these and much more, and it is the real future of hundreds of thousands of people in the United States -- students who are now in school, those who will make up the work force of the future.

But, individuals do not graduate into high technology, nor do they transfer into it. Rather, they are educated for it, trained by the best facilities in our State and elsewhere, trained by the best instructors, the best professors, the best educational institutions. And, training is a special challenge of higher education, and if we expect economic and employment benefits of high technology to be realized in New Jersey, then we must make a substantial commitment to transforming our State into a state that is educationally and professionally a fertile area to not only go to school, but to work. We cannot rely on our location as a guarantee to our future ~~any~~ more than we can hope that our mountains or our beaches will, themselves, attract people to New Jersey.

The future will not fall into our laps, but rather, as the commercial says, "We must earn it."

Mr. Chairman, I know of no better way to earn it, and earn the future than to provide the personnel and the cooperative support of New Jersey's higher education community which they now stand ready to offer. As the current Chairman of the Board of Directors of the New Jersey Association of Colleges and Universities, many whose members are here in this room today in support of this legislation, I believe I speak for many of the institutions of public and private education in our State in saying that we do support this legislation. We realize that our traditional curriculum must be supplemented, not supplanted. In other words, we must not take high tech as our only objective for the future. We must realize that we need to broadly educate a segment of our population -- that liberal arts, history, English, other programs within our institutions must not suffer because of our efforts in high technology; therefore, it means that the State must make a special and new extra effort in the area of high technology, both in education and adapting that education to the needs of our industry.

New Jersey must recognize and shape these changes. It must not be left behind. High tech is not a panacea for all our employment problems. Not everyone who loses their job in the manufacturing sector today can be retrained for a position in high technology, and indeed, many may not want to be retrained in those areas. But, those who have the aptitude and the desire must have the opportunities presented to them.

As President of the University of Medicine and Dentistry in New Jersey, I deal regularly with the biotechnology field, an area that is literally vital to New Jersey's health, and an area in which the University is increasingly active. Biotechnology ranges all the way from the development of the sophisticated diagnostic equipment to devices designed to enhance the human skeleton and muscular systems. The University can and will undoubtedly do much more in this field with the infusion of public and private funds generated by this bond issue.

The benefits are clear -- greater physical mobility of our people, improved diagnostic capacity of our institutions, and an overall improvement in the health and welfare of our State, and eventually our nation.

In addition, by fostering cooperative relationships between the University researchers and private corporations, we will increase the likelihood that the products of our research, in fact, become produced here in New Jersey. It will be attractive for institutions to develop products, and at the same time, those products to be picked up by the manufacturing concerns within our State in order to produce them as agents that will be of assistance to others within the country.

It is sad to hear as a member of the Commission, as we heard at our first meeting, that much of the venture capital being provided for the Boston area developments, for the developments in the Stamford area, has come from New Jersey -- that this has been carried out of the State in bagfuls to other states and other locations as venture capital to get high technology research started in those areas, because up until now, they haven't found the fertile ground here in New Jersey.

I am convinced that New Jersey must take the lead and the initiative in the training of individuals for high technology industry, because the Federal budget just does not seem to have those monies in it any longer. If we, in New Jersey, do nothing to help ourselves, and merely continue to lament our exclusion from the growth industries of the Sunbelt, then we will be in trouble. I believe we can develop our own Sunbelt, our own corridor of opportunity, right here in New Jersey -- build our own strengths upon current strengths. New Jersey, after all, is already one of the leaders in research. We must secure and expand our position by providing a commitment to the development of high technology education and an environment which guarantees the development of this high technology.

Mr. Chairman, the universities and colleges of New Jersey can help provide those people -- indeed, their role in shaping society demands that we do so. We, at the University of Medicine and Dentistry of New Jersey, are certainly ready to attempt to do our part, and we look forward to encouraging favorable consideration by the voters next fall. Realizing that there are legislative and executive hurdles that must be run before that happens, I hope that all concerned will come forward and see that this initiative is enacted, in fact.

Now, the Board of Directors of NJACU met this morning, and they brought up two or three items that I would just like to suggest for your interest.

First, the peer-review concept. We are certainly behind Dr. Bloustein's suggestion and that of Dr. Rogers in that some peer-review mechanism should be written in.

Secondly, we believe there should be a greater definition of the allocation of these bond funds between equipment, renovation, training, and those areas, so there would be some understanding of what \$75 million or else -- we think that that will help us gain support from various constituencies.

Thirdly, we really think there should be some consideration -- I've heard you already mention it, and I think it is a good concept -- of the possible creation of more than one center, or a networking of centers, so that, particularly our northern cities in the Newark area, would have an opportunity to develop similar educational and research programs.

Lastly, we hope that you on the Committee understand that a commitment to this bond issue is only the beginning. A commitment to the bond issue means

a commitment different than we have had before to higher education. It is an ongoing, long-term thing, and we can't just infuse one increment of money into a bond issue and feel that ten years from now, that is going to continue to carry itself. As Dr. Fenster pointed out with his equipment problem, as others have made note in the past, that unless this is an ongoing commitment of the State, we are only solving half of the problem by support of this legislation.

Again, I want to reiterate -- we at the University, we at NJACU support this legislation. We want to work with you in any way possible to marshal support of our constituencies and the general citizenry of New Jersey behind it.

I thank you for the opportunity to appear here this morning. Thank you very much.

ASSEMBLYMAN DORIA: Thank you very much, Dr. Bergen. I think that you made some excellent points in your presentation.

One of the things that I just want to review again is the question of our position in relation to other states. Let's say in the area of biotechnology. Do you feel that we, right now, are in a competitive situation, or are we falling behind in the competitive situation? Are we ahead? What is your feeling in this area?

DR. BERGEN: Well, unfortunately, Assemblyman Doria, we are both at the same time. We have individuals in the State, in our faculties, and in faculties of other institutions in this State, that are competitive with anybody in the country, and possibly in the world. And, I know of three or four instances right within our own University, where people have made breakthroughs in the last six to eight months, that are unique and different approaches to problems in biotechnology and medicine -- the development of an artificial ligament, and things like that.

But, at the same time, those individuals have made connections out of the State of New Jersey, and that is tragic, because we have so much R&D in the pharmaceutical and chemical field in New Jersey, and those industries are looking out of the State. So, we have this paradox of not only our faculty looking out of the State to make connections with corporations in Philadelphia, in California, in Memphis, and places like that, but, at the same time, we have our own industry looking out of the State to make connections with Harvard and other places like that, and, here we are, right together. We need some catalyst; we need some stimulus to bring the riches of this State together, and there are many. They just need that push to get them together, and for each of us to see what we can do to help each other.

ASSEMBLYMAN DORIA: Do you see an urgency in this bond issue?

DR. BERGEN: Oh, yes. It has to move. As Dr. Rogers said in his answer -- and Dr. Bloustein -- to wait a year, to wait six months, we don't have that luxury any longer. We should have probably been doing this, and I don't lay the blame on anybody -- we probably should have been doing this in 1978 and 1979, and then in 1983, we have to go to run that horse race that Dr. Bloustein made reference to, twice as fast as anybody else, just to keep up.

ASSEMBLYMAN DORIA: What about the adequacy of current expenditures with all those needs in this area?

DR. BERGEN: Again, like Dr. Fenster just pointed out, every year we

run into the problem of non-funding of our equipment budgets or very marginal funding of equipment budgets, and then constantly, what we have to do is try to rob and beg and borrow and get, wherever we can, out of our operational budgets, enough money to patch together and keep together the equipment needs for the education of our undergraduate and graduate students. I am speaking from a University that is only twelve years old. We have new facilities, yet this equipment ages, as Dr. Fenster pointed out, in about two years, and it has wear and tear by multiple students -- normal, natural wear and tear, and it just isn't replaced in any orderly manner within the budget of the State.

ASSEMBLYMAN DORIA: Are there any other questions from the Committee members?

I want to thank you very much for taking time out and for being very patient with us. Thank you.

DR. BERGER: Thank you.

ASSEMBLYMAN DORIA: At this point, I'll call on Al Sidar, who is the President of the New Jersey Association of Colleges and Universities.

A L S I D A R: Thank you, Chairman Doria. I am very pleased to be here and to congratulate you and your co-signers on the bill for your overlooking purposes that this bill presents.

I think that from the presidents who you have heard today and those that you will hear from, that it is very clear that there is a mental preparedness on the part of the presidents of the institutions in the State of New Jersey for the kind of effort that this bond issue proposes to support. However, I know we are all aware that, along with the mental preparedness, we need a fiscal preparedness, and this is what you are proposing. So, the New Jersey Association of Colleges and Universities does support this bill.

We believe that the funds are necessary. We believe that the time is now, that we cannot afford to wait. We were involved in a bond issue in 1979 in which we had about three weeks to try to gather people for support. It is totally impossible.

We believe that this bond issue had to be prepared, ready to go by no later than the end of April or very early May. That would give us five months to get together a citizens' support group to raise the money for the kind of publicity that we need for support for this bond issue. Without this kind of lead time, we will be in trouble, and without the bond issue coming forward, I believe, this fall, the State will be in trouble. I don't believe we can wait until November, 1984, for another bond issue of this kind, if this doesn't come forth at this time. That would put us two years behind.

You have asked some of the college presidents where we are in the competition. I think right now, there is no question that we are in the middle of the pack, and we may be falling toward the latter part of the pack. So, we do need this; we endorse it.

Our Board met this morning, as Dr. Bergen indicated, and we support your bond issue, and wish you the best of luck.

ASSEMBLYMAN DORIA: Thank you very much. Are there any questions from the Committee? Thank you very much.

At this point, I call Frank Mertz, the President of the Independent

College Association of New Jersey.

D R. F R A N K M E R T Z: Thank you, Mr. Doria, and members of the Committee. I echo and reecho the sentiments that have been voiced by the other members of the higher education community today, and applaud you for your efforts in acknowledging the role that the State must play in higher education.

My purpose and my comments would be limited to one point, a point made explicit by the first speaker, and a point that has been implicit in each of the comments that have been presented before you up to this time. And, that point is, that in any initiative, which professes to acknowledge and to put in the State of New Jersey in its higher educational system, in the forefront of educational systems throughout the nation, consideration must be given in this State to including the independent sector in the proposed bond issue.

In the 1974 Development Plan for Higher Education in New Jersey, the Board of Higher Education affirmed that it is through the diversity of sponsorship purposes, programs, environment and size that the independent institutions provide students with a variety of options essential to freedom of choice in higher education. Subsequently, in 1981, the statewide plan for higher education recognized the essential need for each institution to maintain its individual and distinctive character. That document went on to state that the importance of the independent sector should be acknowledged through the continuation of support for those institutions which share with the public institutions a public mission.

We appreciate the tangible recognition that the Legislature has afforded our institutions for their contribution to higher education in this State. Since 1973, through the Independent Aid Act, over \$100 million has been made available to our campuses. That support has enhanced the ability of independent institutions to provide the important elements of diversity and choice to New Jersey's system of higher education.

At the present time, our 16 member institutions enroll nearly 20% of the total students in higher education in the State. We award over 30% of the baccalaureate degrees, 40% of the master's degrees, and over 30% of the doctorate and first-professional degrees.

With respect to the proposed intent of the bond issue, I think it is worth commenting on what our institutions do in specific areas of science and high technology. On the undergraduate level, we have indicated that for the period reported, June 1981, independent institutions awarded 31.4% of all baccalaureate degrees in New Jersey. More specifically, we awarded 35% of the degrees in biology, 37% of all engineering degrees, and 36% of all degrees in the physical sciences.

On the master's level, the contribution of the independent sector to this State is even more impressive. Over 35% of degrees in mathematics, 51.9% degrees in engineering, 60% of the degrees in physical science, and 69.6% of the degrees awarded on a master's level in computer science were awarded by independent institutions.

With respect to doctorate and first-professional degrees, 62.9% of mathematic degrees, 61.2% of all engineering degrees, and approximately 70% of physical science degrees were awarded by the independent sector.

We feel that this Legislature and this State government, throughout history, has embraced a policy that a student's choice of college should be based

on academic considerations and not personal financial resources. Thus, you have sought to provide New Jersey residents with the opportunity to attend institutions, regardless of financial or ethnic background.

We feel that, for our part, the independent institutions have been reasonably successful in helping you achieve a statewide goal. In most respects, in academic, socioeconomic, and ethnic backgrounds, our students are parallel to those enrolled in the public sector. For many years, the State has been committed to the principle that independent institutions made an important contribution to higher education in New Jersey. Through legislative appropriations, you have acknowledged that it is in the public interest to assist our colleges in the provision and maintenance of quality educational programs.

We acknowledge, with gratitude, your commitment by law and public policy to the goal of enabling the independent institutions to maintain and improve the educational resources necessary to provide quality programs to New Jersey residents.

We, in turn, feel that if we are going to be able to continue to provide this aspect of our public service mission, that the long-term viability of all of our institutions rests on our ability to add and to maintain our capital improvement in plant and equipment. We feel, that in every respect, the significant investment by the independent sector in its facilities currently is a public resource, allowing us to fulfill our public mission of service to the residents of this State. We feel that the passage of this particular legislation, and the adoption by the voters of the bond issue that is called for, will allow us to continue our mission and more importantly, would allow us to respond to the specific recognized need of science and technology equipment, facility renovation, and facility construction. In this, with the rest of the sectors of higher education, we urge favorable consideration and pledge ourselves to work for the passage of this particular issue.

ASSEMBLYMAN DORIA: Thank you very much, Dr. Mertz. I have one or two questions. The one question I have -- has the Independent College Association endorsed this proposal, obviously, with the inclusion of the private sector?

DR. MERTZ: The Association of Independent Colleges and Universities in New Jersey, at its Board meeting yesterday, endorsed the concept of this particular bond issue and legislation, and, secondly, what we are currently doing is to undertake an impact study to determine what the effect and the utilization of funds would be on the entire sector. We will make that information available to the Committee and to its **aides**.

ASSEMBLYMAN DORIA: Are there any other questions from members of the Committee? Thank you very much.

DR. MERTZ: Thank you.

ASSEMBLYMAN DORIA: Dr. Robert Barringer, President of Brookdale College? I apologize to Dr. Barringer. We tried to get to you as quickly as possible. Thank you for coming.

D R. R O B E R T B A R R I N G E R: Thank you, Mr. Chairman, and members of the Committee. You have a copy of my testimony, so I won't repeat that, except that I just want to highlight a few things that are contained in that testimony.

First of all, we appreciate the opportunity, and I am speaking in support of the bill. I am speaking on behalf of the Council of County Colleges, which has unanimously voted to support this bill.

We believe that this is an absolutely necessary course of action of this State at this time. The county colleges, and you are very acquainted with the efforts of the county colleges of New Jersey -- the county colleges here worked, and as a part of our basic mission, it is job development and skill training. This has been our mission for as long as I have been in the business, and that has been a very long time, not in this State, but in other states. That is intrinsic to our mission, and it seemed to us that what this bill does is one of many things that will pull the assets of this State together.

One of the things that I noted when I came to this State last year from Texas was that there did not seem to be a mechanism which began to pull the great assets of this State into synchronization addressing the problem of economic development. There were pieces around. The State has great assets that have been enumerated here today.

The gentleman who preceded me represents some of those assets. There didn't seem to be a way in which there was a master plan, which pulled it all together, and addresses the needs of the State.

I represent, in the Council, institutions that enroll the majority of students in this State -- over 100,000 students, over 50% of the enrollments in the State, with over 200 programs that are dedicated to the technologies, both in the allied health areas and the other technology areas. It is an enormous asset, which again, I do not feel this State has employed.

For a number of years, I was resident of a college in North Carolina. I worked with Governor Sanford, and with some of the others there, in the development of that state's efforts to attract and retain industry. The Research Triangle has been mentioned earlier today. But, what is often forgotten, is that the success of that state depended a great deal upon the effectiveness of the skill training, the technical training level that Dr. Fenster mentioned, that came out of the technical institutes and the community colleges, because that is where most of the manpower is located. The research facilities are important, crucial and absolutely necessary, but for this State to address that issue, there has to be a large program of training for entry-level and mid-level personnel. Otherwise, we will never be able to carry out the designs that our great universities are able to employ through their resources.

We feel that it is going to demand the leadership of the Legislature and of the Governor, and we wanted to say to you that the community colleges are absolutely dedicated to the revitalization of the economy of this State. We feel that we have the resources now somewhat in place, and with some assistance, and we feel that this bill will provide some of that assistance, along with some other things things that are happening. We do support the Governor's Commission of Science and Technology, and that things will be coming from there. But, we feel that we are like an asset, as the other hard educational segments of the State, are, and we are ready to go; we are ready to help in whatever ways that we can. So, we would like to support these efforts.

If I can answer questions, I would be most happy to do so.

ASSEMBLYMAN DORIA: Well, yes, I think we are very fortunate to have someone like yourself who has had the experience in other states, and in the area of community colleges.

You bring up the whole point of training of technicians, and the importance of the training of technicians. I think that maybe if you would elaborate on that a little more, because, I think, too often we forget the importance of not only the professionals, but the technicians who must work in these high-tech industries.

DR. BARRINGER: Mr. Chairman, it is fairly well established that in industrial circles, that one engineer needs five to six technicians in support of that engineer, and what I find in many cases is that industry under-utilizes their engineering assets. They under-utilize them in the sense that they are doing technician's work, so I found that when they have access to trained manpower, that is the point at which they can then more fully utilize the conceptual engineers. It has been, again, I think, the states that have enjoyed successes in building a good economic base in the technologies have been those that have recognized their many levels of technical training. It is crucial, absolutely crucial to have that top-level training occur, but it is also crucial that our State colleges and our community colleges, and that each level -- and our vocational schools and our public schools -- that each have a contribution to make to this continuum. It is necessary to support all of that in order, I think, to make this response vital.

ASSEMBLYMAN DORIA: I want to emphasize the fact that our community colleges are our point of entry to so many of our people who cannot afford to go in any other way, and who will suffer from many of the effects of the present economic situation. It is important that they have this entry level, and they can move in and get jobs.

I also want to point out that this bond issue is the first time that we are including community colleges in the bond issue for higher education in the State of New Jersey, and I think that is very important, and again, shows the importance of the community college. So, I have to agree with you whole heartedly, and I want to thank you for your support and for coming here today.

Do any members of the Committee have any questions?

ASSEMBLYWOMAN GARVIN: I am out of it today. I am glad that we have got so much support. I think it is marvelous.

ASSEMBLYMAN DORIA: Thank you very much.

DR. BARRINGER: Thank you.

ASSEMBLYMAN DORIA: Dr. Mark Chamberlain, President of the Trenton State College? Dr. Chamberlain, thank you very much for coming here today.

D R. M A R K M. C H A M B E R L A I N: Mr. Doria, members of the Committee, I have no qualms whatsoever in being identified with a very fine institution that is somewhat closer to you than my own. I am from Glassboro, and --

ASSEMBLYMAN DORIA: Oh, I'm sorry, I'm sorry. It is my fault, Dr. Chamberlain.

DR. CHAMBERLAIN: No problems at all. I would want to preface my remarks because they are not wholly consistent with what you have heard here today. With the fact that I am speaking in my role as President of Glassboro State College, and from a variety of backgrounds and experiences, I do not represent the point of view of the Council of State Colleges. There is no position that that Council has taken as a formal body, at least to my knowledge, and therefore, you must weigh my words

as representing my views and not those of any collective.

I do appreciate the opportunity to come here today. I have been here in the State as President of Glassboro State College since 1969. Before that time, I was an administrator and also a faculty member in the Department of Chemistry at Western Reserve University, later Case Western Reserve University in Cleveland. I had the opportunity during the mid 1950's and on through until I left that institution to come here to New Jersey to be involved, not only with the teaching of the sciences, but also a considerable amount of research and the opportunity to work with some very close friends across the fence at Case Institute of Technology, a very fine engineering school.

I have no intention, and I do not want my remarks to be construed today as halting the intent of Assembly Bill 2093. I strongly support the intent and the direction which this bill is going to take the State of New Jersey. On the other hand, I also feel that I have a responsibility, once this bill is passed, and the bond issue goes before the voters of this State, to make the very strongest presentation to them that I possibly can. And many of my questions are in anticipation of that selling job, which I will be committed to do, if this bill goes forward and voters are, indeed, asked to put their stamp of approval through referendum on the concepts here within this act.

My concerns, then, are really, how do I sell this? What sort of questions am I going to get, not from the business leaders, but from the small businessmen from the Glassboro Lion's Club, from my own faculty? If I have got a job to do, I want to be armed with the information necessary to go out and do that job well. Initially, a very minor point -- I am a little concerned about bond issues that come up front and say, "35 years," and then you have to read a little bit further into the bill to be sure that there can be shorter-term bond issues, and given the rate of equipment obsolescence, whether it be in computers or gas chromatographs, I would suggest that, most respectfully, the bill make explicit that we are not going to bond instruments that are obsolete in three years for thirty-five years.

I have visions of being asked, "how come we are going to be paying for something in the year 2000 that you discarded in 1990?" Perhaps some rewording might be of assistance there.

The question, too, of the articulation between the intent of this bill and the Governor's Commission -- the Commission -- it is a distinguished Commission -- I am a manager, and I would like to know how this bill meshes with the clear intent in goals of the reports coming forward from this Commission on Science and Technology? It is important to me. As a manager, I like to know where I am going before I commit resources into that venture, and that is one of the very serious concerns I have. I would hope that, as the information flows forward to the public and to those of us who are going to have to carry the responsibility for selling, that this would be made explicit, so that, indeed, all of us -- our reading from the same sheet of paper -- we're singing the same song out there, because if we are not, then in an economic situation such as we now find ourselves, we are all going to be in trouble.

I also know, all too well, the political realities of getting voter support for bond issues. There is a strong tendency, and I believe, a very natural tendency to try to ensure that there is something in that package for everybody.

This may well be a necessary condition for the voter approval that we must have before we can go forward. But, I would urge that we temper that automatic response with some rather careful thought.

Back in the 1960's, I was involved as one very small part of a very large effort to obtain for Western Reserve University, funding from the National Science Foundation under its Centers of Excellence Grants. To remind you, about 1965, the National Science Foundation put some \$230 million into an operation called "Centers of Excellence." It was divided into several categories, but \$177 million of those dollars were designed to be used to upgrade what was termed "second-tier" institutions, institutions that had the potential and the commitment to become "Centers of Excellence" in the natural and social sciences. Now, 31 were funded. The range of grants came between \$3 million and \$7 million for most of them. The highest, I believe, it was the University of Indiana. It was \$9.2 million.

In 1975, an assessment was made, independently, of the impact of these grants. By and large, the impact was positive. Many of the problems which had been anticipated did not occur, or occurred to such a small degree that the naysayers early on in the process were -- it was demonstrated to them that they were wrong. Not surprisingly, the degree of attainment of the goals of the grants was directly proportional to the number of dollars that were plugged into the operation. The greater the grant, the greater the odds that the individual institution did go forward to become a "Center of Excellence."

I would like to apply the lessons there into the distribution of funds here within the State of New Jersey. The process you have heard described by previous speakers, my colleagues, Dr. Bloustein, Dr. Fenster, Dr. Rogers -- all of them impressing you, I hope, with the idea that peer review is a critical approach to the distribution of these dollars. I agree. I have seen it work. I have gained from it, as a practicing scientist, and I have lost because of it. But, I was confident that the system had been operated fairly, that I was not being judged by anything except my ability to perform the task which I set out and claimed that I was going to perform. I am rather proud of the grants that came to me as a consequence of this review, and I am going back and looking at the ones that I lost. I learned something, too, and the next grant was a better one. So, I strongly support that.

On the other hand, I would not like to see this peer review, dealing with small quantities of money. I would like to see a very clear indication that monies are going to be distributed in this State in more nearly a rifle-shot approach, rather than a shotgun approach. I do not, in any way, wish to cut into any sector's ability or into any private, independent, public controversies. That is not the goal; the goal is to obtain the biggest bang for the buck for the good health of the economy and the citizens of the State of New Jersey.

I believe very firmly that more dollars into fewer places, whether that be in the county college, be it in the State college, be it at Rutgers, be it at NJIT, the University of Medicine and Dentistry, or among the independents is the best way to allocate these dollars -- not a little bit for everyone, but with a very clinging determination that a large number of dollars are going to be spent to make a major impact and not a lot of little impacts.

I guess, as a budget practitioner, as we all are here within the State these days, I simply raise a question. I am going to get hit with this as soon as I walk back on the campus. My Board is going to ask the question, the faculty is going to ask the question, and I raise it here with you. There is no free lunch. Money borrowed today is going to be paid back.

Right now, as I look at the recommendations for the budget for FY '84, somewhere in the neighborhood of 7.7% to 8% is already going in the higher education budget to debt service for general obligation bonds. That is about \$40.5 million. Out of that, about \$18 million, plus, is for interest alone. That is more money than is being given to support five of the eight traditional State colleges in New Jersey. That is a lot of dollars. In saying that, in an era of level funding of budget, I think it needs to be made explicit that either it is the sure intent of the Legislature, the Governor, and most importantly, the citizens of the State, to continue to fund high tech in this bond issue, and all the costs associated with it, as an addition to its ongoing commitments, or alternatively, it be made explicit that this is substitution for its ongoing commitments. Either way, we are dealing here with a major issue of public policy, and I would like to have that very clearly raised, either in discussion within this Committee, or certainly, as it is going to be discussed as we move forward to sell this bond issue to the voters of this State. You are going to substitute, and if you do, something is going to give on one hand in order to support on the other.

Now, I have no problems -- or, I have many problems -- but I have no conceptual problems in dealing with that approach. I have been doing that since 1975 when budgets suddenly became quite constrained. But, I think it needs to be made very clear that this is a reasonable outcome of the actions which are being discussed here today. My own personal view: I think the movement towards development of a high tech capacity within the State is not only a good thing to do, it is an absolute necessity that it should be done. If the costs are weighed up, and, indeed, the determination is made that the State is to move in that direction, then let us move and go, and let us do it quickly, do it cleanly, and do it with full understanding that there are no gains without costs. And, that we are not only willing to accept the gain, but we are also willing to pay the cost.

I thank you very much.

ASSEMBLYMAN DORIA: Thank you. I have a few questions. I think you brought up some interesting points during your presentation.

First, I think that the intent of the Committee and the sponsor of the bill is that the money that comes through this bond issue, and the money to pay this bond issue off, would not be money that would be substituted for money that is coming at the present time. It would be new money, additional money. We are cutting back too much right now on current expenses to use this as a substitution, so I want to make that clear. And, that is the intent, at least of this Committee, and the sponsor of this piece of legislation.

My question to you is, do you think that current expenses can, at the present time, sufficiently fund the renovations that are necessary at Glassboro State College or at the other institutions to meet the need of this new high-tech society, first, and if not, then what means would you suggest, other than a bond issue, to provide the necessary funds to bring about these renovations?

DR. CHAMBERLAIN: Mr. Doria, I cannot get money to fix leaks in roofs, much less renovate or rebuild or replace instrumentation, which in the normal course of events, becomes obsolete or out of service.

ASSEMBLYMAN DORIA: So, what you are saying is, the current expense budget can't do it.

DR. CHAMBERLAIN: It cannot do it.

ASSEMBLYMAN DORIA: What other suggestions -- you have concerns over the 35-year bond issue. Obviously --

DR. CHAMBERLAIN: Well, I am talking, just a matter here -- if you are going to bond for equipment, bond for a shorter period of time. Bond for five years, bond for ten years. It is permitted within the ambit of the wording of your bill. I looked at it first, and missed it completely. I figured that, well, after I got the intent and some of the details, then that is boiler plate that you see in all bond issues. Then I went back and looked again, and it isn't -- it is boiler plate, but it provides more opportunity for flexibility. You don't have to issue every bond for 35 years, at least as I read it.

ASSEMBLYMAN DORIA: No, the way it is set up, there is the flexibility in the bond issue.

DR. CHAMBERLAIN: That is right. It is there, but for the relatively inexperienced individual who is trying to read through, in a rather complicated issue, it might be very helpful to put that up front either in the language of the bill or, certainly, in the public information that flows --

ASSEMBLYMAN DORIA: I would think that this would have to be part of the education process that would be necessary to push for this.

DR. CHAMBERLAIN: Fine, but sometimes you have got to educate the educators.

ASSEMBLYMAN DORIA: Right, but I think it is a good point, and I think it is one that should be emphasized -- that there is the flexibility in this legislation, as presented, to provide for a lesser bonding period for equipment.

Once again, we are talking about both equipment and facilities, so that -- and there is going to be that point of discussion, I am sure.

DR. CHAMBERLAIN: That is right.

ASSEMBLYMAN DORIA: But, I think it is worth bringing out. The only thing I would mention is in reference to the funding. I think the Committee agrees with peer review. I think that that will be one of the amendments that will be added at the meeting on February 28 when we discuss the bill and vote on it in Committee. So, I don't think there is any disagreement on that.

I think part of the process is, we can't allocate in the piece of legislation. What we can do is, set up the system and then regulations will allocate. That is where the Department of Higher Education, working with the Chancellor, would have to get involved in actually determining the amounts of money and the actual allocations and how the allocations would be set up -- how much would be set up to go into training, how much into research, how much into equipment, how much into bricks and mortar, if there are any bricks and mortar? Okay?

DR. CHAMBERLAIN: I am also a very strong believer in the concept of legislative intent as being guide to the Executive Branch for the interpretation

of legislation and the development of appropriate and reasonable administrative regulations --

ASSEMBLYMAN DORIA: I agree with you, and I think --

DR. CHAMBERLAIN: So, I would like very much to have, at least as part of the explicit statement of legislative intent, some of the ideas that I have proposed here.

ASSEMBLYMAN DORIA: I think that that will be part of the Committee's discussion, obviously, and we would get involved. And, hopefully, the Chancellor, by that time, will have decided whether he is going to or not going to support the bill. We would be able to talk about it.

DR. CHAMBERLAIN: That is up to you. You'll have to talk with the Chancellor.

ASSEMBLYMAN DORIA: Obviously. Would you like to ask a question?

ASSEMBLYWOMAN GARVIN: Yes, I think Dr. Chamberlain brought up a very valid point. From my experience with the Nuclear Freeze Referendum, a public relations package, if you will, for selling this bond issue is very crucial, because we are not talking about this in place of anything. This is "in addition" to, and I think the one thing that those of us who support this measure that we are going to have to be very careful about, that they are not entities who want to reduce what you presently have, because we are looking for something we don't have, and that is going to be a very crucial part of the public relations process -- that all of us, collectively -- you know, that last bond issue that went down for higher ed, it had to do with how we didn't sell it, and it did not pass. So, I think your comments are really valuable.

DR. CHAMBERLAIN: Well, my concern also is that I understand the budgeting process, perhaps, all too well. The budget leaves our campus, the requesting budget goes to the Board of Higher Ed, it leaves them, and basically, it is oriented towards resources necessary to do a particular job. And, that is a goal.

When it leaves the Governor's Office, I have a very strong suspicion that it has been changed in its intent to providing the funds within a totally balanced State budget. That is perception. I have not dug down into the catacombs to determine whether this is true or not, but the numbers do imply.

Now, if you are dealing with level funding or a balanced budget, as a general part of State policy, then, in fact, whether you wish or not, you are being forced to substitute. And, I would also point out that, say a piece of equipment or a building, is no good unless you get people to use it. People cost money, and they are ongoing expenses.

ASSEMBLYWOMAN GARVIN: I want the record to show that I am very disappointed that the Chancellor was not here at our public hearing to give us direction, correction, information. I think the Chancellor has that responsibility, and it is unfortunate that he was not here, and is not going to be here, I understand, to give us one of several options as far as his role is concerned. I want the record to show that, Mr. Chairman.

ASSEMBLYMAN DORIA: I would have to agree with Assemblywoman Garvin, and I know the Committee agrees. In fact, I think what we will do is, the Committee will send a communication to the Chancellor, asking him to come.

ASSEMBLYWOMAN GARVIN: Please.

ASSEMBLYMAN DORIA: He will be at the February 28 meeting, and we will ask him to be ready to take a stand, either for or against this piece of legislation.

ASSEMBLYWOMAN GARVIN: Yes, but, I think that is where we get into problems. This was an opportunity for discussion. We, as a Committee, will be hearing the bill for legislative action on the 28th. What we need to be accountable legislators is input before the fact. They always blame us, as the politicians, for not doing this and not doing that, and it is not always true. So, we needed the input before we took the legislative action that I am sure we are going to take. I just don't think --

ASSEMBLYMAN DORIA: I think your point is well taken, and I agree.

ASSEMBLYWOMAN GARVIN: Thank you.

ASSEMBLYMAN DORIA: Well taken.

One other thing on the Commission on Science and Technology -- obviously, we have already begun to coordinate with them, and this piece of legislation has been presented to them. At the next meeting of the Commission, which I am a member, I had planned to bring this up again and ask them for some kind of decision. I understand the Executive Board has taken a position for it, but I don't understand if that has gone any further than that, and that there is further discussion that is going to have to take place amongst the entire Commission. But, that will be taking place, and that will be done prior to this ever going on.

DR. CHAMBERLAIN: That is very much encouraging, because, if we are not reading from that same sheet of music, we find ourselves in great difficulty.

ASSEMBLYMAN DORIA: I agree, and I think it is essential. I think, basically, what we are doing, is we are taking one of the possible recommendations of the Commission. The Commission recommended this year \$10 million to the Governor in current expense to do basically what we are talking about. Well, \$5 million to do renovations, and working in the area of science and technology, and \$5 million in teacher training in math and science. The Commission, itself, in a number of its reports, specifically in the area of the engineering studies, talked about a \$60 million to \$65 million need just in those specific areas -- without going into the other areas, we hear from President Bloustein that a need at Rutgers in four specific areas is \$66 million, other than engineering. So, we are already up to \$126 million, and we haven't heard from the private colleges or the community colleges or the other State colleges. I think, as you say, we have to be careful that we don't use a scatter-gun approach; we have to try to rifle it in on specific needs. There is no question that the need exists, and I don't think that the Commission can say that it doesn't exist. I think the question here is one of diplomacy in that we don't want to look like we are jumping the Commission and a recommendation of the Commission. As a member, I wouldn't want to do that.

This bill was in almost at the time of the inception of the Commission. Before that, we were working on it, so it is a case of where like minds thought in the same manner. Unfortunately, the Commission has to go through a process, and through the Legislature, we can move a little more quickly.

ASSEMBLYWOMAN GARVIN: Bright minds.

ASSEMBLYMAN DORIA: Bright minds, yes. Thank you very much, Dr. Chamberlain. If there are no other questions -- Thank you, thank you very much.

At this point, I would like to ask Dr. Harold Eickoff from Trenton State College. Is Dr. Eickoff here? (no response)

One clarification. Mr. Sidar, if you would sit down for one second. Your membership of the New Jersey Association of Colleges and Universities is made up of all State colleges, as well as private colleges?

MR. SIDAR: Forty of the institutions in the State.

ASSEMBLYMAN DORIA: Are all of the State colleges involved there?

MR. SIDAR: All but one.

ASSEMBLYMAN DORIA: All but which one?

ASSEMBLYWOMAN GARVIN: Independent?

MR. SIDAR: Glassboro.

ASSEMBLYMAN DORIA: Glassboro. Okay, so what we can say is that they -- independents and private -- we can say that the Board has endorsed it, so that the State colleges, except for Glassboro -- Glassboro was spoken for individually by --

MR. SIDAR: Dr. Eickoff was there this morning at our Board meeting, as was Dr. Dixon and a representative from Kean College.

ASSEMBLYMAN DORIA: So, basically, all of the State colleges endorse this also. I just wanted to get that clarified.

MR. SIDAR: Right.

ASSEMBLYMAN DORIA: Thank you. Thank you very much.

ASSEMBLYWOMAN GARVIN: Is there some reason that Glassboro is not a member of this Association? If you don't want to discuss it now, please --

MR. SIDAR: I would rather not discuss it.

ASSEMBLYMAN DORIA: President Sidar and President Chamberlain have to talk about that. Okay, thank you.

At this point, I will call on Professor Edward Boyno, representing the AAUP.

P R O F E S S O R E D W A R D B O Y N O: By way of background, I am an Assistant Professor of Mathematics at Montclair State College, as well as the President of the American Association of University Professors. I am the only faculty member who will be here today.

New Jersey is a high technology State. Maintenance and expansion of this position depends upon a number of factors, not the least of which is an assured pool of highly trained people at all levels. By this, I mean not only PhD-level professionals, who tend, by the way, not to be geographical in their choice of position, but also bachelor-level technicians, computer programmers, and statisticians who do tend to remain at home near their institutions of training.

The role that New Jersey's colleges play in this is well known to all of you. Our recent developments, however, have placed in jeopardy our continuing ability to do so. The reason for this is twofold: both equipment, which is the concern of this Committee, and staffing. Far from being state of the art, laboratories of many of the colleges, especially the State colleges, are often antiquated and ill-equipped. Our computer facilities are embarrassingly inadequate, even to handle those students involved in computer science programs, and, at the moment, we can't even contemplate providing computer access to the general college population, something we believe will have to be done more and more in the future, as persons become more computer literate.

The root of the problem is not surprising -- chronic under-funding. The American Association of University Professors strongly supports Assembly Bill 2093, but it views it as an emergency measure to alleviate the problem that has grown up over the past several years. However, we believe that scientific and computer technology becomes outmoded so rapidly, that the only long-term solution must lie in a policy of adequate continuing of findings of the appropriations process.

Now, staffing is not a matter of this Committee's concern; however, the availability of hardware and technology does affect the ability of colleges to staff their positions. At the moment, it is very difficult, and in some cases, impossible to staff openings in high technology fields, and, of course, in those fields such as business and accounting. I believe that providing capital funds -- as this bill purports to do -- will not be an answer to the problem, unless you also, at the same time, tackle the problem of providing faculty to exploit those issues.

Thank you.

ASSEMBLYMAN DORIA: Okay. I want to thank you for being with us, Dr. Boyno. I want to point out that Dr. Boyno and I are both alumni of St. Peters, and we were students about the same time.

I have to agree with you wholeheartedly, about the current expense question. I think that, obviously, if we don't adequately fund the current expense budget for both renovations and salary to staff, we can't hope to maintain what we are going to try to build up. So, the immediacy is necessary to the current budget. As you say, the question of catching up and doing what we have to do to improve the youth facilities is the bond issue, and that is what the bond issue is directed to.

PROFESSOR BOYNO: That is why we support it so strongly.

ASSEMBLYMAN DORIA: I have to agree with you wholeheartedly. I am so happy to see a faculty member here getting involved. I think that is very important. Hopefully, you could encourage other faculty members to do the same, because I think it is important that we get the input, not only from the administrators and the presidents, but also from faculty who are directly involved in the day-to-day operations of the classroom and the day-to-day dealings with the students and the equipment. They see the problem. They see the leaky ceilings and the lack of equipment.

PROFESSOR BOYNO: It is a serious problem. By way of a horror story -- I know you are all tired and you want to get to lunch -- the entire budget for the School of Mathematics and Science at Montclair State College for purchase of equipment last year was \$16,000. This is an absolute disgrace. One cannot run a college with that sort of budget.

ASSEMBLYMAN DORIA: That is absurd. I think this is a problem that we have to address, and I think, unfortunately, too often in the past when we had to cut, we have cut from higher education. We should begin to adequately fund higher education and fulfill the needs that it has, because we can't continuously try to catch up; we have to try -- Instead of playing "catch up," we have to try to play ahead of the game. I just wanted to point that out. I have to agree with you wholeheartedly, and thank you.

Are there any other questions?

ASSEMBLYWOMAN GARVIN: Thank you for coming.

ASSEMBLYMAN DORIA: Thank you very much. Is there anyone else who would like to present testimony on the bond issue? (no response)

I would just like to sum up this morning's hearing. I would like to sum up by saying that what we have had this morning is, I would think, a unanimous agreement that there is a need for this bond issue, a unanimous agreement that \$75 million is not really enough, but that will move towards doing the job, unanimous agreement on the part of the witnesses that it must be done immediately, and it should be done as quickly as possible -- November of 1983 being the date, 1984 being too late. I think we have seen that there is a great deal of need for development of science and technology in the State of New Jersey. We have seen a need for cooperation amongst the various groups, such as the Commission on Science and Technology.

I want to thank everyone who testified for their presence here. I want to thank my Committee members, Assemblywoman Garvin, Assemblyman Bocchini, and I want to thank Assemblyman Rocco, who couldn't make it, but who did send his aide. Jeff, thank you very much. And, I want to say the the Committee will be reviewing and voting on this bond issue at the February 28th meeting of the Committee.

I want to thank very much the Committee Aide, Kathy Fazzari, for the time and effort she put into getting this whole thing together, and I would like to thank staff and Legislative Services and Majority Staff.

We hope to have the minutes of this available by the February 28th meeting of the Committee, so that we can make them available to everyone who is present and to all of those who were not present. Thank you very much.

This concludes the public hearing.

(Hearing concluded)



NEW JERSEY ASSOCIATION OF COLLEGES AND UNIVERSITIES

P. O. BOX 3300, SOMERVILLE, NEW JERSEY 08876 • (201) 526-1972

STANLEY S. BERGEN, JR., CHAIRPERSON / PRESIDENT, UNIVERSITY OF MEDICINE AND DENTISTRY OF N. J.
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ALEXANDER G. SIDAR, JR., PRESIDENT

February 16, 1983

The Honorable Joseph V. Doria, Jr.
Chairman, Assembly Higher Education
& Regulated Professions Committee
235 Broadway
Bayonne, N. J. 07002

Dear Assemblyman Doria:

I am writing in general support of A 2093, the bill on the "Jobs and Technology Bond Act". There is little question that the kind of funding that you are calling for is desperately needed in the state of New Jersey to upgrade the capacities of our higher educational community to properly serve the state in this area. Further, these funds and the advances for which they plan in institutional training programs and research to support a major state endeavor in high technology are essential to meet current and emerging competition with other states.

Our college and university leaders have suggested some amendments to the bill and NJACU is pleased that you are willing to consider these. These, we believe, will be most helpful in utilizing the resources of all of our institutions that are capable of contributing to the objectives of the bond issue.

A number of our college and university presidents will be testifying at this public hearing today. They will bring forth suggestions for some modifications in the proposed legislation. I am sure you will give these serious consideration.

As a concluding comment, we need to have final action on this proposed bond issue in late April or early May. The planning attendant to the successful passage of a bond issue requires a minimum of five months before the referendum at which it will be voted. The state cannot afford the loss of time, position and progress that would occur if this funding plan were to be delayed in referendum until November 1984.

Sincerely,

Alexander G. Sidar, Jr.
President

ASG:egb
cc



STATE OF NEW JERSEY
COUNCIL OF COUNTY COLLEGES
900 BERGEN AVENUE, JERSEY CITY, NEW JERSEY 07306

DR. NINO F. FALCONE

Chairman of the Council of
County Colleges
(201) 656-2020, Ext. 103

February 16, 1983

ATLANTIC
COMMUNITY COLLEGE
Mays Landing, N.J. 08330

BERGEN
COMMUNITY COLLEGE
Paramus, N.J. 07652

BROOKDALE
COMMUNITY COLLEGE
Lincroft, N.J. 07738

BURLINGTON
COUNTY COLLEGE
Pemberton, N.J. 08088

CAMDEN
COUNTY COLLEGE
Blackwood, N.J. 08012

CUMBERLAND
COUNTY COLLEGE
Vineland, N.J. 08360

ESSEX
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COUNTY COLLEGE
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Jersey City, N.J. 07306

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Somerville, N.J. 08876

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COMMISSION
Sparta, N.J. 07871

UNION
COLLEGE
Cranford, N.J. 07016

WARREN COUNTY
COMMUNITY COLLEGE
COMMISSION
Belvidere, N.J. 07823

TO: Members of the Assembly Higher
Education and Professions Committee

FROM: The Council of County Colleges

RE: A-2093 - The Jobs & Technology
Bond Act of 1983

My name is Bob Barringer. I am President of Brookdale Community College, and I am speaking today on behalf of the Council of County Colleges in support of A-2093, the Jobs and Technology Bond Act of 1983.

We are pleased to support this bill which for the first time recognizes the needs of New Jersey's public institutions of higher education to renovate their research facilities, and purchase equipment so that their students will be able to compete for jobs in new high technology industries.

In its 1981 Annual Report, the Economic Policy Council suggested that "New Jersey's future economic prosperity will depend to a large extent upon the State's success in nurturing and augmenting its high technology industries."

Five factors were cited as crucial in attracting science-based industry. The second factor pointed to the necessity for a well-established network of colleges and universities with strong research capabilities in many fields of technical innovation and with the ability to produce graduates with degrees ranging from the Associate

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in Applied Science, a degree offered by the County community colleges, to the Ph.D.

Until now, the missing element in New Jersey has been a coordinated plan for retaining existing industry and for the attraction of new industry.

The county colleges are already active in efforts which are supportive of economic development and the enhancement of an environment for high technology development in our state. They have been hampered, however, by the lack of funds for capital construction and for equipment. In addition, the meager amounts of capital funds that have been available in past years could not be used for renovation or the purchase of equipment.

The county colleges continue to work with local business and industry in responding to many of their instructional needs while seeking their support for staffing, equipment, and consultative and advisory assistance.

We are working with the Task Force on Technology-Trained Manpower of the Governor's Commission on Science and Technology. We are supporting small business institutes and working with small businesses which employ a majority of workers in the State.

We are encouraged by this legislation because we believe that the community college is the organization that is and can be increasingly helpful in creating a technically skilled work force. Currently, we are educating a great proportion of technicians being trained in the State. At the 19 community colleges, over 200 individual programs are being offered in the areas of engineering, business, computer science, natural sciences, and health.

Much has been made of the North Carolina economic development experience, citing the facilities of the Research Triangle and the resources of the several great universities in the State. What is less well known is that the community colleges and technical institutes have played a prominent role in the North Carolina success story -- last year the State funded 30 new high cost/high technology programs.

In all other states which have been viewed as successful in economic development and high tech development, there have been a coordinated economic development plan and a subsequent breakdown in parochialism. For any success in this arena, there must be a commitment from the Governor and the Legislature with concomitant funding and a recognition that the Community College, whose mission includes technical training at the mid and entry levels, can be a presumptive deliverer of such training.

With your and the Governor's leadership, together with the participation of the higher education community-- education in general and technical education in particular -- and the private sector, the organizations I represent envisage a partnership which will make New Jersey a leader in high technology development. As a result, jobs will not only be retained but also brought back to this State.

We support any effort which does that, and we believe that the Jobs and Technology Bond Act begins to address that issue, and we pledge our support of the efforts which our State will make over the coming years.



State of New Jersey
GLASSBORO STATE COLLEGE
GLASSBORO, NEW JERSEY 08028

OFFICE OF THE PRESIDENT
(609) 448-8202

Testimony
Assembly Bill No. 2093

Mark M. Chamberlain, President
Glassboro State College
February 16, 1983

Thank you very much for the opportunity to testify today. My name is Mark Chamberlain and I am President of Glassboro State College. I have served in this capacity since 1969; before coming to Glassboro I was an administrator and a member of the faculty in Chemistry at Case Western Reserve University in Cleveland, Ohio. My comments today draw upon my experience as college administrator and in research/teaching at a major university.

It would be difficult to fault the intent of Assembly Bill 2093. Addition of \$75M in capital assets to the system of higher education in New Jersey cannot but help all of us--in New Jersey's colleges and universities and in society as a whole. Certainly, the area of high technology--however you wish to define that term--is critical to the continuing economic good health of the State. Certainly, New Jersey's higher education system is already a strong contribution to the development of high technology and, with better equipment, facilities and faculties will do more. My concerns with Assembly Bill 2093 should be taken as concerns with timing, wording and implementation and not with the basic concept of support for the improvement of New Jersey's high technology capabilities.

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First, I am concerned with the timing of this bill and the bond issue it is to trigger. This year, a special commission is at work to define New Jersey's needs and directions in encouraging the development of high technology. This distinguished group of business, public and educational leaders has yet to report its findings and recommendations. As a manager, I like to be sure I know where I am going, with some specificity, before I commit resources to the journey. The Commission's final report and recommendations should go far towards defining New Jersey's goals and objectives in high technology development. This definition would help to insure wise commitment of resources to that development.

Second, I am concerned with the multiple intents of this bill. Bonded indebtedness is to be incurred for both physical facilities and equipment. It is clear from a variety of state and national studies that colleges and universities are in crying need of modern equipment to support their high technology programs. I would question, however, the soundness of funding both facilities and equipment with 35-year bonds. After 35 years of good use, the facilities will still be there but most equipment will have long since become obsolete or unusable. We could find ourselves in the position of paying, in the year 2000, for equipment that was worn out and discarded in 1992. I would urge strongly that, if equipment is to be obtained it should be financed by short-term bonds and only facilities and equipment with a longer expected lifetime be funded by 35-year bonds. A-2093 makes the issuance of such short-term bonds permissive. I would suggest that language be changed to mandate use of short-term bonds for equipment purchases.

Third, although I understand all too well the political realities of securing voter approval of a bond issue, I would argue strongly against scattering bond monies across all sectors of higher education and geographically across the entire State. Seventy-five million dollars is a lot of money but the needs in development of high technology are also great. I would urge that these funds be put into a limited number of projects--those with the most evident prospects of improving New Jersey's high technology capacities.

In the mid-60's, the National Science Foundation took this approach with its "Centers of Excellence" grants. Some \$230M was awarded to a relative small number of selected "second tier" institutions--institutions with the potential to become first-rate in certain scientific fields. The bulk of the money, \$177M went to 31 universities--judged to have the potential and commitment to develop excellence. Most grants ranged between \$3M and \$7M; the largest was for \$9.2M. By 1975, evaluation of the effects of this approach was in hand. The results were positive, the general goals of the project had been attained and, not unexpectedly, the study found that the greater the grant the greater its positive effect. I urge a similar approach here in New Jersey--in essence a determination of where the State can get the biggest bang for its buck.

Fourth, I am concerned with the ongoing financial impact of this bond issue upon the year-to-year operating budget of the State--and particularly, higher education's budget. We are all well aware that there is no free lunch and monies borrowed must be paid back with interest. In FY84, debt service on general obligation bonds in higher education is estimated to total \$40.5M, almost half which is interest. Debt service is roughly 8% of all funds recommended for appropriation to higher education. The interest payments alone exceed the recommended direct state support for five of the eight traditional State Colleges. If additional bonded indebtedness is to be incurred in an era of level funding, costs for that additional indebtedness will have to be assessed across the entire system. This may be an acceptable cost but we should at least make the decision knowing that there will be such costs and how these costs will be borne.

Further, initial costs of facilities and equipment are only part of total costs. Buildings and equipment must be maintained and repaired but more important, buildings and equipment must be used. Returning to the NSF "Centers of Excellence" grants of the 60's: one result, viewed as positive, was the increase in faculty size at public institutions

receiving these grants. I too view this outcome as a very real good but I also know that people cost money and that this cost must be accommodated within an institution's year-to-year operating budget. Retraining of existing faculty can only go so far; new talents and new cost must be added.

And so my arguments come full circle. A-2093 is more than a start towards improvement of the State's ability to develop high technology business. In fact, this bill is a major statement of public policy both in what it overtly sets out to do and in what it implies can no longer be done within existing higher education programs. As a manager, I would be a lot more comfortable if I knew more clearly where the State intends to go in high technology development, how A-2093 assists in reaching these State goals, and whether the costs to other programs have been weighed into this statement of public policy.

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