
Public Meeting

of

LEGISLATIVE MANUFACTURING CAUCUS

“The meeting will focus on workforce training issues, with testimony from vocational-technical schools, county colleges, and NJIT’s Manufacturing Talent Network”

LOCATION: County College of Morris
Randolph, New Jersey

DATE: October 17, 2017
10:00 a.m.

MEMBERS OF CAUCUS PRESENT:

Senator Robert M. Gordon, Chair
Senator Ronald L. Rice
Senator Anthony R. Bucco
Senator Robert W. Singer
Assemblyman Anthony M. Bucco
Assemblywoman BettyLou DeCroce



ALSO PRESENT:

Christopher Emigholz
Mark J. Magyar
Caucus Aides

Kathleen Fazzari
Gregory L. Williams
Luke E. Wolff
Office of Legislative Services

Hearing Recorded and Transcribed by
The Office of Legislative Services, Public Information Office,
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SENATOR ROBERT M. GORDON (Chair): This meeting of the Senate and Assembly Legislative Manufacturing Caucus will come to order.

Would you all please rise and join me for the Pledge of Allegiance? (all recite pledge)

Thank you.

May I have a roll call, please?

MR. WOLFF (Caucus Aide): Assemblyman Bucco.

ASSEMBLYMAN BUCCO: Here (upon entering). Timing is everything. (laughter)

MR. WOLFF: Senator Rice.

SENATOR RICE: Here.

MR. WOLFF: Assemblywoman DeCroce.

ASSEMBLYWOMAN DeCROCE: Here.

MR. WOLFF: Senator Bucco.

SENATOR BUCCO: Here.

MR. WOLFF: Senator Singer.

SENATOR SINGER: Here.

MR. WOLFF: Senator Gordon.

SENATOR GORDON: Here.

Good morning, everyone.

I am Senator Bob Gordon. It is my privilege to share this Legislative Manufacturing Caucus.

I want to welcome you to the second meeting of the bipartisan Legislative Manufacturing Caucus; and I would like to thank, particularly,

Dr. Anthony Iacono, President of the County College of Morris, and his superb staff, for their help in setting up today's meeting, and the tour we will have a little later.

Our first hearing in Paterson focused on the challenges facing manufacturing; a sector which employs 360,000 workers, making more than the average State wage, in more than 10,000 companies. And we focused on what we need to do to expand manufacturing in the state, a state that gave birth to American manufacturing in the first planned Industrial Enterprise Zone on the banks of the Passaic River.

Since that hearing, we've been listening to and meeting with manufacturers. Last week, members of our bipartisan Caucus attended the New Jersey Manufacturing Extension Program conference in Bridgewater, and the New Jersey Commerce and Industry Association's Conference on Manufacturing in Newark.

Today, our focus is on education and training, and how we can meet the pressing need for technically skilled workers to fill critical jobs in manufacturing and other growth industries.

Notice that in contrast to prior meetings, I've stopped talking about a shortage of *middle-skilled workers*, and I am now talking about *technically skilled workers*. More than 30 percent of our vo-tech high school graduates go directly to county college or technical training, and 40 percent go directly to four-year colleges. And the training and skills required in advanced manufacturing today are anything but middle-skilled.

Senate President Steve Sweeney has proposed a vocational-technical training bond issue to go on the 2018 ballot to meet the needs of manufacturing, life sciences, logistics, and other growth industries.

These technically skilled workers will be critical if New Jersey is to have a competitive edge in the new economy.

We're looking forward to hearing today from the vo-tech schools, the county colleges, NJIT's Advanced Manufacturing Talent Network, and from a leading manufacturer about where we need to go and how this bond issue should be structured to ensure that it meets our goals.

I want to thank you all for being here, and I'd like to offer other panel members an opportunity to make some opening statements.

Senator Singer, anything to say?

SENATOR SINGER: Just thanks for having us here.

SENATOR GORDON: Okay; Senator Rice?

SENATOR RICE: Good morning.

SENATOR GORDON: Assemblywoman DeCroce.

ASSEMBLYWOMAN DeCROCE: Yes, is this mike working? (referring to PA microphone)?

SENATOR BUCCO: Yes.

ASSEMBLYWOMAN DeCROCE: Okay.

Thank you, everyone, for being here in Morris County. I live in Morris County; actually, I live about -- not even 10 minutes down the road, right off of Route 10.

The County College of Morris is something that I'm very proud of. I know it's in Senator Bucco's and Assemblyman Bucco's District; but I'm right on the border there, and I have family members who attended and graduated the County College of Morris. And it's a fabulous school, and I'm very proud for you to see what the Morris County Freeholders and the

County College of Morris, working together, have produced here as a county college.

So thank you for being here in Morris County; I appreciate it. I only had less than a 10-minute ride, so I thank you. (laughter) And I thank the Chairman for that.

And welcome to Morris County.

SENATOR GORDON: Thank you.

Senator Bucco.

SENATOR BUCCO: I just want to thank all of you for coming into our District. We are very pleased that you decided to have this here, Senator Gordon. I think that it's very important that you are going around the state and hearing what workforce is needed. And I'm sure that we'll get a lot of input out of this meeting this morning.

So thank you.

SENATOR GORDON: Thank you.

Assemblyman Bucco.

ASSEMBLYMAN BUCCO: Thank you, Chairman, and welcome everybody.

I look forward to an informative discussion this morning. I think this is probably one of the most pressing issues that we face here in New Jersey, in terms of our workforce development program. The County College of Morris does an excellent job, and is trying to be ahead of the curve. And I hope that this panel can assist not only the County College here in Morris County, but other vocational schools and colleges around the state.

Thank you.

SENATOR GORDON: Thank you.

And now I'd like to bring up the first panel. I know Dr. Iacono has some introductory comments to make.

Doctor.

ANTHONY J. IACONE, Ph.D.: Good morning.

It is an absolute pleasure to have the opportunity to host the Manufacturing Caucus meeting and to have some great political leaders with us this morning, and honored guests as well.

And so on behalf of the County College of Morris -- and our partners who I'll be talking about in this County -- I do welcome Senator Gordon, Senator Bucco, Senator Singer, Senator Rice, Assemblywoman DeCroce, and Assemblyman Bucco.

We are so fortunate, I can tell you, in Morris County because of the kind of support that we get. I want to give you just a couple of quick examples. But our political leaders are always immediately available; they are very supportive, and they really understand what Morris County needs.

We're honored that you have chosen us, a beautiful part of New Jersey, a productive part of New Jersey. And as the Assemblyman referenced, we are trying to get out ahead of the curve. And we do meet with local businesses on a regular basis; there is a lot of emphasis on our manufacturers in the area. We do host roundtable meetings as well, in partnership with the Morris County Economic Development Corporation, to understand what they're going to look like in three years, and what do they need.

And the number one answer that comes back to us is, we need support with hiring a skilled workforce and training our existing employees

so that they remain on the front end as well. Their big concerns, as we all know, are simply, do we have the ability to continue moving forward. We're facing retirements; we're facing individuals who have been great, but they do need to be retrained. And CCM is at the front end of all of that, and we take a lot of pride in the work that we're doing in that regard as well.

We're keenly aware of what all of the studies show: 6 million eligible Americans who need to go to work, and employers who can't find that skilled workforce. We want to be a big part in reducing and closing up that gap as well.

So we work with large global corporations, like Arconic; we work with smaller manufacturers, like Glenbrook. And all of them -- we are appreciative. They donate -- when you take your tour of the manufacturing labs, they donate a lot of equipment that is in there. They donate it for students, and they donate to train their current employees as well. They provide internships, scholarships and, most importantly, they hire our students as well. So we're excited when we see headlines that say, "County College of Morris is number one in alumni salaries;" but what we're really excited about is students can come here, get the education that leads immediately to a good-paying job, and allows them to support the communities that we love and allows us all to prosper. That's really where the heart of our work truly, truly lies.

Building a pipeline is not just about taking existing employees-- Although we're placing an increased emphasis on people who are 25 and older and retraining them so they can be economically productive as well, but it also allows us to rely on partners like Morris County Vocational

School. And you're going to hear from the panel of how we have built a very deliberate pathway, where we're able to say to students, in middle school even, "Here's your path, and here's what you do. You go into that vocational school, which is outstanding; and then, by design, you come over and spend part of your day at Morris County in training and manufacturing labs." It's exciting to watch students who aren't bored with mathematics. They're excited, because they're applying it in many different ways. They're telling their friends about it, so we continue to increase the number of students who we're serving at the high school level, and then at the college level; and that is an important part of making sure that we have a pipeline of skilled workers as well.

The only thing I will say -- and you'll get to hear a little bit about them, I believe, as we go through this -- we only have one problem. We've got great curriculum, great instructors, great equipment, terrific partnerships. We need space, and that's our biggest issue. When we talk to manufacturers, the demand coming at us -- it is difficult to keep up with. And we're actually, for the first time, running a short waiting list for employers. They're saying, "I need my people trained now," and we're in conversations, such as, "I can get you in at 9:00 on a Friday evening." Most people don't want training at 9:00 on a Friday.

So we're exploring -- we're so fortunate, again, to have the support of our Assemblymen and Assemblywomen, of our Senators. Our Board of Chosen Freeholders have been remarkable. I know we have Freeholders Myers and Cesaro with us; our County Administrator John Bonanni is with us as well today. So it is just one of the most cooperative environments; it's put together very, very well, and we continue to just

benefit our residents in this County. You're going to hear that from other colleges across the state -- what they have going on. It really does make such a difference.

So thank you for the very important work you're doing. I look forward to listening to the discussions today, but it really does mean all the world to the future of our County and all the others around the state.

Thank you.

SENATOR GORDON: Great; thank you, Dr. Iacono.
(applause)

Just in response -- I know that when I started doing a little homework on this subject, and was looking at documents prepared by the New Jersey Manufacturing Extension Program -- which showed the allocation of manufacturing firms by county -- I was really very surprised to see just how high on the list Morris County is. I just tended to associate manufacturing with urban environments. And that was very interesting to see -- just how important Morris County is. And so I think it's an appropriate place for us to have this hearing.

And so I would like to start with our first panel, which consists of Robert Staudinger, President and CEO of the Chatham-based National Manufacturing Company, and Chair of the New Jersey Business and Industry Association Manufacturing Network. And then we will also hear from Sharon Castelli, Assistant Superintendent of the Morris County Vocational Manufacturing Program; and also from students and parents who have been participating in that program.

I would just ask everyone to identify themselves, for the record, before you begin your presentation.

Dr. (*sic*) Staudinger, would you like to begin?

R O B E R T S T A U D I N G E R: I'd be glad to; and it's *Mr.* Staudinger. (laughter)

SENATOR GORDON: Sorry.

MR. STAUDINGER: Thank you all for being here today and talking about manufacturing. I mean, manufacturing is *in*; it's *cool*; and who knew? (laughter)

And this is something that we wouldn't have talked about 20 or 30 years ago, and that's just a short time. So it's wonderful to be talking about it today.

And it's around us every day in our lives. Everything we see and we touch, somebody has made. There are factories out there with processes, and machinery, equipment, and teams of people who are building everything we see in front of us in our daily lives; the vitamins we take in the morning. And to talk about the opportunities in manufacturing is quite an opportunity here, for me; and thank you very much.

I've been asked to talk from a couple of different perspectives -- first-hand perspectives, actually. One is something that we did about seven years ago with the basic metalworking skills program; I was one of the founders of that. And two is, what's happening today between the vo-tech school here in Morris County and the community college; and we were a supporter of that evening program as well.

And as a manufacturer, I'm no different than any other manufacturer we talk about, Whether it be Arconic, here in the area; or Norwalt technologies; or Cliff Lindholm's business, Falstrom, up in Bergen

County -- we're all the same. We have customers, we have processes, we have employees, we have competition. And we want to improve every day.

One of the things that we do also have in common, and have for a long time, is that we didn't have the opportunity to hire good people. As Co-Chair of the Manufacturing Network of the BIA, we have thousands of members. And about seven, eight years ago, we would commiserate with one another and say, "We can't find good people," and we were trying to grow our businesses and we couldn't find the talent to hire. We couldn't find qualified employees; we couldn't even find capable people. And it was becoming an impediment to our growth, to our success. And either we were going to be able to change it here in New Jersey, or many companies were looking to go elsewhere, where they could find employees. A business is all about its employees.

So back in 2011, there was a group of stakeholders: Cliff Lindholm, Co-Chair, and I, with the Network; along with the Department of Labor, Hal Wirths -- we're in his office; Aaron Fichtner; Marilyn Clark, at the time; BIA; Melanie and Frank; the community colleges -- Bob Bowman, Anbar -- talking about how can we create a program to help manufacturers. And I think it was Bob Bowman who said that (indiscernible) called it *demand training*; *on-demand training*. So we, as manufacturers, had to be the ones to step up and take responsibility for what we needed. We can't complain, we have to do something about it. And we've done a lot of complaining over the years.

So we actually, through those stakeholders, created what came to be the Basic Metalworking Skills program. It was a 12-week program, designed between the Camden County group, my company, and others.

We developed this program to actually create the basic skills that we could hire.

In 2012, the first class graduated. We were fortunate enough to hire one of the people out of that class who knew nothing about -- nothing about manufacturing 12 weeks prior. We hired that person. That was five years ago, and today he's a fully qualified tool-and-die maker of our company.

That program had expanded to include CNC machining; to include production technology; to include welding -- over the last five years. And as I understand it, it has become one of the most successful -- if not the most successful -- training-to-hire programs ever in New Jersey; a 90 percent hire ratio from graduates of these class. It is just a tremendous success, a demonstrated success. So for your group and the Manufacturing Caucus we're talking about, we need to continue this; we need to continue to support that.

That was a short-term need -- I was right there; I understood the work that goes into it -- a lot of hard work from a lot of people, and it created tremendous success. And it's a congratulation to all those people who put the hard work in.

At the same time, though, in 2011, were talking about longer term. So the 12-week program was an immediate need, looking for unemployed, underemployed people. We said, "Well, how do we find the people to help grow our businesses long-term into the future?" And we started looking at the vo-technical schools and the community colleges; and frankly, there weren't a lot of programs available at the time. We, as manufacturers, also -- we had our head down; were making parts. We

didn't look up too often to develop our talent network, if you will; so part of it is our fault. We didn't talk much about it; we said, "We have to do something."

So what do we do? We reached out to Morris County School of Technology, vo-tech. We said, "What sort of talent, what sort of programs do you have? Because we need a feeder school; we need the farm team to come through and help us grow our businesses." They didn't have much. They said, "What do you need?"

Now, we also know that, 20 or 30 years ago, the programs used to be out there -- the shop programs. They went away; they atrophied. Why? Because manufacturing left. We went from high-cost areas in the Northeast, to lower-cost areas in the South, to lower-cost areas in Mexico, and even lower-cost areas in China, okay? So all those programs atrophied, because we weren't there to hire the students who were graduating. And the people at the vo-tech were very concerned. "Well, wait a minute. You're saying you need people now; what's it going to look like in the future?" The amount of time from gestation period, to develop a program, hire the instructors, get the capital, equipment in is a long time; it's a big commitment.

Well, our manufacturing network said, "We need people long-term. Manufacturing has had a renaissance; it's coming back to New Jersey. It's speciality. And we're not going to be here in New Jersey unless we can find the talent."

What the vo-tech school has done with the Community College here is outstanding. The cooperation, coordination of resources, the brick-and-mortar, the equipment, the bond, the \$2 million of a new system; the

educators who are here -- Benny and Tom Roskop. I mean, these are wonderful people, teaching very, very bright students.

Certainly, the vo-tech schools are the jewels of the state; the talent that is there is tremendous. Tom Roskop, the instructor -- he's a rock star. I mean, you go into a school with his students -- they stand in ovation for this instructor, for this professor. They are really learning.

This Caucus -- we really need to continue these programs; expand what's happened here in this County to other counties. I know some of that's working, but it's a tremendous, efficient, effective use of resources where one school doesn't have the brick-and-mortar, and the other school does; the talents that are out there. The cooperation, demonstrated again, is very successful. And it is certainly my recommendation, and the Manufacturing Network, that we continue this throughout the state.

Thank you for your time.

SENATOR GORDON: Thank you very much.

Sharon Castelli.

S H A R O N C A S T E L L I: Good morning.

First of all, thank you so much for hearing about our wonderful program.

I'm Shari Castelli; I'm the Assistant Superintendent at Morris County Vocational School District. And thank you to Mr. Staudinger for those wonderful remarks.

I'm here with -- I refer to my *partner in crime*. We're the farm team that Mr. Staudinger referred to. Patrick Enright is the Associate Vice President for Workforce Development, and the Dean for Professional

Studies and Applied Science here at the County College of Morris. And we also have two students with us today -- we have Robert Murphy, who is a completer of our Engineering Design and Advanced Manufacturing program; we fondly refer to it as *EDAM*; and Erin Foody, who is currently a senior in the program; and we have Mrs. Lucie Cohn, whose son completed the program last year and he is currently at NJIT continuing his education.

So Patrick and I are going to talk a little bit about the program, and then we'll hand it off to the rest of the panel.

So EDAM is a Share Time Program. Morris County Vocational School District runs two kinds of high school programs. We have full-time Academy programs, and we have Share Time programs for juniors and seniors for high schools all throughout the County. This is a Share Time program, and that means that juniors and seniors come to us every afternoon in order to study engineering and manufacturing. We take 20 students per cohort; so at any given time, we have 40 students studying here at the College in the afternoon.

Students take actual college classes in engineering technology, manufacturing, and electronics. And they come here through an application process that the vocational school district implements. The first year of the program, when students are juniors and they're new to the program, we use a professor, Tom Roskop -- who Mr. Staudinger mentioned -- to help them transition in. He is a joint employee of both the Vocational School District and the County College of Morris

The second year of the program, the students have multiple CCM professors as instructors. The unique thing about this program is because students are taking actual college classes, they're able to earn a

minimum of 32 CCM college credits before they even graduate from high school. And Patrick is going to talk a little bit about that course work.

P A T R I C K J. E N R I G H T: Good morning, and thank you for being here.

I want to just talk a little bit about the Share Time students.

As Shari is saying, the students come by bus from all over Morris County and, traditionally, those buses would go to the Morris County School of Technology. What's different here is that the buses pull up at the County College of Morris.

From CCM's perspective, when the students get off the bus, they're college students. And we'll talk a little bit about coordinating high school student and college student at the same time. The students arrive here, and they head off to classes.

The classes that they are enrolled in are part of the Mechanical Engineering Technology degree program. This is an ABET-accredited program which is constructed in, really, two major pieces, like most degree programs. It's an Associate of Applied Science; one piece of it is General Education -- things like English Composition, Introduction to Sociology; and then the other part of the degree is the technical core, if you will. And the students in the Share Time program are taking the technical core. So when Shari mentioned they get 32 college credits, those are all in the technical core.

So for example, the students, right now, who are juniors are taking Basic Engineering Graphics, Computer-aided Drafting, and Materials for Engineering Technology. If you are able to come over and see our

wonderful labs, you'll see the students in the Materials Lab pulling apart metal, looking under X-rays for flaws.

So the 32 credits are part -- are embedded in our Engineering Technology degree. And just to give you a sense that we can-- These students are enrolled in the college classes, so they are generating a college transcript.

To give you a sense that these are not, you know, half-high school, half-college classes, we had agreed that if we were unable to fill a cohort of 20 students -- which hasn't been the case -- but if that were the case, the remaining spots would be -- CCM students could enroll in the section. We would open it up for other students.

So the curriculum is the college curriculum, what's been approved by ABET, and is exactly the same course that any college student would receive here at CCM.

I want to just-- So that kind of gives you a layout of the program, and some of the things that you'll hear about today that were unplanned; things that the program has attracted over time. We have a partnership with NASA; it's called the NASA *HUNCH* program. NASA partners with schools all over the United States -- and it's really, they partner with high schools; we're only the first community college that has had them as a partner. And as part of that, in their courses the students are manufacturing parts for the International Space Station. So in fact, the first cohort of students produced bolts that are now holding in a footlocker that is in low Earth orbit as we speak here this morning. The footlocker that the bolts are holding in -- the bolts have been signed by the students;

in fact, the President of the College -- his signature is now in low Earth orbit.

In addition to manufacturing the part -- and I think this is a key to the experience that they're getting -- NASA is not going to put anything into orbit that doesn't have a history behind it -- from where did the metal come from, what was the type of metal, who's touched the metal, who cut the metal, who's measured the metal, and who packaged the metal. The students are learning documentation, which is a big part of lots of manufacturing in the United States, particularly medical device sorts of things that are governed by the FDA.

And I will turn it over to Shari for more opportunities that we've had.

MS. CASTELLI: So one of the testaments to our strong partnership is that every time we run into a hurdle, or experience a wrinkle, we've been able to turn that into an opportunity. And one of the first things that arose is that high school academic calendars are very different than college academic calendars. For example, school is over in the fall semester mid-December for colleges, but high schools continue through to the end of December and then pick up January 2; whereas the college doesn't commence again until the third week of January. So we had time in between where we had high school students, but no developed coursework for them.

The same thing happens in June at the end of the high school year. So one of the things we were able to do is find coursework that our high school students could take during the *Winterim* periods and the early summer period here at CCM. And what that's done is, it has allowed our

students to get ahead in gen ed courses and earn even more college credits than we had initially planned; and also to bolster their math studies. So that was really great.

And then we were surprised at how supportive our business and industry partners are. And you heard from National Manufacturing, but there have been many companies that have stepped up, and they have provided field trips for our students. So they have been able to go out to some of the local manufacturers -- like Norwalt, which is right down the street, and Brewster Washers, and Sandvik Coromant -- and they have been able to see manufacturing, firsthand and up close.

MR. ENRIGHT: The program, when we built it from the ground, was designed to do three things, or to give students three opportunities. And so putting the courses together we wanted to ensure that all three were -- all of our three goals were met for the students: *a)* A student could complete the two-year program; complete it, graduate high school; they would have 32 college credits, a CCM transcript, and they could go to work. The important point there is that the 32 credits constituted employable skills. They have AutoCAD, they have materials, they've taken manufacturing courses, they've run CNC machines -- among other things.

The second thing they can do is stay here an additional year after high school and complete the associate's degree. So they are going to graduate high school, and they are one year away from the associate's degree; they matriculate right into the program because they've been in the program, as far as we're concerned, since they were juniors.

The other thing they can do is, upon graduation from high school, they can transfer directly to NJIT, which is what our parent is going to talk about; that's what their son did. They could transfer to NJIT after the associate's degree; they could transfer to NJIT after the 32 credits. And the reason that works is because we have a transfer agreement with NJIT, and all of the credits will transfer. And you will hear some more detail about that.

MS. CASTELLI: So one of the reasons that this partnership is so successful is because we started with a very strong partnership. Our fulltime Academy students -- those are our grades 9 through 12 students -- are already able to come to CCM their senior year. We have a senior option, where 75 percent of our students are able to take CCM classes their senior year. That translates to about 120 of our students who are currently at CCM taking coursework here. So we were able to leverage that existing partnership and generate articulation for the EDAM program.

MR. ENRIGHT: And the other part of the partnership is, students who graduate from Morris County School of Technology Academies -- and so this is independent of the Share Time programs -- we have articulation agreements with. So students who graduate from Morris County School of Technology -- depending on the Academy that they are in -- they'll receive college credit in Culinary Arts, for example; Criminal Justice; in our Dance program; in our Engineering Technology program for computer-aided drafting; in our Computer Science program; and, right now, we're working on an articulation with our Exercise Science program. Those articulations -- the faculty from the two institutions need to be in contact regularly in order to ensure that those curriculums align.

And so, over the years, every year, right about this time of year, we're doing a survey of the coursework -- what's changed, what hasn't changed -- and reaffirming that articulation. So over the years we have had a lot of communication -- faculty-to-faculty contact, advisory committees. Our faculty is on their advisory committees, their faculty is on our advisory committees. So this step to Engineering Design and Advanced Manufacturing was a pretty natural next step because we all knew each other.

MS. CASTELLI: But this program would never have gotten off the ground if it hadn't been for a State grant opportunity. So in 2014, the State developed a grant for county vocational partnerships, and we were on the ground floor of that. We had applied for that grant with CCM as our partner, and we were able to fund and start the program with that grant; and more importantly, that grant was the impetus to get everyone in the room together, because we all live such busy lives and we have so much to do. Without that incentive, I don't think we ever would have gotten everyone in the room. And so that was a huge perk for this program.

MR. ENRIGHT: And the reason the grant money was focused on the Mechanical Engineering Technology degree program, and manufacturing in particular, was because at the same time we had completed a complete renovation of our labs. The lab renovation was funded with State dollars, with Federal dollars, and with County dollars. When I say that there was *GO Bond* funding some years that helped redo the interior of the facility; there was another fund called the *Equipment Leasing Fund*, which was State dollars that funded the repair of existing

equipment and the purchase of new equipment. Again, if you come over, you're going to see a beautiful space with modern equipment in it.

So that facility had been redone; and at the time, I had capacity. And so we were walking down the hall, and I looked in and I said, "I need this lab to be full;" and she had the grant money, and that was the origin of that connection.

MS. CASTELLI: Right. And the reason why we wanted to start something specific to manufacturing was because there was such strong industry need. We attend regular meetings through the New Jersey Council of County Vocational and Technical Schools, and at each of these meetings NJBIA comes to the table and they tell us about industry trends. And we had been hearing from small manufacturers that there wasn't enough talent in the pipeline. And so this was a way we could fulfill that need for skilled labor, and to leverage our partnership, and utilize some of that partnership grant funding.

MR. ENRIGHT: And I would just, finally, add that a key part of this was that the Morris County School of Technology leadership was focused on career and tech education programs that were relevant, that were 21st century. One thing Shari said to me at the time was, "You know, we couldn't buy this kind of equipment, but it would be great if our students got to use it." And so it was that commitment -- they didn't need to own the lab, they didn't need to own the equipment, but they did want their students involved in it. And so that commitment, together with funding, together with a great lab facility provided by the State and the County, that was the key.

MS. CASTELLI: Right. And so now we have students in the program. And we run admissions each year for this program, and select 20 students in April. And the students we're looking for are those who gravitate towards hands-on learning and who really want to work with their hands. They're not afraid to get dirty. And they're different from our math, science, and engineering students; those are our theoretical engineers. And a little anecdote: We interview both groups of students before selecting them. And when we interview our math, science, and engineering students, we give them a task and they're supposed to -- we give them materials, and they're supposed to build something. And they sit there, and they look at it, and they think about it; but they rarely ever touch the stuff. When we vet our EDAM students, they can't wait to get their hands on the *stuff*, and to build the *stuff*, and they're not afraid to knock things over and try them and test things out.

So those are the kinds of learners that we're looking for, and we've really tapped into a need in this County. Because we started out with 20 seats, and we had over 20 applicants; but just a hair over 20 applicants. And last year, we had over 40 applicants. So we've been able to double the number of applicants to the program, and we'll see where that goes in the future.

One of the things we've also been able to do this year to support our students here is to hire a College and Career Counselor. And we're excited to have her here to work with our students, and inform them about the opportunities that they have for post-secondary, but also for workforce placement.

So I'm going to turn it over to Robert Murphy.

ROBERT MURPHY: Okay; hi, I'm Rob.

I'm a completer of the EDAM program, and I am an active student at CCM now.

And I thought the EDAM program was really good, because I was curious about math and science. I don't know; I didn't really like high school that much, so they gave me the opportunity to, kind of, apply my skills and show my potential in my own way. And it really gives you the skill to work by yourself and be independent, like a college student.
(laughter)

We learned a lot of stuff. We learned a lot about CAD, and we learned a lot about physics, and we just learned how to approach things from a different point of view -- from an engineering point of view, and really think about things and analyze them. And we also got to work with our hands a lot; we took, I think, three different machine classes. We were on big machines, and we were on CNC machines; we learned how to program a little bit. It's very challenging, but I like it now; I enjoy it. I am looking forward to continuing my career in engineering.

SENATOR GORDON: Thank you.

Erin.

ERIN FOODY: I'm Erin Foody; I'm a senior at Morris Hills High School, and also I'm in the EDAM program, currently. I'll graduate this year.

I heard about the EDAM program my sophomore year, so I applied then. And honestly, I just consider myself so lucky to have been the second class. If I had been born, like, two years before, I wouldn't have

been able to have this opportunity. And just being in Morris County at this time -- right time, right place, I guess.

And I wanted to do the EDAM program because I knew for a while that I wanted to do engineering. I think I took a drafting class freshman year of high school, and I was like, "This is it; this is what I have to go into."

Besides all of the mechanical engineering and building stuff, we've learned -- besides all that, I've learned so much about college and time management; it is very much different from high school classes.

At high school, I would have been bored, I think, because this is so much more interesting. This is, like -- it doesn't even feel like class; it feels like, this is what-- And I know that after I graduate I'll be able to get a job and go right into that, and then apply to a four-year; and hopefully continue my education.

SENATOR GORDON: Great.

MS. CASTELLI: Lucie.

LUCIE COHN: Thank you.

My name is Lucie Cohn, and I am the parent of an EDAM completer. My son Michael graduated last year from EDAM.

Michael has always been interested in how things work, in how things were made, and in building things. He would always be taking things apart, creating new things, or wanting to help with repairs or construction tasks. As long as I can remember, if you asked Michael what he wanted to do when he grew up, he would reply that he wanted to be an engineer or to build things.

Michael never fit in at his high school; because he was gifted, the courses that were offered bored him and did not provide a challenge for him. There were no engineering-type courses for him to take to keep his interest. He didn't have the same interests as his peers, so he didn't have many friends. He just didn't fit in.

When we heard about the EDAM Program, he immediately begged us to let him apply. He wanted to attend the EDAM program because it was an opportunity for him to have a fresh start with new classmates in subjects that interested him; and to him, school had become a boring chore. EDAM was a program that would, hopefully, give him some relief from the normal school day which, after 10 years, had become painful, boring, and monotonous for him.

The EDAM program relied on hands-on learning to teach him the course material. Whether it was learning how to use Autodesk products or to maximize the use of Microsoft Office, Google applications, and other computer programs to complete tasks; or to use different machines and tools in the labs to manufacture components instead of just reading about how to do it in a book, this program was a great fit for Michael as a learner.

Michael is a kinesthetic learner. He learns best with hands-on activities. This is something that is not done in the traditional high school environment, where the classes are taught for the average student with little differentiation in courses of study. Everything is taught from the book, and the hands-on shop classes have been eliminated.

In addition to the hands-on activities, the EDAM program also included textbooks for the students, which provided additional information

about the equipment or subject matter being studied for reference and study.

The unexpected addition of the HUNCH Program was a bonus that provided the students with a real-life manufacturing experience their first year, and a real-life design and prototyping experience their second year -- not a made-up book project that most students get.

When Michael first started the EDAM Program he thought, like many others, that manufacturing involved machines and unskilled laborers. He soon learned that his impression was false -- that manufacturing involved far more manpower than he ever had imagined. Manufacturing, he learned, took a lot of skill, from determining in what order steps should be taken to produce a part, to how to complete those steps, either by hand or through the use of computer controlled machines. It takes skills to program the computers correctly and to imagine a blank in the machine for testing, to spotting issues during production. It takes skills to prototype a new design or to make a one-of-a-kind part. It also takes skill to make a consistently repeatable part. Learning to design parts to be able to be manufactured takes a lot of skill; and without the hands on-learning that came with the EDAM Program, he would not have realized just how integrated design was with manufacturing.

Many students enter college today with the most popular major being *undecided*; or they end up changing their major after their first semester or year. This program allowed the students to experience the Mechanical Engineering Technology major; and while there were a few in his initial EDAM class that did decide this was not right the right path for them, it reinforced for Michael and many others in his class, that this was

exactly what they wanted to do. Not only did Michael successfully complete the EDAM program, earning a place on the Dean's List each year, he took additional classes during his summers and winter break, and his self-esteem and confidence in being able to be successful in college improved.

He also became more independent and self-sufficient. While taking Physics Lab class at another college this summer, he observed that his classmates did not have the rigor to follow the procedures laid out for each lab or the knowledge of how to properly measure the results of each experiment, and achieved incorrect solutions which concerned him; but at the same time, assured him that he was prepared for college and a career in engineering.

As a consumer, looking at the technology coming on the horizon, it is scary to think that the people who may be manufacturing the parts that go into things -- like the self-driving cars that we may be relying on or sharing the road with in the future -- will be made by those same students who could not follow directions or measure results in that Physics lab that Michael was in.

We need to ensure that we have a skilled workforce that can support manufacturing in New Jersey, and it needs to start with our students in programs like the EDAM program.

Today, Michael is a first-year student at NJIT, majoring in Mechanical Engineering Technology in the Newark College of Engineering. While he is technically a first-year student, academically he is a second semester sophomore. At the end of the semester he will be 42 percent complete with his degree.

Through the EDAM program, Michael was introduced to Mechanical Engineering Technology as a major and realized that this was really what he wanted to study. It has also helped him to earn most of the credits to achieve his advanced standing. He was also recently offered an opportunity by the New Jersey Department of Education to speak to middle school students about his experiences in the EDAM program.

Just weeks into the school year, other RAs at his college have suggested to him that he should apply to become an RA next year. He is making friends and being a team leader. These are all qualities that he would never have had without the confidence he gained from this program.

When Michael finishes college, he plans to get his master's degree in Mechanical Engineering and sit for his Professional Engineer license. After having witnessed a medivac helicopter crash while on a vacation during high school, Michael made it a personal mission to design an aircraft cabin to have fire and heat-proof insulation, without losing space or increasing weight, in order to protect the occupants of the cabin.

Once he graduates from college and grad school, he plans on fulfilling this mission, as he feels that rescue aircraft personnel don't have a choice about flying in bad weather; bad weather is when many accidents that would require medivacs occur. And this is something where he feels his mechanical engineering background is going to pay off.

Thank you. (applause)

SENATOR GORDON: Thank you all very much.

This has been a very enlightening presentation from all of you.

I know there are a number of questions here on the part of the legislators.

Before we do that, I've been advised by Assemblyman Bucco that there's a gentleman in the audience; his name is Michael Seitel, if I am pronouncing that properly. He is the CEO of Norwalt Design, which is an organization that has been working as part of this program, and employing and training some of these students. And he has some thoughts he would like to offer, and I would like to give him an opportunity, perhaps.

Mr. Seitel, if you could go to the podium and tell us what you think we need to hear.

MICHAEL SEITEL: Okay.

All right, so we're right up the road, about a mile-and-a-half. We employ 60 people at Norwalt; we build high-speed automation. So on how it's made, things of that nature-- Every deodorant we use has been put together by one of our machines. So we sell to Unilever, and Proctor & Gamble, Colgate, Henkel. And Assemblyman Bucco was just here -- and we have a couple of machines there, now, that are actually going to China. So Unilever will contract us; they pin us against the European machine builders, for cost and all that.

So we take these machines and we ship them to China because, guess what? Their labor cost is too high now. Which is great to hear; that means we can sell there. Hopefully, they don't copy it. (laughter) But, I mean, this is great, what Shari and everyone has done; these are the types of people who the manufacturers are looking for. We're looking for hands-on. For example, our engineering manager in electrical engineering, and our best programmer -- both of them have two-year college degrees. They went to a county college and got two-year degrees. But they were all hands-on guys

who wire, they built machines, they did that kind of work. Our best mechanical engineer went through a type of thing like that in Argentina.

So we're not, per se, looking for the four-year college degree profession; that's not what manufacturers are looking for here. Our biggest need is the shop floor -- mechatronics technicians, okay? Our plant manager went through an apprenticeship program in Germany; similar, hands-on learning at school, and also going to work at the same time. And our system -- we just promoted a kid up the system to plant manager who never went to college; just all hands-on-type learning. So this type of learning that they're teaching is fantastic.

You know, the skills that we're looking for are similar to what-- We're looking for machining skills, blueprint reading, basic CAD; fluids, like hydraulics and pneumatics; and PLC programming.

So this is what they're doing here, and everyone around the country is looking for people like this.

What we did recently is, we started an apprentice program with Gale from NJIT; we're one of the sponsors with Triangle Tool. I don't know if anyone else is in it, now, Gale?

So what we have is six people, current employees; we are trying it with our current people, and we're going through and we're paying them to go to school at night and learn. And teaching them -- they have a book, like they did -- the plant manager in Germany. He has to write what they're learning every day.

And now what we want to do is take that to the next level and start getting new students out of high school, or in high school, who can go in an apprentice program. And ideally what we're looking for-- And this is

the part where New Jersey just sucks, all right? (laughter) Because you guys don't warn me, all right? I'm working with NJIT on this, then NJMEP -- they have one that they're developing; probably someone else is doing it. So it's not coordinated.

What we want to do is get a program where we can get a kid who goes to school one day a week or two days a week; and then we go and bring them to work and train them at work -- okay? -- and they get a certification. So that's a big thing that's missing, that-- All the manufacturers are talking, "Apprenticeship, apprenticeship, apprenticeship," right? It's the big buzzword in the industry, but nothing is getting done. We're trying to work on it, Gale, but it needs some steering in this state.

I know Carolina -- they have it with Piedmont Community College -- a program like this, where they will send the kids-- But you have BMW down there, German companies. Guess what they did in Germany? They all did apprentice programs, right?

So we're trying to model our business, getting new people through an apprentice program; and also people -- engineers, people like this -- through this program.

So I'm not sure how to do it, but I think if we can coordinate in the state to get something like that it would be a big plus too. You know, you need this program; because we'll hire a guy from this type of program to work in our design end, or even in the factory. But also, there are kids who may not even get in this program who we can also-- We're willing to pay; we're looking for kids that we can pay for their county college degree;

we'll pay for it. We need people, you know? It's a big shortage, and we need to find the kids.

So I think that's all I have to say.

SENATOR GORDON: Mr. Seitel, that was really very, very helpful to hear from somebody in the world of manufacturing who can offer ideas on what we can do better. I think one of our objectives of this initiative is to learn the best practices that are in place elsewhere and apply them here in New Jersey. And clearly we have a great model here.

I'd like to just start with a question for the panel.

What are your suggestions on how we take this statewide? How do we build on what you've done in Morris County and create a structure that we can use from Sussex County to Cape May?

MS. CASTELLI: I think one of the selling points of this model is that it is very replicable. Every county has a vocational school, and every county has a college -- a community college. So this is something that can be done as long as the college has a facility. And one of the things that Patrick and I have been doing is going around and presenting the model at various State conferences, both at the high school level and at the community college level.

MR. ENRIGHT: And I would just say that the key to the program is that the county college has a facility; and we're able to put together the kind of equipment the manufacturers are looking for. So I think the partnership starts with the county college being able to identify that they have a significant facility that could benefit the schools.

And I think, you know, what's important, in terms of cost on this, is that it's an efficient way to do things. They're not reproducing what

we're doing here. So I think that as you push it out, the question is to ask the county colleges, "What facility do you have that's special, and that, moreover, is closely connected to the job market?" I mean, part of this program that's the biggest score is how closely it's connected to the job market. We heard Mike talk about -- these are the kinds of students-- He's not the only one; we've had other manufacturers come over and say, "Geez, we'd like to come meet with your students." And I think they'd like to present opportunities to the students for jobs right out of high school.

SENATOR GORDON: Let me turn to my colleagues. I know Senator Singer has a question.

SENATOR SINGER: Yes, I have two questions.

First of all, help me understand who pays for the courses here that the student is taking at the Community College? Does the individual school district--

MS. CASTELLI: So currently, the vocational school district pays for the courses.

SENATOR SINGER: What does that-- In other words, so you can pay for 20 students in each--

MS. CASTELLI: So we receive tuition revenue from the students' sending districts for educating them for half the day. So we get revenue from that. And also for the past two years and, currently, the third year of the program, we also have that grant funding that helps support the--

SENATOR SINGER: Well, when that runs out, what happens?

MS. CASTELLI: Then the funding will come from, primarily, the students' sending districts.

SENATOR SINGER: Okay; so the districts do pay for actually one year of community college for the students?

MS. CASTELLI: Yes.

SENATOR SINGER: Okay.

Secondly, help me understand -- what have you done to change the mindset of the guidance counselors in the existing school districts? Let me just-- Part of my problem is -- and maybe because I have a daughter who is a junior at Purdue University in Construction Management Technologies. I was very proud of her; this summer, she had her internship. She walked out with her hardhat and boots, and was the OSHA inspector on her site.

The key that bothers me is, in the high schools, especially-- First of all, number one, many of the guidance counselors never worked in the private sector, or haven't worked in the private sector for 25 years or 30 years. They are tuned to say, "Four-year college, four-year college, four-year college." And no one turns around-- And I sit on Higher Ed; we still don't know what percentage of the people graduating from our universities and colleges in New Jersey work in their field, because when they do the surveys, it just comes back, *working*; they won't say if it's in their field or not. And nobody -- because I had the résumés, like every one of us, on our desks of young people graduating from our colleges and universities with degrees that there are no jobs for. And nobody says to them, "Do a spectrum look at where you want to go in the future, and look at these opportunities that are job creators." There are jobs out there; you just heard from a manufacturer. "You can get a job immediately when you graduate."

What are we doing, from the vocational school, to help the regular schools understand that? Because it's not happening.

MS. CASTELLI: Yes. Senator Singer, you have exactly articulated where our work is, particularly in a County such as Morris County.

They think there is -- guidance counselors think there is one pathway to get to heaven, and that is through a four-year degree. And we in the trenches know that that is not the case.

So we work with the guidance counselors at the high school level to educate them about the value of not just this program, but all of our trades programs which offer work at the end of a high school diploma. It's a tough message to get out there; it's not just guidance counselors--

SENATOR SINGER: Parents.

MS. CASTELLI: --it's parents as well.

SENATOR SINGER: Yes.

MS. CASTELLI: And, you know, so it's even more deeply entrenched than just guidance counselors.

SENATOR SINGER: Just two follow-ups, and then I have to run.

One is, of course, you know, I was a little bit-- As you heard the manufacturer talk about *guys*. I have three daughters, so, you know, it's nontraditional role factors for young women. And my daughter-- In most of her classes, she's one of two women in the class, as you can imagine that.

But let me just share something with you. You know, you said something very important to me, that you have a coordinator here who

works with the students. We have to put that coordinator in the high schools--

MS. CASTELLI: Yes.

SENATOR SINGER: --because *they* get it. And I'm telling you that we are producing more and more young people who are unemployable. And it is amazing -- the courses they're taking, and the parents allowing them to take them -- that just don't have jobs at the end of that whole thing. And it's not one or two; and when you talk to the students, you say, "What were you thinking?" -- that, "I have a degree in Archeology and I don't want to be an archeologist;" or that, you know, "I've taken Spanish as my major, and I graduated with a four-year degree in Spanish, and I don't want to teach Spanish."

But it's pervasive, and it really starts at the high school level because it's all about not-- We don't have enough guidance counselors; that's one factor. They don't get to see the student enough. But more so, we did something with nursing in our county, and we were amazed at how few guidance counselors really understood where nursing is going today and the importance of nursing, per se.

So that's really part of our task, I guess, also, is helping you educate the parents and the students about the opportunities.

MS. CASTELLI: Yes; that's--

MR. STAUDINGER: And Senator, if I may.

It's also incumbent upon manufacturers, like myself, to spread the message: What are the opportunities that we have? Again, this is on demand; we are the ones who need to go to the advisory boards in the vo-techs and the community colleges -- that these are opportunities in industry

today. This is where the education should lead the students; these are the opportunities they have.

In February 2011, Harvard put out a great study, *Pathways to Prosperity*. It's a watershed study today; you can have college preparatory or career preparatory. It's about that thick (indicates); but it really hit it on the head back in 2011.

But it's incumbent on manufacturers; we have to step up and do more in spreading the message as well.

SENATOR SINGER: But can I just ask the students one thing?

Did you find any type of peer pressure because you were going to vocational school, comparison within your high school itself?

MR. MURPHY: What do you mean, *peer pressure*?

SENATOR SINGER: In other words, what were-- "You're going to *vocational school*?"

MR. MURPHY: Some kids, like, said that; but I was interested on my own. I didn't really care what they were saying. (laughter) Most people were actually kind of, like, impressed. "Oh, I don't even know what that is; that sounds really nice." Most people-- I don't think there was any peer pressure.

SENATOR SINGER: Okay; interesting.

MS. FOODY: Especially at my school, the engineering, like, math and science fringe is housed at Morris Hills. So everybody thinks that the vo-tech is really smart kids. (laughter) So everybody was kind of impressed that I was going to CCM. I don't think there was any--

SENATOR GORDON: That's an interesting attitude for a change.

Ms. Cohn.

MS. COHN: But as a parent, my son -- there was not a lot of support for the program at my son's school. And, in fact, even though he was taking college courses, they were weighted in his GPA as being academic, so it actually hurt him. Even though he was making Dean's List here, he actually lost out on scholarship opportunities because he ended up being in the bottom half of his class because it pulled his weighting down.

SENATOR GORDON: Interesting.

Assemblywoman DeCroce; and then I know Senator Rice has a question.

ASSEMBLYWOMAN DeCROCE: Okay, thank you.

I have been working with Dr. Iacono, and I've been looking at him, motioning to him.

And by the way, my son is a product of vo-tech and CCM, and then went on; so I truly understand. And he never had any pressure, and he was very proud of being at vo-tech.

So when I started looking at all of this, and started talking to CCM, we found that with the tuitions -- and how the Senator asked, how you pay the tuition and it comes from the district, in. But once this Caucus looks at this, by legislative product we can bring together CCM with vocational school so the student loans, and the grants, and the monies that CCM receives will be able to offset what they need. They have space; they have space with equipment there. The County College has the classrooms, but we know that we need more space than that. We need a workforce development building, and it should be within the counties -- which could end up being a public-private partnership in developing. And however

that's laid out with the counties -- maybe building or having somebody invest in the structure of the building, and then the manufacturing companies that I have toured and dealt with are willing to help put and house what needs to be inside it to address-- Each and every manufacturing company has a different requirement.

As I have said to the Caucus in the past -- and if Dr. Iacono can even talk a little bit about this -- he's working with the International Longshoremen right now on the pilot program that I talked about with CCM. They were just at the Port and they toured it. And they require different classes that each of you have for every different manufacturing company.

So this is not just something that can -- that you can throw it on vo-tech and say, "Do it," or CCM and say, "Do it." It has to be a broader picture. And more space available with the workforce development equipment that can address each one of the industries; and look at those industries to help us, as a Caucus, come up with the money with the State, and the County, and the districts. But I think the tuition can offset and help the vo-tech schools an awful lot if we do the proper legislation to bring these entities together.

So I don't know, Mr. Chairman, if I have the right to ask Dr. Iacono to address that. But he's doing that very thing right now.

SENATOR GORDON: This is a-- We're loose here; I mean--
(laughter)

DR. IACONO: Okay; thank you, and thank you so much for that support and understanding. It's a great example of the support we get from our local legislators and so forth.

But yes, we do have that need. One of the things that-- We find an easy agreement, when we talk to industry and our wonderful partners at the vocational school, and so forth, that space is the predominant issue. We don't want to be -- and we are in the position now of saying, "I can't do that training." I mean, literally, to the point to where we had a wonderful piece of machinery that was donated to us from Arconic. I have nowhere to put it unless I take out what they gave me last year to train people on; and they still want people trained on that, right? So they want people coming in with these skills.

You brought up a really great point earlier, Senator Gordon, of how do we really make this work out. You know, we do share, with our vocational, who is well aware; but other high schools as well. Hey, 80 percent of the jobs created since the recession had to require some post-secondary credential. And we hear exactly what this gentleman testified to. "I don't need a four-year degree," okay? So companies come to us and say, "Look, I'm going to be hiring 100 or 200 more people over the next couple of years. I don't need them to have four-year degrees. Some I do, but an even greater number -- I need them to have industry certifications; I need them to have two-year degrees." And they are very valuable.

So when I say, "We are number one in New Jersey for alumni salaries," that's students with a two-year degree, not the four-years, okay? But our students average a \$69,000-a-year salary. That becomes a livable wage. So these are good, good paying jobs.

It's about coordination; and when we get that kind of support that says, "This is where we're going, and this is what we're doing," we build programs around that. So absolutely, it's a lot of coordination.

I would say, you got us this far; and we appreciate it so much. But we need your added support to go where industry is telling us we need to be next.

SENATOR GORDON: Thank you.

Just based on the comments that Mr. Seitel made, I'm just wondering -- and I'm really thinking out loud -- whether there are opportunities here for a public-private partnership in the financing. I mean, he said that he'd be willing to pay for people to be trained in a particular area; I'm just wondering whether we can create pots of money that are funded in part from the private sector, and those organizations get a preference in terms of recruiting the students when they're done. I mean, I'm just thinking out loud here, but these are the sorts of ideas I think we're going to try to kick around over the course of the next few months, that I hope will lead to pieces of legislation and programs to really take what's working in a place like Morris statewide.

I know Senator Rice had a question or comment, so let me turn to him.

Senator.

SENATOR RICE: Yes, thank you, Mr. Chairman.

Someone said that 30 years ago we wouldn't have had this conversation. Not true. I have been in the Legislature for 31 years, and I started this conversation when I first went in (laughter); and no one was listening but Greg -- okay? -- who did the legislation.

UNIDENTIFIED MEMBER OF COMMITTEE: Who's Greg?
(laughter)

SENATOR RICE: That's right. We've been having these conversations for years; so I'm glad it's coming to the forefront, like a lot of other things, based on needs that we've always had in the urban communities. It's just that folks who left us recognized they have the same needs now, because times have changed.

But I'm interested in some information, because you mentioned that you really got the program started because of a grant. How much was that grant, roughly? Or maybe the question is, how much do people really need to start, at other colleges, to get it off the ground?

MS. CASTELLI: It was approximately \$300,000 over a three-year period.

SENATOR RICE: Okay; so that's not a lot of money.

And so-- And then I also heard-- And I'm glad that Assemblywoman Lampitt and I, and members of the Joint Committee, years ago -- and some people here remember this -- we put together those articulation agreements that the four-years really didn't want. And we said, "You're going to have them." I chaired the Committee -- still do -- and we have them. So I see that the articulation agreement is helping you, and probably needs to be enhanced too.

But I want to say that we can't rely on the Federal government, but I do know -- in fact, I just did some resolutions, because I chair the Labor and Workforce Development Policy Committee for the National Black Caucus of State Legislators. I know that there are dollars there that can be used for certification programs -- the amount of money in the Workforce Investment Act, etc.-- and so we're trying to shake some of that loose. But until we do, you mentioned apprenticeship programs. Does

anyone have an idea what an apprenticeship program would cost colleges if they were to institute them with vocational schools?

MR. ENRIGHT: You know, I don't think we have put pen to paper to come up with dollars. I think that-- The apprentice program is going to use two things; it's going to-- As Mike said, from Norwalt -- they would come here to take courses, for example, and he would be willing to fund them. And so with them contributing-- And then it's really the cost on their end of being able to take somebody offline to be training the apprentice on their site. So I guess the short answer is no, we haven't put pen to paper to file that out.

MR. SEITEL: (off mike) (Mr. Seitel speaks from the back of the room, out of range of microphones)

That would be totally colleges -- we would (indiscernible); right? The question is, the program; you could do it. CCM has one; maybe that's not the right county college. Or some county colleges start where you have one, where you have-- Okay, you're going to get a, say, two-year certification in -- what did we say, (indiscernible) or something like that -- that you can go anywhere in the country now. And that's kind of what we're doing. All the companies are going to pay to send their kid there -- but there's need -- and then they will work. But there's no program like that in the state, because you don't want to do it, if you can't (indiscernible); you're not looking for a guy with calculus, you know, for six months. You don't need that. You're looking for -- I want to send a kid here; he's going to go your school for eight hours. Then he's going to come and work for me for three days straight, and then he's going to go back to you for four hours. And he does that for two years.

SENATOR RICE: So the cost of an apprenticeship program, the training part, is not necessarily a dollar part -- that industry. But getting a student interested, or getting them into school may be a cost. Is that correct?

MR. SEITEL: (off mike) Well, that's the hard part.

MR. ENRIGHT: What I think that the -- I think you have some infrastructure cost, the comment was made. Right now, if we wanted to bring a student over from multiple manufacturers for eight hours, we have no place to train him. In other words, the lab is currently maxed out. When we brought in the EDAM students, that was-- I have 40 students, high school students, slicing out the middle of the day using the labs. We have another 160 colleges students enrolled in the program. So the lab is kind of maxed out. And I think our next step is, really, we need more floor space. And if you come visit the lab later today, you'll see -- we're pretty well jam-packed.

So to deliver -- to support the industry, to send employees over to train during the day, we're going to need more floor space, basically.

SENATOR GORDON: Well, hopefully, this bond act that we're going to be talking about shortly is going to finance the infrastructure that we need to satisfy the agreement.

MR. ENRIGHT: And you can see, we can fill this -- you can hear that we could fill this space.

SENATOR RICE: So, to the Chair, could you have-- Through the Chair, could you have--

Mr. Chairman?

SENATOR GORDON: I'm sorry.

SENATOR RICE: Yes, that's all right; I forgive you. (laughter)

SENATOR GORDON: Thank you, Senator.

SENATOR RICE: Could you have the staff work with the State Administration and with the people here to see if we can get an idea what type of apprenticeship course is involved, if any at all? On the construction side, we have apprenticeship stuff; it's just not being used. They have money, but it's going to get used because we are making some changes in January.

But the point-- The other question I want to raise, that's important to me, is -- and this goes to the Community College -- what is your Board structure? In other words, the makeup of your Board -- the authority is the County, but do you have corporate members on your Board of Trustees?

MR. ENRIGHT: I am going to defer to the President on that.
(laughter)

DR. IACONO: (off mike) I'm sorry, I couldn't hear that back there.

SENATOR RICE: Do you have corporate members appointed to the Board of Trustees for the Community College?

DR. IACONO: We do. We have a well-rounded Board of Trustees that represents a background of professions.

SENATOR RICE: Okay. And the reason I raise that to our members is because, under the Obama Administration, people didn't pay a lot of attention; we played politics too much, and were not looking at what people were doing. The Workforce Investment Opportunity Act, when it was changed from WIA to WIOA, it really kind of mandated that there be a

change in creating pathways for apprenticeship programs, working directly with the community colleges; and forcing four-year colleges to do the same thing. But it also said that there should be a different kind of relationship with corporate America, and that we should be looking at putting some corporate people on these boards so that the boards can strike curriculum based on business needs in those areas and those regions. And so we need to start talking about-- And we're doing that at SETC; I'm on the SETC. But we need to make sure that we, maybe, tighten up and, if necessary, legislate when those things happen.

The experience I'm going through at Essex County Community College -- that none should be reading about -- a lot of that is based on the Board in violation, also, of the guidelines -- how you get Board members. But I can't really think of -- the way politics put the Board members on, I can't think of one corporate person -- at least, coming from the manufacturing side, okay? -- on the Board. I see a lot of community people, and they're nice people; but they are really not structuring pathways. And if we structure pathways, that means that we'll be talking about funding, because you can't have one without the conversation on the other, if, in fact, there's a cost. And then we'll be talking about cost-benefit analysis; and once we have an analysis, we'll know just where the dollars should be coming from. And oftentimes, we don't have to raise dollars; we have to take advantage of what we have and shift them, because what we have may not be the best things.

So I just want to lay that out there for us, for the record. And I hope this is being transcribed, so I can reread it and remind myself too.
(laughter)

MR. MAGYAR (Caucus Aide): It is being transcribed.

SENATOR GORDON: Thank you very much, Senator Rice.

ASSEMBLYWOMAN DeCROCE: Can the Doctor address that, because I think he can give more insight on what they've done here on the chemistry of the Board.

DR. IACONO (off mike) (he speaks from the back of the room, out of range of microphones): So there are a couple of things.

And we did have some Board vacancies, and our Freeholders have been remarkably supportive and generous. We work closely, and they knew right away that we needed more individuals. We do have industry representation (indiscernible) a quorum.

Every program we have done we did build an advisory group around industry professionals, so that curriculum is a complicated one (indiscernible) about hiring, the workplace where they are going.

It is our intention, as we really expand out, to have an advisory group that does workforce only. But we don't have a program that doesn't have an advisory group around it; and we have gotten very, very good support from the Board members, making sure that's a diverse board who can speak to those issues as well. And again, we're comfortable. We've got a few seats that are open; and I believe that our voices are being heard on that.

SENATOR GORDON: Thank you; thank you, Doctor.

We could, clearly spend all day getting into the greater levels of detail. I think we're all fascinated by what we're hearing. But I'm trying to be mindful of the clock as well, and I want to thank this panel for some very thought-provoking presentations.

I'd like to move on to panel number two, and that is going to consist of Judy Savage, Executive Director of the New Jersey Council of [County Vocational-Technical Schools](#), who is going to present a needs assessment on the need to expand vo-tech facilities. We will also hear from Scott Moffitt, Superintendent of Morris County [Vocational-Technical School](#), and President of the New Jersey Coalition of County Vocational-Technical Schools. And from my home County of Bergen, Howard Lerner, Superintendent of the Bergen County Technical Schools.

Welcome.

Judy, do you want to begin?

J U D Y S A V A G E: Yes; thank you so much, Senator Gordon and members of the Caucus. It's my great pleasure to be back with you again today to talk -- dig a little deeper about the career and technical education bond act.

What we'd like to do is give you the opportunity to hear briefly, first, from Dr. Lerner from Bergen County. He has a time constraint and a meeting that he needs to get to, so he may not be able to stay for the full discussion; then from Scott Moffitt in Morris County; and then I will wrap it up with sort of a statewide overview.

H O W A R D L E R N E R, Ed. D. Great; thank you, and thank you for having us here today to talk about CTE and expansion of CTE.

My name is Howard Lerner; I'm the Superintendent for Bergen County Technical Schools. And I'd like to begin by talking about some numbers -- numbers of applications for admissions to CTE -- career and technical education schools in Bergen County.

We have approximately 1,400 to 1,500 applications for about 265 to 285 seats at Bergen County Academies; we have approximately 1,000 to 1,100 applications for 175 to 185 freshman seats at Teterboro. Our newest high school, Applied Tech High -- which I will talk about in a little while -- we have 90 to 100 applications for 30 seats, freshman seats; and at our Paramus Tech campus, we are full at over 300 fulltime students with special needs, and approximately 265 to 275 part-time students, both general and special education.

So you see, right off the bat, what the numbers show us, in terms of the demand for CTE programming in Bergen. In fact, we just opened up our portals for our open houses; and it goes online, and people sign up to go to our open houses in each school. It closes out as quickly as a Bruce Springsteen concert. You open it up, and it fills up -- four open houses, over 2,000 students want to come see our programs.

Expansion of CTE was and continues to be needed, especially at the middle level professions that will provide students with good, livable wages. And to respond to this need, BCTS collaborated with our community college, Bergen Community College, and created, with the assistance of the same partnership grant -- we received \$600,000 over a four-year period; and County funding -- we developed Applied Technology High School three years ago.

BCC provides us with space; and the teachers and professors are from both BCTS and BCC, depending on the course that you're taking. This certainly helps BCC, because we act as a feeder to the--

SENATOR GORDON: That's Bergen Community College.

DR. LERNER: Bergen Community College, right. Thank you, Senator. (laughter)

We act as a feeder to the college; and eventually, it certainly will help with graduation rates, as well, at the college.

Our first program at Applied Tech High School was Advanced Manufacturing, Mechatronics, Robotics, Drone Technology. We accept 30 students a year, and the students will receive a high school diploma in four years; and, in addition to that high school diploma, every student will have anywhere from 24 to 30 credits -- college credits at BCC.

Once completing their high school diploma, they can go to get an AA degree at Bergen Community College for another year; and then, after that, they can either go on to work or they go to our other partner, which is NJIT. And there's also a transfer connection that we have, like Morris was talking about, with NJIT, and they can complete their bachelor's in Educational Technology in about two years. And this is a great way for students and families to save money on college education costs, for sure.

Next September we will have full enrollment in our Advanced Manufacturing program; so we will have grades 9 to 12, 120 students -- that's 30 a grade; and, at the same time, next September, we are accepting our first freshman class in our second program connected with Bergen Community College, which is Allied Health Professions.

Now, what happens is, BCC provided us with space to start the program in Advanced Manufacturing; we were in this space for two years. And starting last month, this past September, when we went to grades 9, 10, and 11, they gave us approximately half of a building and a hall, which

they helped us renovate. And now it gives us an ability to expand into that second program.

So eventually, we're going to have two programs at BCC -- Advanced Manufacturing and Allied Health Professions -- with 240 students. That's the goal right now, short-term; longer term, we can certainly expand that as well.

The partnership grant got us started, but does not address the overwhelming needs to serve more students and create new career programs to address the emerging demands.

In Bergen, we are considering -- in addition to expanding the Applied Tech High School -- we are considering a new high school aimed at middle-skill areas such as Global Logistics, Green Technology, and Data Analytics, just to name a few. Thus we need bonding of significant dollars to continue to expand in the area of CTE.

However, we would also like the ability to collaborate with our local public schools to help create CTE programs in their own high schools, in their own towns.

SENATOR GORDON: If I could just interrupt for a second.

As you're speaking, I'm just wondering what kind of impact does the creation of these programs have on the regular public school districts -- the students left behind? I mean, is there -- are there resources being diverted from the 70-plus school districts in Bergen County?

DR. LERNER: So what we did in Bergen -- just to finish that thought about assisting local public schools by providing them with our expertise, setting up CTE programs that are not duplicative. So in other words, if the County school system has certain programs, if a local school

district wants to open up a program that's different, we can go in there and certainly help, as we did in Bergenfield. We leveraged our expertise and we created a Green Technology program in Bergenfield High School for Bergenfield students. And I'd like to do more of that, if we can.

The effect in Bergen -- we have 72 school districts or so; probably 55 or so with high schools. You know, you're not -- we're not taking 250 students from one particular school system. But this is an option that students, and parents, and families should have because there are certainly enough students to go around, and certainly not enough seats in career tech ed, based on the demand that we're seeing in terms of the numbers of students applying and, unfortunately, not being able to take part.

SCOTT MOFFITT: Thank you.

Good morning; my name is Scott Moffitt. I am Superintendent of Morris County Vocational School District, and I am currently the President of the New Jersey Council of County Vocational-Technical Schools.

And first, I want to start by saying thank you for getting all of your hard questions out of the way with the first panel. (laughter)

But I do want to thank you for taking the time to listen and hear about these issues.

And as you've heard from Howard, and you will see later in Judy's presentation, the demand for CTE programs is high, from both parents and students. But it doesn't end there. The need for CTE programs is echoed from business and industry, in a wide range of industries. It's not just manufacturing that we're hearing from.

Advanced manufacturing, however, was really where I got my first introduction to business and industry as the new Superintendent. And Bob, who was on the initial panel, sat down with us as a team, way back when; probably, seven years ago, at this point in time. And he toured our programs; he talked about -- talked to us about the needs that he was seeing in advanced manufacturing. He talked about the requisite skills; and we talked about how those skills, depending on who you talked to, might range a little bit, but there are definitely some core sets of skills that they're looking for.

And he was saying about how the workforce for them was aging out. And it was clear, at that time -- to us, and many other schools across the state -- that we weren't really doing enough in this field.

It doesn't end there, though. My continuing education manager then decides that it might be time to start a Precision Manufacturing program for adults in the county. We held a meeting with employers; we had 15 to 20 employers saying exactly what you heard earlier. "We'll pay for it; we'll give scholarships out." Fifteen to 20 in a room, all clamoring to get, maybe, the graduates of that program -- the talent that would continue through that program.

What was disheartening is, you run the program and we would barely get it off the ground -- seven to eight students -- adult students, adult learners, into a program that they're almost guaranteed a job when they complete. Part of it is getting that word out, and trying to figure out how to communicate that. I'm glad to hear that people, like Bob and others, feel like it's part of their job, also, to get -- stump for the need for manufacturing employees, and why it is so important.

We then heard from the Manufacturing Talent Network, and they continue to drive that point home.

The point of telling you all this is that we knew we needed to start a program; my colleagues knew they needed to start a program. However, we didn't have the space; and you've heard it over and over -- we didn't have the space, we didn't have the equipment, and we didn't have the ability to start a program. So essentially, the great idea sits on a shelf for, probably, another three or four years, just incubating there, waiting for something to come along.

And it wasn't until, what we would call, a *seed grant* came along that really got everybody to the table talking about how we can pull it all together -- the County and State resources, all getting pulled together, right here, to make it happen. We were lucky; we had the strong partnering with the County College of Morris. The Administration got it; they wanted a program, we wanted a program. They had just renovated a facility. But when you ask what it takes to get a program off the ground -- a few hundred thousand dollars might make it worthwhile for all of us to sit down and get it all ironed out, pull everybody together. But without that equipment, this idea would still be just sitting on a shelf somewhere. So the equipment needs in a program like this are great; and in almost any program we run, the equipment needs are great.

And the alternative is, we would start eliminating existing programs that are currently serving the community. So, what do we do? Eliminate electrical trades program, a welding program, a sports medicine program, a culinary arts program, to start a new program? We don't do that; as long as we're serving the community and students are being served

in those programs-- We have great need in a lot of areas, so it's very hard to just eliminate one and start a new one. These things just sit on a shelf.

We don't-- It's not just this industry, and that's the important thing to take away from here. We hear from Atlantic Health Systems here in the County, and Chilton hospital -- they're talking with us about a healthcare -- an Allied Health program that would be run, maybe, in conjunction with Pequannock School District. But Atlantic Health is sitting at the table talking about their need -- not for nurses, not for doctors -- but allied health professionals, technicians, therapists, you name it. And they're there because they're worried about their talent pipeline too. We hear from them.

We hear from students and families about unmanned aerial vehicle aviation -- you know, drones and drone technology. So there are needs that keep coming at us, and they just sit on shelves.

Someone actually mentioned, a little while ago, BMW. BMW has a headquarters over in Park Ridge, and they frequently visit our schools because they're worried about their talent pipeline and they want to make sure that our doors stay open for automotive technology. So we hear from industry; we hear, we hear, we hear. Sometimes we run the program; but without space and without the resources, these are ideas that sit on a shelf.

And I think that's the important work that's in front of you guys as well right now -- which is, how do you support all these businesses and these schools; how do you pull it all together without sacrificing what's in existence already.

And then you might come along and find models that work. How do you scale those up? You've heard, over and over again, we're

servicing 40 students in junior and senior year. That's a drop in the bucket in what's needed, from what we're hearing. It's a start, but how do you scale it up? Even here, we have our limitations; and you heard from Patrick -- they have a set of sections running in the morning, we fill the middle gap, and they have a section running at night. Beyond that, we don't have the ability to really scale it up here right now, even if we wanted to, and even if we had the students who we could stick in the program. It's just not -- we don't have the capacity to do that.

So I will end there, because you've heard a lot of what we've covered already. And I would turn it over to Judy, who has done a needs assessment of the county vocational schools, to do that presentation.

SENATOR GORDON: Thank you.

Judy.

MS. SAVAGE: Terrific.

Thank you very much. It's great to be back with the Caucus. We are really, really excited about your work. Last month, when you were in Paterson, I had the opportunity to, sort of, kick it off in giving you a little bit of an overview of some of the great progress that our county vocational schools have made in meeting the needs of manufacturers. And we're really thrilled and grateful that you've made the trip up here today, and that you're going to get -- you've heard from some students, but you're going to get to take a walk over to the lab and see what they're doing.

This summer, when the Senate President announced the formation of this Manufacturing Caucus, and his proposal to create a Bond Act to expand career and technical education in New Jersey, we got started on the needs assessment to try to inform that effort by giving the

Legislature and the Caucus a realistic picture of what the needs of county vocational schools are to meet both employer demand and student demand throughout the state.

We asked our county vocational schools' leaders to think, broadly and aspirationally, about what are the needs of the future. Not just what are the needs in front of your face right now -- how many students did you turn away last year, what roof needs patching -- but really, where do you need to be in the next 10, 15 years, or longer to position your county for economic growth and sustainability?

Some of our districts have been thinking about those very questions for a long time. And sitting on either side of me are two examples of our school leaders who I think have been really pondering those questions for a very long time. Quite frankly, I think other counties, maybe never even imagined, in their wildest dreams, that anybody in the State would come along and ask them what they really need, and how the State can help them get there, until the Senate President came forward and said this is what they wanted to do.

But nevertheless, everybody sat down; they rolled up their sleeves, they sat down with their teams, they talked with some of their employers and county officials to try to create a realistic estimate of what the future needs might be. I think what I'm going to present to you today is the beginning of a long discussion; you know, we really began this discussion with our folks at the beginning of September; it's mid-October. We didn't give them a long time to really think about it and talk a lot about it, but we knew that we really needed to come to you with some realistic information so that you could get started on this.

So what do we know? From 21 county vocational school districts, we know that all of them need to expand; they need to serve more students; they need new programs; they need to upgrade their programs to keep pace with industry and attract the next generation of tech-savvy students to programs, even those that have long been a mainstay -- things like auto technology.

Dr. Lerner talked about the demand in Bergen County; we've already talked to you about the statewide demand. When we went out with the needs assessment, we collected new numbers. So these are 2017 numbers: over 29,000 students applied; over 12,000 could be accepted; and more than 17,000 students were turned away. So that's up from 15,500 in 2016.

That amounts to, basically, 2.4 students applying for each seat, on a statewide average. It varies from program to program; it varies from county to county. Some places -- Morris, Bergen Academies -- are way more popular and in intense demand for that. In other places, I'll be quite frank -- our districts are working hard to attract enough students to run a Construction Trades program or an Auto Technology program. Those programs need some upgrades.

Again, on a statewide basis, we have space available for 41.5 percent of the applicants. That means that more than half of the students are going away disappointed; more than half the students who wanted that career-focused education are not able to get it.

How are we seeing this overwhelming demand? Certainly it comes from student applications across the board; as Scott talked about,

extreme employer demand -- both for secondary programs, and also for those short-term adult programs. We're seeing increased--

SENATOR GORDON: Can I just break in for a second?

MS. SAVAGE: Sure.

SENATOR GORDON: It seems to me that we're talking about infrastructure here that could satisfy demand, not just for the 15-year-olds who are interested in a technical training and moving into a manufacturing career. We also hear a lot of talk in this country about retooling our adult workforce in industries that have been feeling the effects of globalization. And I'm just wondering, is there any reason why this infrastructure can't be made available to the 45- or 50-year-old person who's been laid off from either a manufacturing job in an industry that has gone offshore, or from some industry that has experienced disruption and wants to retool into some field that offers potential? Is there any reason why we can't use that same infrastructure? And if the answer is "yes," are these numbers about half of what they should be, if we want to deal with adults as well?

MS. SAVAGE: Well, I think you're absolutely right. And of course, there is no reason why the infrastructure couldn't be used by multiple audiences; and I think that's the goal. County vocational-technical schools -- almost all of them use their existing infrastructure. They go 16 to 18 hours a day; they use their existing infrastructure with the high school students from 7:00 in the morning until 3:00. And most of them run extensive adult training programs in the afternoon-evening programs.

The scope -- the level of those adult training programs has dwindled over recent years, partly because there is so much demand from the secondary students. So a lot of districts used to run some of those adult

programs during the day; they don't have the space anymore. They still run them at night. The other thing that has hurt those programs is that State support for those programs disappeared in 2008; so now it's all what those adult students can pay, and assorted grant and workforce-type-programs.

So there is a huge opportunity here when we talk about career and technical education. It is high school programs; it can be two-year college programs; and it is also adult programs. And I think you're hearing, throughout the morning, about willing partners at both the county vocational school, county college level to meet that full range of needs. And it's a huge opportunity to find new and better ways of doing that all across the board.

SENATOR GORDON: Okay. Sorry to--

MS. SAVAGE: I think you're exactly right. That's coming in, like, 15 more slides (laughter), so thank you for getting ahead of it; and, as always, spot on.

So what kind of facilities are folks talking about? What are the needs? Well, more than half of the districts -- 11 -- said they need both new construction, expansion of their existing facilities, and some major renovation; 5 counties said they absolutely need some new construction; 4 are thinking about major renovation; 2, expanding existing facilities; and 2 counties feel that they need to do some new programs and expand enrollment, but don't necessarily need additional infrastructure. One of those is just completing a major project, so they're in good shape.

We need things like shops and labs; that's the biggest piece of this. They are expensive to build, they take a lot of space, and they also require a lot of specialized equipment.

If we talk about expanding the number of students who have access to these things, we also need the academic classrooms that go along and support that. And, of course, ancillary and support facilities for additional students.

So here's the fun part. When we get to start thinking about expanding and serving more students, we get to really think, in a serious way, about new programs. So when we went out and asked 21 county vocational schools, "What are the things that you're thinking about that you would like to do?" nine of them talked about logistics and distribution. And it's right in line with what I heard on the radio when I was coming here this morning. You know, it's Amazon, it's Walmart, it's UPS -- all of these companies have major facilities here. We had our summer professional development meeting, and we had a presentation from UPS, FedEx, and the Port. And they all talked about the need for a future workforce that has the technical skills to do jobs at all kinds of levels from-- UPS starts all their people driving the route and only making those left-hand turns. But they have needs, from that level, all the way up to advanced programming to run the applications. UPS is now exploring the drone delivery that launches from the top of the truck.

So advanced manufacturing -- we have, now, 11 of our 21 county vocational schools; 10 of them are new programs started in the last five years. When we asked, 7 said they either want to expand those programs or add new ones. Aviation drone technology, healthcare support and technicians is huge, energy and green technology, and sports medicine are all high-demand programs. Additional areas that districts are looking at -- cybersecurity, robotics, digital media, data analytics. And while most of

our districts do have welding programs, some don't; and they recognize a huge demand for that sort of thing.

Again, the need -- we're hearing about it from employers, some of whom are existing business partners. The Department of Labor is a partner in all of this. They have much better labor demand data than they ever did before. It's much more accessible and they are great partners.

Our local workforce boards are driving the demand. And I think students and parents are also somewhat more in tune with the idea that all this education really needs to lead to a job than they used to be.

I think, sort of, the theme that you've heard already today is about alignment and partnership with county colleges. We see that as an essential part of this whole initiative. We want to work with our county college partners to sort of maximize any State and county investment for infrastructure, for equipment. There is no reason that we shouldn't be doing this.

You heard a couple of references, earlier today, about students in these programs earning college credits. More than 10,000 students in county vocational schools earned college credits as part of their program in 2015-2016. That's 30 percent of all the students in grades 9 through 12. Not only does this show that the career-focused students are college-ready, but it also reduces the time and cost of earning a degree. And a lot of our schools feel very strongly that these kinds of experiences, like you've heard today, are a way more authentic show of college readiness, and a way more authentic experience than an AP class and an AP exam.

So as we talk about an expansion, it would certainly be our intent to collaborate very closely with county colleges to both expand those dual credit opportunities and maximize facilities.

Lots of opportunities for new approaches, as Senator Gordon was alluding to. First of all, I think that the focus on credentials is really important and it's gaining a lot of ground. You know, we've heard a lot about, sort of, that college-for-all idea that has been in place for so many years, and it drives the dialogue in local high schools. It's what guidance counselors are measured on, and it's what every parent has, sort of, been brainwashed to think -- it means success for their kid: where are they applying, where they get in. I'm a parent of two, and it was the same way for us.

But the pendulum is finally starting to swing back to recognizing that there are multiple pathways for students to succeed.

I think everybody agrees that in the 21st century some kind of education beyond high school is needed. The beauty of career and technical education is that, very often, our students are getting that education beyond high school while they're still in high school, and they are graduating with industry credentials, they are graduating with college credits. They can be ready to go if they want, or they can go on.

So there's a growing focus on industry credentials; and I also really appreciated the dialogue this morning about work-based learning and about apprenticeship. The other big presentation we had at our summer meeting this summer was about apprenticeship, with an expert from Washington, who's leading the way. And the term that he used is: This is the other college; it's the one without the debt. Apprenticeship is a way

that students can get education beyond high school, post-secondary training and, in many cases, a college degree without it costing the families a dime.

Another idea that we have been talking about at the county vocational school level is the need for a one-year career training program for high school graduates who may not even be interested in college. With more capacity, county vocational schools can collaborate with their county college partnerships to provide, sort of, a 13th year program that enables students to come after high school, spend a year in career training, get that industry credential, and have it linked in --- linked up with the county college so that those things would also be recognized as leading them towards an associate's degree. At the end of that time, they'd have their, sort of, technical studies completed or well underway, and be able to wrap around the gen ed that they need and get an associate's degree. To our mind, it's a way to hook students who may not be that academically inclined with something that they can feel, touch, be successful at, and then let them come back and do that math and English. Hopefully, they don't need any remediation; but if they do, start with the stuff that is going to grab them, and then finish it up.

So what are we talking about when we talk about the need to expand career and technical education? Certainly we need some significant construction and facility expansion. Based on our survey -- which, again, is the initial take of 21 counties -- that need for construction came in at a total of -- an estimate of about \$630 million. This is based on a number of counties seeing the need for a new vocational high school, and some also seeing a need to shift from some of those Share Time programs in outdated facilities to a new fulltime type of a situation.

In addition, a number of our districts see the need for a major renovation to upgrade shops and labs, and renovate outdated facilities. They estimated the cost of that at just over \$200 million. I think one of the most interesting ideas that was put out there is -- Sussex County talked about the need for a major renovation. They have a large indoor pool that's nonfunctional and is a major drain on resources. They want to fill it in and use that big space to create new shops and labs. So they don't need to expand their footprint, but they need a major renovation to make that space usable.

And finally, the last piece of this is a need for equipment for both new and upgraded programs. The districts estimated that cost at about \$53 million.

The picture here, I just want to point out -- you've heard the term *mechatronics*. This is a mechatronics setup from Hudson County. It's essentially like a mini-modular assembly line that enables students to learn how to program and even troubleshoot smart machines that are ubiquitous in manufacturing today. It's expensive to equip a lab with mechatronics equipment; and even more expensive are things like an automotive technology shop, where everything is computer-driven and it's essential to keep up with the industry standards.

So all together, you know, that puts the initial (indiscernible) and statewide needs at about \$891 million. We recognize that's a huge number; nobody's expecting the State to be able to fund all of those needs. We think there needs to be a local match in it. And there needs to be priority setting, and our folks are continuing their conversations at the local level about what the priority needs are.

But I want to salute our folks who did a yeoman's job of trying to put a number on those statewide needs so that you could have a feel for what the magnitude is.

SENATOR GORDON: Can I just insert a question here? And Senator Singer and I were, sort of, chatting offline about this.

Is there an opportunity to fund a part of that with private sector money, which might create-- For example, we could tell a company that if you put -- for every dollar you put into a pot in the County of Bergen and the County of Morris for these programs, we'll give you some kind of tax benefit, tax credit, reduction -- whatever -- to provide some incentives to attract private sector money to help satisfy these needs. Is there any reason why we couldn't do that?

MS. SAVAGE: I think it's a possibility. I don't know that that's ever-- I mean, I know that sort of public-private partnership has been done, to some degree, at the college level with facilities. I don't know if it's been done at the school level, but I don't see why it couldn't be done. Certainly, there's an opportunity for partnerships that would help with the equipment. You know, in many cases we do have employer partners who have donated some kind of equipment. But I think everybody is open to those conversations about how that could occur.

SENATOR GORDON: Okay.

SENATOR RICE: Mr. Chairman.

SENATOR GORDON: Senator Rice.

SENATOR RICE: Yes; I think what you may want to revisit is -- if you look at what we did to attract businesses to New Jersey, we spent too much money. Some of the industries -- they got afforded \$80 million;

we could've probably cut down on that. So if we revisit that, and say, "Okay, we can still do an incentive to get you here, but this piece is going here--" Do you understand what I'm saying? We need to revisit that, because that was, to me, good; but it was more political than objective. And so that may be a way to get the match from the business communities as they come, etc.

DR. LERNER: And Senator, if I could add to that.

I mean, sometimes the incentive might not necessarily be the tax break. We partnered with a company called the Air Group. And if you see around this county, their trucks are going everywhere for heating, ventilation, and air conditioning. Judy mentioned -- we had space constraints; we had to move adult programs, basically, offsite during the day. They were more than willing to step up, provide space, provide equipment; with one, really, main goal in mind: that they have first crack at the talent that goes through that program.

SENATOR GORDON: Yes. I mean, they could get -- rather than a tax benefit, which would have a fiscal impact, maybe you give those organizations first shot at the students.

MS. SAVAGE: Okay, right. Well, we're sort of winding down here.

So, I mean, you may wonder how did that need get so big? Why has construction and upgrades of county vocational schools lagged so far behind? The State has done two major bond acts for schools, but about 1 percent of that went to county vocational schools. So essentially, the 21 county vocational schools shared \$150 million, between 1996 and 2008, out of \$12.5 billion. So we felt kind of left out of all of that.

SENATOR SINGER: Through the Chair, just one thing.

I still want to go back to that 13th year; that kind--

SENATOR GORDON: Yes.

MS. SAVAGE: Okay.

SENATOR SINGER: I would just -- I think you're going down the wrong track with that. It's going to be a 13th year that's going to be put on the vocational schools, or the public schools -- wrong track.

MS. SAVAGE: Okay.

SENATOR SINGER: I mean, where school districts in my area are fighting for dollars to do what they're doing now, I can't add an additional burden to that. And if those schools have that kind of money to do that, then maybe we have to rethink some of the things you're talking about.

MS. SAVAGE: Right. I was not necessarily suggesting that it would be part of K-12, or paid for by the local school districts. It would be after they graduated, and it would just be, sort of, a hybrid option for students and families when they're out of school to do something one year short-term that's not necessarily a commitment to a college degree program, but has those options.

SENATOR SINGER: But who would pay for that?

MS. SAVAGE: The students and parents.

SENATOR SINGER: Okay, as long as we understand that.

DR. LERNER: Or we all would; you know, there's some funding there, if it was opened up.

MS. SAVAGE: Yes; right. But I would--

SENATOR SINGER: No, I just don't want--

MS. SAVAGE: I wasn't suggesting it as a school district's responsibility.

SENATOR SINGER: Okay; thank you.

MS. SAVAGE: And I absolutely acknowledge your concerns that we don't-- By expanding career and technical education, we don't want to create problems for K-12 school districts.

SENATOR RICE: So we need free community college.

MS. SAVAGE: There you go.

SENATOR SINGER: Thank you, Mr. Murphy. (laughter)

SENATOR GORDON: Assemblyman.

ASSEMBLYMAN BUCCO: Is the presentation done? Are you complete? I just -- is the presentation finished at this point? Are you all done?

MS. SAVAGE: Almost.

SENATOR GORDON: I think we have a few more pages.

ASSEMBLYMAN BUCCO: I can wait until she's done.

SENATOR GORDON: Okay.

MS. SAVAGE: Okay.

So just-- I mean, I mentioned that we recognize the need for a match; counties certainly need to provide a contribution to any investment in the infrastructure. Our recommendation would be to set this at 25 percent, which is the same level that was required under the Higher Education Building Our Future Bond Act. We think that provides a significant incentive to counties to invest in this need sooner, rather than later, while certainly helping with the cost.

Just going back to Senator Singer's point and concern -- you know, first of all, we need to recognize that additional students are going to create the need for additional resources. As county vocational schools serve more students, we just need to keep the progress, that's already happening with the School Funding Reform Act, to ensure that the ongoing operating aid will be enrollment-driven. That will help to cover the cost of additional students.

And we're very mindful of the fact that local districts, and the counties, are both under a 2 percent cap. And so their ability to increase their funding for these things is limited.

SENATOR SINGER: That's still up in the air -- that 2 percent cap. (laughter)

SENATOR GORDON: Not to be confused with the police cap.

MR. MAGYAR: That's a different cap.

SENATOR GORDON: That's a different cap. (laughter)

MS. SAVAGE: I was talking about the tax levy cap, but-- Yes, absolutely.

I don't think we want to belabor the point too much; you have already heard quite a lot about the importance of partnerships. Partnerships with the county and four-year colleges; of course, partnerships with employers; and there's also opportunity for partnerships with local districts. We all need to work together to avoid duplication, maximize efficiency, and maximize the value of investments. And I think we all need to collaborate to help students identify their career interests early and get on a solid career pathway early in the game

What it all takes to make it work is, really, a new dialogue. We need -- we've alluded to this already. We need a new dialogue with students and parents when despite the popularity of career and technical education programs, many of them still harbor perceptions and a stigma about vocational education being something that's good for somebody else's kid. Some people still think about it as a lesser option than going to college. We need to work with schools, we need to work with community leaders, we need to work with employers, and others to help everybody recognize that there are so many career opportunities that don't require a four-year degree, and that do pay well and offer a family-sustaining wage.

I think the Many Paths, One Future initiative at the State level is a good step in this direction. They've set an attainment goal, for New Jersey, of 65 percent of residents earning a credential or a two- or four-year degree by 2025. This kind of changes the dialogue at the State level where, quite frankly, our Department of Education, and every other State policy, has always been all about *college*. All the accountability metrics for school districts, for too long, have been college-driven; they measure how schools are doing with AP scores, and SAT scores, and with admission to college; and there hasn't been enough recognition of students going into the workplace and earning industry credentials.

You need more focus on work-based learning; we heard about apprenticeship today. Last week I had the privilege of being at a press conference at the State House where the Rowan Work & Learn Consortium was introduced. It's a Consortium that goes from the vocational to four-year college level, aligning all levels of the system with the needs of employers. I think you may hear more about that today.

And finally, we really need to break down barriers with local school districts and improve the collaboration, so that something like this is not seen as a tug-of-war for *our* students or *your* students; but that they can be seen as *everybody's* students who can have new opportunities, with shared service at the county level.

So with that, I will stop talking. Thank you so much for the opportunity to present this needs assessment, and I look forward to lots of continued dialogue and details.

SENATOR GORDON: Thank you, Judy, for a very good presentation, analysis, and in real numbers, to at least start the conversation with.

Let me just ask my colleagues--
Assemblyman.

ASSEMBLYMAN BUCCO: After listening to both the educators and the folks who are in the field -- the manufacturers -- it seems to me like there are two different programs here. One is a program where the manufacturers would like the students to be able to get some coursework and some, maybe, a little bit of hands-on experience; but spend two or three days a week actually learning about the jobs that those students are going to go into.

And then, I guess, there's the program that students are looking for in the technical fields that may or may not lead to a job right out of college, or may lead to them going to a four-year institution, like NJIT, to get an advanced degree to pursue a career in advanced manufacturing.

And I'm a little bit concerned because we hear about this need for additional space; and we certainly do need additional space, because if

we're moving in that direction of the technology area, there needs to be some additional space. But I don't think we'll ever be able to create enough space to address each individual industry's need. I mean, every manufacturer has a different type of hands-on need that the student is going to have to learn. And I don't think that we can build our technical schools, our community colleges big enough to handle all of those different aspects.

So while I'm convinced that we need some additional space for the educational area -- the technical educational area -- I think that the students are better served if they're not seeking a higher degree, if they're looking to get into the manufacturing world at a relatively young age, then creating these programs that are linked with the individual manufacturers so they're learning what they need to learn, book-wise, and maybe a little bit of technical stuff; but pairing them up with the manufacturers that need the hands-on work. And where they can go three days a week to get that experience because, number one, the manufacturers appear to me to be willing to pay for their education so they'll leave the educational system without huge debt; and two, you know, we're going to be putting these kids into a guaranteed job when they finish their education.

So I think we-- This was very helpful to me, because I get the whole workforce training program -- I get it -- but I just don't think the State has enough money -- or could we ever find enough money -- to build space large enough to address all of the different technical needs that cross the spectrum.

SENATOR RICE: So--

SENATOR GORDON: If I could just break in, then I will turn to Senator Rice.

When I-- And I'm wondering whether the local school districts can provide some of the space that we're looking for.

When I graduated from Fairlawn High School, there were 704 graduates in my class; peak of the baby boom. The high school class there now is probably much smaller. I'm wondering -- is there is an opportunity to try to make use of some of the facilities at the district level; and doing that might also reduce the threat that some of the districts may be feeling about resources going off-campus to Teterboro or wherever?

MS. SAVAGE: Well, you have the master of those kinds of agreements sitting right in front of you. So I am going to let Scott tell you what he's doing right here in this county.

MR. MOFFITT: To Assemblyman Bucco's point -- I mean, yes, there-- Yes, I mean, the need is so overwhelming; and when you look at some of the numbers, they're big already. And when you put them in context, the large bulk of those are students who are 8th graders looking to do something in the 9th grade. It's not the four-year spectrum of what would have been, potentially, there.

But what we're taxed with and led to do from Federal and State guidelines is to develop a pathway that has multiple off-ramps. So when we build a program like this with the county college, there's an off-ramp for students to go through a two years and go right into the job workforce. Then there's another pathway, maybe, to go to a two-year degree, and maybe another pathway to go to a four-year degree.

So we have these multiple pathways that are available to students. A couple take advantage of one route, a couple take advantage of another route, and a couple go the other way.

And yes, I mean, it's a drop in the bucket in the grand scheme of what's needed; but it's a very good start, and it allows families to put students along that pathway.

And when it comes to partnering with local districts -- yes, there absolutely is a potential there. It's a complicated one, but there is potential. In this county we've been able to work in conjunction with a number of school districts. You heard me earlier talking about Atlantic Health. If we're successful in pulling a program together over there, that would be a program with Atlantic Health, Chilton Hospital, Pequannock School District, and Morris County Vocational; largely housed in Pequannock, on their campus, which is across the street from Chilton Hospital. And they would be going to Chilton Hospital to do two or three days a week of interning in the hospital.

So we're trying to build programs like that, and we are trying to work with local school districts to do that. There's a program run in conjunction with Morris Hills Regional; there's a program we run for environmental science out in Jefferson; and there's a brand-new program we started that's a collaboration between us and Mountain Lakes for a Biotechnology Academy. So, you know, they had the space; they converted it into a lab. And we run a cohort of students, 9 through 12 eventually, through that program. And some of those were also possible because of the grant that came out of the State not too long ago; because, once again, you

have that initial seed money that needs to start to fund the equipment needs, if you will, and to design the curriculum around.

SENATOR GORDON: Senator Rice, did you--

SENATOR RICE: Yes, I just wanted to say, I agree with the Assemblyman; but also, we need to take a look at -- when we talk about the manufacturing stream in New Jersey -- at the number of industries, which is different -- the number of companies is different than the number of industries. And so a lot of the training is the same for some of the companies, and so that kind of narrows the down the need for a certain type of space.

Then we need to look at who and what we're trying to attract in that area of industry. We look at healthcare, we look at pharmaceuticals, and stuff like that. So what is our manufacturing industry, if you were to really find some commonality? Where's the growth, and what are we trying to bring in? And that will also help define space and, probably, minimize the amount of space that we would potentially need.

So I just want to put that down, because these are questions that need answers, as we move along the program. I think what we're looking at, as a Caucus, is some legislation, some things -- (indiscernible) some things, and teaching and training stuff that can immediately help our industries enhance; and also give people an opportunity to look at New Jersey and want to come in.

But then I think there's some long-range planning that needs to be done with questions that still need answers. And it's like, what is our niche going to be, moving forward; and how do we make sure, if this is our niche and we have to make a transition in 10 or 20 years in the niche, how

do we make that transition? And I think that's the way we need to be looking at this.

SENATOR GORDON: Okay.

Assemblywoman.

ASSEMBLYWOMAN DeCROCE: Yes.

When I've been in to talk to the County College of Morris, we did talk about the different manufacturing companies and the different specialized training each and every company would need. And not only does each and every company need the certification, a lot of them require accreditation with the certification. So that's bringing the County College and the vo-tech schools together.

The question was, once we do that, CEUs are required to keep their accreditation up-to-date. So we looked at the *specialized* for a company that is going to require an awful lot.

So when I spoke to Dr. Iacono and some of his staff, with my staff, it was talked about -- train the trainer. So the college would train the trainer, who could carry it back to more specialized within the facilities of the manufacturing companies; which then could train, within the facility, and the accreditation that came along with the college would follow the train the trainer. So therefore, we're starting to spread out some of the concerns that Assemblyman Bucco had, and Senator Rice just spoke about -- could be spread out there so that the workforce development facility, if there's one, and what's available in the vo-techs could be used to their maximum. But in the interim, too, there would be train the trainer that could go out to the manufacturing companies and be one of their own employees who goes through the program, through the County College of

Morris -- or any county college -- and can go back to the company and do the training within the facility.

Most manufacturing companies that I have met with have said that the technology that they're using lasts about two years. So in two years, the technology is changing, so this equipment that may be housed in the workforce development building may only be -- have a lifespan of two years, when it's already changing.

So we have to be able to deal with that in a way -- and that's where the public-private partnership comes along -- and also by vo-tech and the county colleges doing it together, it qualifies the students for tuition that they can't get right now, Senator Rice. The money that is out there and the students can't get -- if we do a bill putting that together, the students will be able to go to vo-tech, the County College of Morris. Because the County College of Morris is accrediting the certification they're doing the students then qualify for tuition, so that they don't have to pay for it. Because they can't afford the Lincoln Technologies of the world, and that because they're not accredited (*sic*). And that is a problem here -- that we need to bring those entities together with the accreditation programs.

SENATOR GORDON: Okay.

This has been extraordinarily interesting. The conversation will continue, but we're going to move on to our next panel.

And we will be hearing from the county colleges -- from that group. And this panel will consist of -- and I apologize in advance for pronunciation of names -- Larry Nespoli, Executive Director of the American Association of Community Colleges; Jianping Wang, President of Mercer County Community College; Jacki Belin, Vice President of

Strategic Programs and Development, Raritan Valley Community College; Michael Plagianakos, Vice President of Rowan College at Gloucester County; and Sivaraman Anbarasan, the Executive Director of the Community College Consortium for Workforce and Economic Development. I think I covered about four languages there. (laughter)

And I welcome you all; thank you.

I don't know who would like to go first, but--

LAWRENCE A. NESPOLI, D.Ed.: Mr. Chairman, I'll kick it off, in the interest of time.

SENATOR GORDON: If you could just identify yourselves of the record.

DR. NESPOLI: I'm Larry Nespoli, President of the New Jersey Council of County Colleges, the State organization for New Jersey's 19 community colleges.

And in the interest of time, I will send, through the Chair, to the members, the community college's needs assessment and the hoped-for participation of the county colleges in the bond.

Because a couple of our members -- to my right and left -- you'd be interested to hear that they have a hard stop to attend a graduation ceremony at Amazon's facilities in Mercer County; a graduation ceremony for a program that -- very much to your point, Mr. Chair, you said earlier this morning about adults and others, too, returning to retool. And that's what the program with Amazon -- Amazon's in the news these days -- and very much proud of the community college partnership with Amazon. They have targeted our colleges as their premier provider of training throughout their many facilities in our state.

So in the interest of time, let me just say -- invoke one word, and one word only, and then hand off to President Wang from Mercer to get us started. *Partnership* is my takeaway from today; and it's very much akin to what we heard Senate President Sweeney and others say a week or two ago. This is all about addressing this need of our state in a partnership way.

And the good news for the Committee is that you have the right partners at the table. You have the county vo-tech high schools, you have the county colleges together, and how great is it that you chose Morris to have this hearing today, because you've seen that partnership in the real world and what it's doing for the citizens.

And so it's all about partnerships, it's all about employer-driven demands.

And with that much said, I will follow up, Mr. Chair, to give you our particulars on the community college take on all of this, and our thinking on the bond as well.

But Madam President, you have some exciting work going on at Mercer County Community College. And we'll look to you first; maybe take questions for the President, so that she can depart for this ceremony at Amazon.

Madam President.

JIANPING WANG: Thank you very much, Larry.

Thank you, Mr. Chair; thank you, panel.

I am honored to be here to share with you some really, really exciting partnerships, as Larry indicated, and that may answer the questions that were discussed early on.

So Mercer County Community College, in the last 18 months, has been partnering with industries on several fronts. So we have a partnership with a community technology company that is providing smart homes, smart businesses, smart streets, smart everything. And they came to tell us they have a negative 10 percent employment rate. So I said, "Wow, you are the provider of computer services, and you have a 10 percent negative employment rate. That means we have a problem."

So we sat down and we talked, and the CEO said to me, "We typically hire a bachelor's degree, so there is not much we can do with you." And I said, "Really? So tell me what you are looking for. Don't tell me you're looking for bachelor's; tell me what skills you're looking for, and maybe we can look at what we are training, and maybe we can find some match."

And long story short, not only did he agree that our students fully met his industry needs, but also he agreed to -- like someone said -- how about business investing. He invested more than a half-a-million dollars out of his pocket to open up a tech startup academy on our campus. It had started six months before; it was at his location -- his headquarters in Cranbury. But some of our students don't drive, so those students who don't drive don't have the opportunity to go. So we invited him to come on campus as a partnership. I gave him a room; I outfitted the room to his specifications. He brought the entire equipment because, as you said, I don't have the equipment. I told him, "If you give me money, I don't know what to buy," because it has to be up-to-date.

Then he hired an Executive Director to run this academy, who happens to be a Mercer graduate; a female on top of it. So I am very proud of it, because it gives students a role model to follow.

So this academy is in the works; and on October 6, we had a ribbon-cutting ceremony. A student named Alex came forward to speak. And just like this parent who spoke about her son, that child, since age 4, dreamed of something related to computers. He took his own family computer apart, put it back together, took it apart, back together -- but could never find a job because he doesn't have any experience.

So he, now, is hired by Domain because he's so good; and Domain now says they no longer need to import technicians from Indonesia and India. They used to go out there and look for those people, and pay a lot of money; and now they hire our students as paid interns. And students would walk in there, work for a couple of hours, and go take classes; and come back, work for a couple of hours. So that's just one example.

We also teamed up with ABJ Drones; and somebody mentioned the drones. Our academy is starting next week; we have nine students so far registered. And again, the academy is fully equipped with drones provided by the industry. I don't have the money, I don't even know what drones to buy, and I don't have the instructors who can fly drones, because my faculty got their Ph.Ds. 15, 20, 30 years ago. (laughter) There were no drones back then.

So they provide hands-on instruction; I provide a series of courses -- because we have an aviation program already certified by the FAA. So it's just a win-win for everybody; 4:00 this afternoon, the CEO is coming to see me and says, "Now I need to take the next step." And I said,

“We haven’t finished the first step.” And he said, “No. no. no. The first step is all set to go; I’m confident it will fly.” The next step -- he wants to do a drone repair shop. So now I’ll talk about the needs later.

Another example I did with -- we have a medical lab technician old code and billing program. Well, the industry has changed; it’s all medical electronic coding and billing. So we have no equipment, we have no technology, and we have no instructor. So I teamed up with GBG Group in Hamilton, and we use their lab to teach hands-on experience. And our students get the up-to-date equipment and instruction by GBG Ph.Ds. So my faculty couldn’t do that; but they can do that over there.

We have another program in downtown Trenton -- Security Industry Association. So old time security guards are no longer what suits the industry needs. It’s all camera surveillance, it’s all computerized control. So the Security Industry Association, headquartered in California, contacted us and said, “I can’t find employees; what can you do for me?” And I said, “What do you need?” And they said, “I need this, this, and that.” I said, “Okay, how about I give you two rooms and you bring all the equipment?”

So they brought all the equipment; in May, we graduated the first student. The student was offered a job by SIA with a \$55,000 starting salary; \$55,000. This is an adult learner.

SENATOR GORDON: Could be some opportunities for legislators in this. (laughter)

DR. WANG: Yes.

SENATOR SINGER: That’s a pay increase for us.

SENATOR GORDON: It’s a pay increase. (laughter)

DR. WANG: It was a better salary than my first salary, for sure.

And you just heard about Amazon. We started offering classes for Amazon last fall. The same thing -- I went with my recruitment team, and we held information sessions. We asked them, "What are your needs?" They said, "We don't know." I said, "Why don't we just go there and listen to your employees?" So we listened to the employees, and they told us what they wanted. And we offered to them; and they built a classroom on the site for us because their employees need to be in a cohort.

So all in all, partnerships do work. And the key ingredients in this successful partnership, for me, are the following.

I want to make sure all industries understand those internships must be paid. If they are not paid, many of our students cannot participate because they have to work part-time in order to support themselves, pay for the gas, pay for the meals. So we insist all of our partnerships -- the company pays.

The second thing we insist on is they offer jobs to our students if they successfully complete all the paid internships and degree programs. So my partnership industries all guarantee jobs to our students. And one partner -- we just signed the agreement in September with Maestro Technologies in Trenton; they just had a ribbon-cutting ceremony. And I even -- because I'm getting a little bit better hang of this thing -- so I said to Maestro, I said, "You know, in your area, a bachelor's degree is required; sometimes, even a master's degree" because they are in the data security business. So I said, "If you hire my graduates, and if they do well for you, I

want you to send them to finish their baccalaureate degree on your dime and on your time.” And they said “yes.”

So we have an agreement with them; not only they hire them, but pay for their baccalaureate degree so students have a viable means for future jobs. And I have four-year institutions agree to offer them at my downtown campus in Trenton, which is one-and-a-half blocks away from the company. So it makes the company happy because they don't have to waste a lot of time for the employees to be traveling on the road.

So these partnerships really, really paved the way for our students. The key issue now -- I think we need support from this group -- is resources, particularly resources in terms of space. We need additional classrooms, we need additional staff because the existing faculty members, like I said, don't know how to do drones, don't know how to do advanced manufacturing, don't know how to do SIA -- security system technology; they never heard of it. So I have to hire a new faculty, but the lines are not there for me -- the budget line, what that means, is not there. So now, right now, as we speak, I have one opening line due to retirement in the STEM division -- Science Technology division. So they came to me and they said, “Hey, Dr. Wang, we just signed an agreement with Piedmont Airlines to train their retired helicopter pilots into commercial pilots.” And I said, “Well, that's great.” They said, “They're going to bring us 100 veterans a year.” And I said, “Well, that's even better.” They said, “Yes, but I need an additional instructor.” And so I said, “Well, you have one line.” So now they're struggling: Hiring an advanced manufacturing person, or hiring a pilot instructor. So this is where our budget line is struggling; and the space. So if you have 100 more people coming into aviation, you need to

buy a new simulator; and a simulator is \$150,000. So it's not a small chunk of change.

It's those kinds of things I think we need to find the resources for -- innovative things.

And I really, really want to thank you all for listening, and I'd be happy to take any questions.

SENATOR GORDON: Okay.

DR. NESPOLI: Mr. Chair, if the members would like to address questions to President Wang that--

SENATOR GORDON: Yes, any questions for President Wang? (no response)

DR. NESPOLI: Might I just say the following, very quickly, and then I know you need to get on the road.

But you just heard a compelling example, and you heard it previously from President Tony Iacono here, some of you are old enough to remember the phrase -- which we no longer like -- *junior college*. When CCM was started, Assemblywoman, 50 years ago, and even Mercer in my county -- they were mostly, the first two years--

You were not old enough; you are not old enough. (laughter)

--the first two years to the bachelor's degree. That's no longer the case. The community college -- the *comprehensive* community college is what you've heard today -- from Tony, from Jianping -- very much active in the training and retraining especially for good jobs, good paying jobs that require some college, but not a bachelor's degree.

Thank you for being here.

DR. WANG: Thank you very much.

SENATOR GORDON: Thank you very much, President Wang; thank you.

DR. NESPOLI: You're going to hear, first, from Anbar, who heads our statewide workforce training consortium; and then, other examples of community colleges -- comprehensive community colleges, not junior colleges -- comprehensive community colleges, very active in this space.

Anbar.

SIVARAMAN ANBARASAN: Yes; before I start, we have a short media -- a couple of minutes.

DR. NESPOLI: This is a piece out of Georgetown University.

(film clip plays)

MR. ANBARASAN: And we didn't have to pay them to do this for us. (laughter)

Thank you, Senator Gordon, and members of the Manufacturing Caucus, for giving us the opportunity to present a growth plan in advanced manufacturing, training, and other much-needed workforce programs.

The folder you have has some information about this program that I'm going to talk about specifically; and also the contact information of the speakers from our sector.

New Jersey's 19 community colleges educate and train about 300,000 students and workers in New Jersey -- the most of any other higher education institution. As the workforce development arm of the

community colleges, for the past 12 years our Consortium has helped the colleges train nearly 200,000 workers in about 8,000 businesses.

The key is the partnership with the employers. Our work revolves around the employers' need to fill those jobs that they have, as well as improve the quality of the workers they currently employ.

You heard about our manufacturing training program six years ago; Bob Staudinger talked about that extensively. That program, along with a few others, are all funded by grants from the New Jersey Department of Labor, as well as the U.S. Department of Labor. We have been able to wrap those programs up: Advanced Manufacturing and CNC operations, Certified Production Technicians, Welding. Of late, Electromechanical Training at Passaic County Community College, where we partnered with Haier America -- if you know Haier, they are the largest -- world's largest appliance manufacturers; they acquired GE Appliances recently. So together, we have trained, I would say, in the last five years, about 450 manufacturing technicians; and 90 percent of them are working at over 100 manufacturing companies in New Jersey.

How do we do that? Working with the employers; that's the key.

The collaborative program that you heard of at CCM requires more resources, just like our ongoing grant-funded training programs. CCM -- you heard we have 200 students, 40 of them are from high school; and they are getting requests from local manufacturers -- about 483 of them -- they all want more training for their employees. There is just no space and no equipment to train them.

And our grant funds -- some of them end in 2018. To continue the good work the colleges are doing, we would need more funding to continue that type of training. We brought forward, to the state, the first mobile manufacturing labs. These labs travel on a 48-foot trailer to various locations throughout New Jersey where the jobs are. Manufacturers tell us they need 10 technicians, so we bring our trucks there, and we do the training at the local community colleges. After the training, they get industry-value credentials, which translate to college credits, toward a career pathway in manufacturing. And 90 percent of those trained get jobs; and the 10 percent -- they didn't want to stay in the program, and they left on their own.

I want to highlight two other programs that we are currently working on that are stalled because of lack of funding.

Transportation, Logistics, and Distribution is so intricately connected to the manufacturing industry. And a recent economic study, commissioned by Atlantic County, recommended creating an Aviation Technician Training program in Atlantic County. The county college there -- Atlantic Cape Community College -- worked with the county government, and the government has agreed to allocate space at the city airport -- Atlantic City Airport -- to the college for a lab. But we need tons of equipment, we need new curriculum, we need staff, we need training materials, we need licensing, we need certification by FAA. So that is a huge program; that's going to be an economic driver in the Atlantic Cape Community College area, and that's a program that could be helped by this bond issue.

The construction industry is another one that has been identified as a key sector for New Jersey's economic growth. The construction companies, as you know, utilize thousands of heavy diesel equipment; and guess what? They have technicians who are quite old and ready to retire, and they do not have a strong talent pipeline to fill those. A group of 30 such distributors came to us last year and they wanted to have an accredited associate's degree program -- create this associate's degree program that will create certified heavy diesel equipment technicians for them. And these guys, after a couple of years' experience, they make--

DR. NESPOLI: And gals.

MR. ANBARASAN: And girls (laughter) -- they make \$70,000-plus a year. And right now, their problem is, they're taking people off the street and spending two years, and hundreds of thousands of dollars, in training them for three or four years before they can be productive.

So we need this program right now in New Jersey. And they are willing to hire every one of them in a class, as long as they pass the two-year degree program.

So these are some of -- the two hot programs that we have in mind that could start. And you heard President Wang talk about many initiatives; we have other colleges that are going to talk about some of the initiatives they do. The community college is in a position, very well, to work with the employers, and bring these accredited programs that create a talented work pool that is in demand by the employers. And this Caucus is working toward that end, and we thank you for listening to us.

SENATOR GORDON: Thank you very much.

DR. NESPOLI: Raritan Valley Community College, Somerset and Hunterdon counties.

JACKI W. BELIN: My name is Jacki Belin; I'm the Vice President for Strategic Programs at Raritan Valley Community College. And this is my colleague, Joanie Caffaro, the Director of Workforce Development.

So we thank you for allowing us to tell our story today.

As all of the community colleges in New Jersey, we're preparing a highly skilled workforce through industry-driven training, professional development, and corporate partnerships.

So briefly, I would like to just talk about the evolution of our workforce training programs, because I think it highlights what can be accomplished when government, industry, and education partner.

So in 2011, the college applied and received a Trade Adjustment Assistance Community College and Career Training -- known as the *TAACCCT* -- grant. And that enabled us to design and develop 10 industry-credentialed programs. The key to that grant was that all our programs were developed with employer engagement. So the employers came to the table while we developed the curriculum, and they identified the skills, knowledge, and abilities that are required for entry-level employees.

All of our programs end with an industry or an educational accreditation. The *TAACCCT* grant allowed us to buy equipment and, at the time, we didn't have a facility. So we distributed the equipment in leased areas throughout the counties.

The success of our developing 10 programs positioned us to apply for a Higher Ed Building Facilities Bond; we received \$8 million. We

coupled that with \$3.5 million from Chapter XII funding, and we were able to build a state-of-the-art Workforce Training Center, which opened this past June. So I would encourage all of you -- if you haven't seen it, considering so much of the conversation is around facilities, we would welcome all of you to our college and give you a tour. There is 47,000 square feet; it houses our Workforce Training programs.

The goal of the Workforce Training Center also aligns with the State's strategic plan, which was mentioned, that by 2025, 65 percent of adults need some post-secondary credential to be successful and to be able to earn a living wage so they can stay in New Jersey. Currently, some of the programs that are housed in our Workforce Training Center include Automotive Technology -- it's a fully equipped automotive technology lab; Cosmetology; Environmental Control Technology, which is, sort of, an updated version of HVAC. And you'll be happy to know that our Environmental Control Technology program was just approved as the training portion for apprenticeship programs. So if our students go through our education program, that satisfies the education portion for an apprenticeship.

Programs that we're going to expand on in the future include Welding, Energy Utility Training programs, Supply Chain Logistics, and Mechatronics. In fact, we have the mechatronics trailer that Anbar was referring to on our campus. And we're planning on running -- we call them *boot camps*; they're 12-week training programs that give students, sort of, the entry level certification to get a job. And we're going to contact Norwalt, because they were looking for mechatronics students.

And our flagship program in our Workforce Training Center is our Advanced Manufacturing program. And I'm going to let Joanie, who really administers and is responsible for the success of the program.

JOANANNE COFFARO: Good afternoon, now.

My name is Joanie Caffaro; I'm the Director of Workforce Development at Raritan Valley Community College.

Our Advanced Manufacturing is our flagship program because it has a noncredit-to-credit pathway, it has stackable credentials, it has employer partnerships. We have internships and apprenticeship programs in place. It really helps students of all kinds. So we have a pipeline from the youth program; we have a *MEAM* program in our high school, which is mechatronics, engineering, and advanced manufacturing. They come to our -- from 9th grade to 12th grade, they come -- just like the CCM program. So that is a pipeline into our full program. They will receive 12 elective credits into our Engineering Technology degree once they finish the program.

We also have these CNC boot camps which, through government funding -- if it wasn't for the government funding that we receive, we would not have the success of these programs. We train long-term, unemployed, and dislocated workers. These are 300-hour programs; that give them the fundamentals of work, we get them placed in employment. We have had 100 students come through these programs, and we have a 90 percent placement rate.

Some students choose, once they're in school, they want to go back to school to attain different outcomes. These programs are wonderful because they have been long-term unemployed. We place them in a job,

and then we bring them back for advanced training, which the employers help pay for. So it really gives a well-rounded student the education, the credential, and allows them a career pathway forward within the company.

And we also, as Jacki mentioned, are going to start that mechatronics trailer in Robotics, which not only can the MEAM students from the high school take advantage of, but we're going to start one -- we've identified several employers in our area that have a large mechatronics presence in their company.

And we also do some employer training; so we advanced peoples' careers as they come for higher-level training like, 3-axis, or mill, or lathe set-up operations. So it's a kind of higher end training than our full-year program.

But all of these programs have started with grant funding; and we do want to expand into Supply Logistics and Welding, and it's very important.

DR. NESPOLI: So batting cleanup, our community college in Gloucester County. And I know you're seeing the consistent theme here: Community colleges -- formerly primarily a place where students went to for the first two years of a bachelor's degree -- have now morphed beautifully and powerfully into comprehensive community colleges, providing technical training programs. Not middle-skilled jobs, Senator Gordon; highly technical, highly technical skilled jobs.

Gloucester County.

MICHAEL S. PLAGIANAKOS: Thank you.

Good afternoon.

SENATOR GORDON: And thank you for traveling -- getting the award for the longest trip. (laughter)

MR. PLAGIANAKOS: Thank you; thank you for having me today.

My name Mike Plagianakos; I'm the Dean of University Relations at Rowan College at Gloucester County. I believe I am also one of the last speakers between you all and lunch, so I promise I will be as brief as humanly possible.

I'm here to talk about the Work & Learn Consortium, which was unveiled last week by the Senate President, Steve Sweeney. This is what we hope is going to be a model for the entire state to adopt. What it is, is a partnership from the county vocational school, the community college, and the four-year university.

And what it builds upon is a stackable credential model, starting with the community college; the certification of some kind in a high demand field. So we've identified seven high demand fields in the State of New Jersey, including advanced manufacturing, healthcare, transportation logistics -- a lot of what we've heard today. And what that does is, it allows the student to stop in or stop out at any given point. What we're trying to do is take away the all-or-nothing phenomenon of higher education, which is, you either have a degree or you don't. So what we're looking to do is identify students -- both at the vocational schools at the high school level, as well as adult career changers -- give them opportunities to get retrained and back in the workforce as fast as possible.

Now, we're doing this by partnering with industry, with the Chamber of Commerce, the Department of Labor, and with the local

Economic Development Board to provide advisory boards from the industries, to provide us with what credentials they're looking for, what skills they are looking for.

We are also partnering with them to provide training for their employees; we are also partnering with them to provide paid internships. You heard President Wang say that the internships have to be paid; we agree with that model -- that there has to be an investment there. And a lot of our students are unable to take unpaid internships because they need to work a job to be able to go school.

So that combination, then, allows us to tie into an associate's degree; and then beyond that, additional certifications for the third year -- what Rowan University calls *Certificates of Undergraduate Study*, or *CUGS*. And that, ultimately, ends in a baccalaureate degree.

What this allows us to do, and what it allows the employers to do, is build a workforce, a talent pool that they can identify immediately. So they have an individual who comes and works; they reach the credential they're looking for, they've interned, they're performing well, they're a good worker, they're a good student. They may want them right away in the workforce; they may hire them after one year.

What it also allows them to do is, if they have individuals who they are identifying to have leadership capability or management capability, they can continue on, throughout this program, all the way up to the baccalaureate degree -- that will not only provide them with technical skills, but those soft skills and those management skills that are so valuable in the industry; not just the front-line workers, but also the managers and the supervisors.

In addition to that, we are also working on prior learning assessment, which will provide academic credit for work experience, which I believe is critical to this type of initiative.

So that, in a nutshell, covers this model of what we're looking to do for the entire state. And we believe this kind of lays a blanket over everything you've heard today, and ties it together with a model that is sustainable, that is achievable with very little cost to the State, to the institutions, or to the students.

So, thank you.

SENATOR GORDON: Okay.

DR. NESPOLI: Mr. Chairman, members of the Committee, let us finish where we started.

We will send you our particulars on the single-biggest impediment we're facing: lack of space. You can see, we're in the game; but to fully respond to the call for action that was in the video, what you heard today about employers needing highly skilled employees with some college -- an associate's degree, but not necessarily a bachelor's degree -- we need space. And we will follow up, through the Chair, with that information.

SENATOR GORDON: Okay; great.

Well, I don't know if there are any questions--

SENATOR BUCCO: Senator?

SENATOR RICE: Yes, I want to ask--

SENATOR BUCCO: I have one question.

SENATOR GORDON: Senator Bucco.

SENATOR BUCCO: Thank you.

Now, all the panels have been very informative, but one question I have -- do you have a central registry that would tie in the community colleges with the vo-techs and the four-year colleges? In other words, as the owner of a manufacturing facility, I've contacted my community colleges in my area where my business -- and the vo-techs -- but didn't have that much success. My thought is, if there was a registry that I could go on, or any manufacturer could go on, telling the company the location, what we're looking for, what skill sets that we need -- I think this would also be very beneficial--

SENATOR GORDON: Great idea.

SENATOR BUCCO: --for seeing what direction that the jobs are going.

So I don't know if that's possible.

DR. NESPOLI: It is. In fact, Judy and I collaborated -- time flies -- maybe a year ago on producing a listing of the collaborations between the county vo-tech schools and the community colleges throughout the state. It's probably a good time to update that.

SENATOR BUCCO: Yes; I mean, because if I'm on the registry -- and it may not be in Morris County, it may -- Passaic County or Gloucester County may be able to tell me whether there is somebody who has interest in that type of job.

SENATOR GORDON: Excellent idea.

DR. NESPOLI: I'll follow up.

SENATOR BUCCO: Thank you.

SENATOR GORDON: Senator Rice.

SENATOR RICE: Yes, I have a similar question. Not so much a registry, but I think that's a great idea.

Could you send, through the Chair, a list of all the community colleges' programs and collaborations with the manufacturing industry? I don't need to know the other people; I just need to know -- I want to be-- I want to look at manufacturing. Because it appears that there are different programs taking place, and all different *ask-fors* that are not in place right now -- so we can see what community colleges-- Because in New Jersey we're not supposed to be selfish; we're supposed to be sharing best practices because we're regional as well. And we never know where industry is going, so we need to know what we would be paying, in terms of the workforce. And there is no shame in someone who is prepared in one county, but there's a job in another, relocating if they have a job, because that's what people do. It seems that everybody's coming in state from out of state, so why don't we just move our folks around in the state.

So if you can get that-- That you already have.

DR. NESPOLI: Yes.

SENATOR RICE: So that I would expect to get real soon.

(laughter)

DR. NESPOLI: Tomorrow.

SENATOR RICE: You got it.

DR. NESPOLI: Through the Chair. (laughter)

SENATOR GORDON: Great; thank you.

DR. NESPOLI: I always like to tip our hat to-- The good Senator Rice is a proud community college alum.

SENATOR RICE: That's right. (laughter)

SENATOR GORDON: Anyone else? (no response)

Let me just say that I find what I've heard today, particularly from this panel, very exciting.

When I came here today I assumed we were talking mainly about students at the high school level, finding new pathways to technical education. I hadn't appreciated that we have institutions and infrastructure already in place -- at least, in selected parts of our state -- that can help with the retooling in response to an ever-changing economy. We all know that the era of lifetime jobs are over; lifetime careers. People need to be fast on their feet and be able to retool. And when you're 45 or 50, you can't just pick up and go back -- take time off and go to college and become -- get some new skills.

When I was in my 40s, I picked up and I retooled in healthcare; and I took nine months off to do that. Most people are not in a position to do that. But to have a local institution -- a county college down the road where they can go and get these new skills, and certifications, and pursue new interests; or get the academic training that they didn't get earlier in their lives -- it's a wonderful thing.

And our challenge will be to figure out how we can take these best practices and roll them out, statewide.

And we'll look to you as models -- and also to other states -- because, certainly, other states have figured out how to do this, and we should learn from that.

So I want to thank you all for being here.

DR. NESPOLI: Thank you.

MS. SAVAGE: Thank you.

SENATOR GORDON: I believe we only have one final witness, and that is Gale Spak from NJIT. She is the Associate Vice President for Continuing Education and Distance Education.

G A L E T. S P A K, Ph.D.: All right. So, which seat should I take?
(laughter)

SENATOR GORDON: Your choice; your choice.

DR. SPAK: Thank you. I'll be right in front of you.

Good afternoon, everyone.

SENATOR RICE: Good afternoon.

DR. SPAK: And I will try to be shorter than planned, given the time.

But I do want to talk about the public research university perspective, as exemplified by NJIT -- and I know you've heard a lot today -- on the issue of manufacturing in New Jersey.

So I'm going to read some things -- not a lot, but I'll read some comments.

Innovations in education are numerous today. But for this testimony I'm going to focus only on those which NJIT believes show the most promise -- promising practices to bridge the gap among educational programming, innovative teaching methods, and the New Jersey advanced manufacturing sector's need, company need.

In my role as NJIT's Associate Vice President for Continuing Professional Education -- which I have occupied, as of two weeks ago, for 25 years -- and as the lynchpin at NJIT for workforce and talent development initiatives, I have the most light to shed, I think, on this matter of relating

how education can help overcome the universally acknowledged fact that, in New Jersey, we have a severe shortage of workforce in manufacturing.

I should also mention that I am the prime contact in this state for three of New Jersey's seven talent networks; one of which is Advanced Manufacturing; the other is Transportation, Logistics, and Distribution, which is so connected to manufacturing; and the third of which is IT Technology Talent Network, the STEM areas.

Well, you have already heard from many people how people -- most people still think about manufacturing. It conjures up images for the public of making stuff, large or small, on dirty factory floors where menial and dead-end jobs are performed. We know the specific products are ever-changing, and I would argue that many of the things that need to be known to make these very many different products actually have a great deal of commonality. They are not all very, very different, but there are some differences.

So what do we mean by *advanced manufacturing*, which is really the future of our state and of manufacturing in this country? It is usually used to describe the transformation of how processes, design, and products have changed; and it does, as you've heard this morning and this afternoon, require a higher degree of technical competence, leveraging of new technologies, and implementation of processes, often computer-based.

And I stand before you telling you that not all the jobs require a bachelor's degree; I'm not about to tell you that everyone should come to NJIT because we teach these programs. Everything you've heard this morning and this afternoon is correct, but there is a role for the four-year schools in this process.

And you know that all these efforts of advanced manufacturing will one day permit products to be made on a large-scale by robots, artificial intelligent machines, and 3D printing, requiring far fewer workers than ever before; we all know this. But the workforce that's leading these advanced manufacturing robotic changes do require a very well educated professional workforce with bachelor's, master's, and graduate degrees.

And of course, NJIT is the main producer of this kind of workforce in our state, and I believe you're quite familiar about NJIT, but I will very briefly talk about four programs that really are what NJIT excels at. But they are not the ones that I will dwell on that have to do with what your mission is, but just to remind you.

So starting at the earliest and very quickest -- for the last 40 years NJIT has had a Center for Pre-College Programs, which works in underrepresented districts in our state to teach young kids -- including in middle and high school -- STEM; and we've been working at this forever. We are also teaching the teachers and the train-the-trainers so they can integrate into the classrooms. And through this program, called *Pre-College Programs*, we are offering many dual-enrollment, college credit-bearing programs. This sets young men and women in our state on a track to earn these vaulted four-year and higher degrees, and we have the data to support that.

Of course, you know NJIT serves 18 and older, both fulltime -- and I want to emphasize part-time -- students who are seeking to get degrees. Just to be very brief: We offer 150 bachelor's, graduate certificates, master's, and doctoral academic programs in these areas. And

just this last May, we conferred nearly 3,000 degrees, representing a great diversity of population.

Number three: NJIT, through my division, Continuing Professional Education, works with professionals and adults who need upscaling, both at their places of work-- We go there, online, and on our campus. Over the last decades, my unit has trained and educated over 74,000 employed New Jersey residents in over 600 companies in STEM areas. We go and do these all-tailored programs. And as you've heard mentioned before, we operate at many State Labor and Federal U.S. Labor training programs for unemployed, underemployed people in our state, with great success.

Finally -- I will not dwell on it -- I believe that you're all aware of NJIT's newest innovation, which is our New Jersey Innovation Institute. I think you all know what that is, but it is a 501(c)(3), and it's designed to help private enterprise discover what is possible. And it really is about helping to solve either grand R and D problems or even a single company's need for a technical solution, by collaborating and putting academics together with our companies and with our other partners.

So these four programs do produce an agile workforce of scientists, engineers, and mathematicians who execute their knowledge in facilities that are decidedly not on dirty factory floors, but rather in safe, spotless, and sustainable environments.

But science, engineering, and mathematical disciplines represent only three-fourths of the academic disciplines in the term *STEM*. The "*T*" has been missing in what I've said so far. And this "*T*," or

technology, is what specifically is of attention, I believe, to this Caucus. Because that's where we've been paying particular attention.

In this role, NJIT, being a public research university, is serving as the function of facilitator, convener, empathetic listener, and sharer. This is not about NJIT, and, "Come and get your four-year degree" what I'm about to talk about. This is about playing the role that we are, statewide, to help everyone in this room have a more coordinated approach, with room and open access. So again, not an NJIT-specific program.

So moving on to that, let me tell you, and just kind of verify, again, what you've heard more than once this morning. Among the multitude of manufacturing jobs and job categories that are needed in New Jersey there is one category which, relatively speaking, and in the conceivable future, continues to afford the largest number of employment opportunities. That category includes jobs requiring skills and knowledge that align best with the topics represented by the "T" in STEM -- technology. Technologists; we might have, in the past, called them *tradesmen*, and women -- but they were mostly men in the past. They are not *so-called* anymore; this is what everyone here this morning has been talking about. It's the "T" in STEM.

And it matches the fact that, in this state -- which is overwhelmingly comprised of small- and mid-sized manufacturing firms today -- this is the kind of jobs that are needed. It is not-- We'll never have enough engineers -- I have to put my NJIT hat on -- but I am talking about those who are in the production line; you've heard that from Mike Seitel, from Bob. This is what's needed, and this is what we've been focusing on to help this state meet this challenge.

So facing this challenge is supreme to what we've been hearing from all the manufacturers that we talk to. Without the human capital or talent of the technologist to operate the machines -- which we do need; and the equipment, which we do need -- on which these products are made, manufacturing companies cannot stay here. There still, however, appears to be a problem with understanding this and addressing this. Because we hear about the need for engineers, engineers, engineers, right? So this is where I believe that NJIT -- and this is why I'm standing alone here, among -- representing the four-year schools -- has really begun to stand out.

There are a number of excellent engineering schools in New Jersey; I say that openly. But I have to tell you only NJIT has a particular degree-- And you've heard it mentioned this morning, but I don't think all of you -- I believe that not all of you understand the meaning of it. You've heard it mentioned before. We have, for whatever reason, a bachelor of science in engineering technology degree. It has eight concentrations, you heard mentioned. Is our mother still here? (looks at audience) Your son is one of those eight concentrations. It's called mechanical engineering technology. We have just started, and to speak about Senator Rice's comment about -- for 30 years you've heard this, so for 25 I've heard it -- we have a brand-new un sunsetted degree in manufacturing engineering technology. It went out of business 30 years ago because there were no students, there was no manufacturing left in our state. It's now back in business, and I want to-- All the degrees that are offered through NJIT in its bachelor of science in engineering technology department require hands-on internships, partnerships with companies, and real experience on equipment.

So that is one of the reasons why I stand here, as NJIT, talking to you about a role we've been playing in advanced manufacturing. It matches everything you've heard here today that's needed, from the CTE schools, to the community colleges across this state, to get that workforce that companies need.

So this program, in particular, speaks to something we've also been hearing about this morning. I think due to what you have done already in Trenton, NJIT is about to open its soon-to-be 24,000-square-foot *Makerspace*. Thank you, gentlemen and women, for doing that. But this is exceptional; this is the lab -- you all know about computer labs. And that's how we taught so many people to begin to understand the digitization of every enterprise in this state. This is the lab, this is the bling that let's -- that youngsters understand what they can do on the modern equipment.

So this lab -- which is opening, and you have helped to fund; thank you, again -- will be open, not just to our students in this degree program, but to external community college students who will come and use it; to workforce adult learners who will be able to use it; and to companies that have a need to work on this equipment and can't yet afford to buy it, or don't have the space to install it in their facilities.

You've heard a lot about *space* this morning. What you haven't heard -- or at least I didn't catch from the manufacturers, the two who spoke, Bob and Mike -- when you put in these new machines, these new robotic machines, they are very expensive, but they occupy space and our companies don't always have this space to even think about installing them. We need space for our students to learn how to use the machines of the future, and now; and they are expensive because no company in New Jersey

in New Jersey in manufacturing can afford to have down time to let our kids use these machines. So there is space issue on both sides -- for our learners and for our companies.

So the Makerspace is another innovation that is open beyond the walls of this one university up in Newark.

Another innovation has to do with, again, funding that has existed. So you have heard that a lot of grants have been given, and have been the sparring, the seed, of what has happened. One that I want to call attention to is the Advanced Manufacturing Talent Network, which was created in 2011, and which I have had the privilege of being the prime contact on since then. And we have spoken to manufacturers. So if you want to know what the ear of manufacturers are, what they're saying, we have an MEP that knows a great deal; but we have, also, the Talent Network working with MEP that gets to speak to manufacturers. In the last year alone, we've spoken to over 300 manufacturers; and what we've done, like MEP does, is to facilitate and codify, for the State, the voice of manufacturers. So when I say everything you've heard this morning is true, it's because my Advanced Manufacturing Talent Network Director has said, "This is what I'm hearing out in the field." And John Kennedy can also tell you, this is what he hears in the field.

So we are another resource for you to be able to help you with your work.

Well, from this work -- and this is the last thing I'll mention -- from this work that started in 2011, funded by taxpayer dollars -- by us, by you, through the Department of Labor -- something has emerged which is a stand-alone entity. And it is a formal, registered, apprenticeship program

for manufacturing in New Jersey. We call it Mecha -- as in *mechatronics* -- *MechaFORCE Registered Internship Manufacturing Program*; that's a mouthful, but we abbreviate it as *M-RIM*. M-RIM is a coordinated career and educational pathway program that NJIT did create -- because we had gotten all this information -- and it was commissioned by industry. Industry is paying for it, at least partially, to prepare high school, and millennials, and Generation X, and others for professional careers in, specifically, New Jersey small- and mid-size firms.

It is a scalable and flexible approach, and it's driven specifically by industry needs. But it involves all the CTE schools that you've been hearing about this morning. We're working with all the community colleges in our state, and other four-year schools; as well as the academic portions of the colleges and the continuing ed portions -- which don't offer degrees -- to fix this problem.

So most importantly about this program is that it follows, strictly, the U.S. Apprenticeship model. So everything that the Federal government says is the U.S. Apprenticeship we are following. And in fact, one of the things, besides what you know you know about apprenticeships, people are getting full-time jobs with pay. But they are required to have on-the-job training by their employer; as well as outside technical instruction which can be done at the high schools, adult and for youngsters at community colleges and four-year schools. That's where this use of all this strength in our educational system comes out of.

But another thing that the formal U.S. Apprenticeship Program rules permit is to have a third-party intermediary help the small- and mid-

size manufacturers in our state to find their workforce, and keep them and train them.

Well, the third-party intermediaries are called *sponsors*. Just this past August, the U.S. Office of Apprenticeship signed official documents designating the Talent Network -- the Advanced Manufacturing Talent Network -- as M-RIM's intermediary. We are the official, now, intermediary for advanced manufacturing in this state. But we are not alone; this is a coordinated, every level of education, effort.

We realize that most New Jersey manufacturers do lack HR divisions, training divisions, IT units -- so this is what this designation as *intermediary* will help us do. NJIT staff will be able to bring forward potential apprentices to companies to be hired fulltime, enable New Jersey high schools and two- and four-year colleges to become the providers of classroom instruction required by the Apprenticeship model -- which we're teaching anyway, by the way -- and to facilitate the signing of articulation agreements between colleges offering two- and four-year degrees. You've heard about some of these articulation agreements with NJIT already, but it doesn't have to be only with NJIT. Rowan, perfectly fine. This is a statewide program.

So today, we have six registered apprentices at Norwalk -- you heard it this morning; we have 34 companies ready to sign on; we have 9 high schools in our state, we have 8 community colleges in our state; and we have Thomas Edison State University, which is actually playing a very unique role, which I will not have time to talk about. They are all participating, and we have just begun.

So let me conclude by saying that this -- these remarks, this testimony has sought to reveal to you, I hope, that the recognized manufacturing skill gap in New Jersey, at its heart, is a gap in education -- it really is -- which with innovation, industry guidance, and your help we think we can start to solve.

So thank you very much for the time before you.

SENATOR GORDON: Thank you very much, Dr. Spak.

It was, I think, very helpful. It's interesting to hear from the perspective of a four-year institution. We heard from Don Sebastian--

DR. SPAK: Yes.

SENATOR GORDON: --at our first meeting.

DR. SPAK: Don and I -- we work together all the time.

SENATOR GORDON: I know that it will provide a great foundation for the work that we're going to do.

Do any members of the Committee have any questions for Dr. Spak?

SENATOR BUCCO: No.

SENATOR GORDON: Hearing none, it's been a long day; we're approaching our fourth hour. I didn't think this was going to turn into something like the Legislative Oversight Committee. (laughter)

But I do want to thank you, as well as all the other witnesses who were here.

This is really exciting stuff, from my perspective; I'm sure I speak for my colleagues. We have an educational gap to fill; the McKinsey organization recognized this mismatch of demand, on the part of manufacturers for skilled employees and the labor supply, as one of the

major impediments to economic growth and our economic future in New Jersey. And this is going to have to be part of the solution.

We're excited about taking all this information, transforming it into recommendations, and then going the next step and developing bills, programs, and sources of funding. And if anything, we've learned today there is important -- there really are significant opportunities for partnerships among the various educational institutions and with the business community. And I'm looking forward to the end product of this process.

So thank you all for being here.

This Caucus will stand adjourned; and I will see you -- we'll see you all again; I'm not quite sure where, but soon. (laughter)

Thank you.

(MEETING CONCLUDED)