

TESTIMONY BEFORE THE SENATE COMMERCE & LABOR COMMITTEE

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Madame Chair, members of the committee, today I would like to talk with you about Michigan Tech's recent experiences, as well as our legacy of linking education, research, innovation and business.

This past July, the Business Roundtable issued a report with both a challenge, and some sobering findings. Former Michigan Governor John Engler was a signatory to this report.

The challenge: double the number of science, technology, engineering and mathematics graduates with bachelor's degrees by 2015! Or what are now commonly referred to as STEM Skills.

Among their sobering findings:

- By 2010, if current trends continue, more than 90 percent of all the scientists and engineers in the world will be living in Asia
- South Korea, with one-sixth of our population, graduates as many engineers as the United States
- The number of engineering degrees awarded in the United States is down 20 percent from the peak year of 1985.

- Of the 1.1 million high school seniors in the United States who took college entrance exams in 2002, just under 6% indicated plans to pursue a degree in engineering- nearly 33% decrease in interest from the previous decade.

This is all at a time when the US economy becomes even more reliant on workers with STEM skills (science, technology, engineering, mathematics).

Why are these so important? Alan West and I hope to be able illustrate that over the next few minutes by using our experiences with Michigan Tech's role in economic development of the State of Michigan, and how we see K-12 link with universities and the business community.

What are we about? Michigan Tech has about 6500 students and just over 300 full time faculty members. It is not the smallest university among Michigan's 15, and it is clearly not the largest. It is the most focused and we think, among the most agile in joining education, research, innovation and business. 60% of our enrollment is in engineering, with the rest spread out across the sciences, management, pre-law, pre-med, pre-dental, and forestry.

We focus on student learning so that our students can develop, understand, apply, communicate and manage science and technology. We do this to bring Michigan Tech to a higher level of service to the people of the State

of Michigan, especially those sons and daughters of Michigan who put their trust in us for a quality education.

We are focused on the simple notion that we have the ability and the passion to be among the best and this requires that our faculty teach not only from books but from the experience that comes from scholarship, research and innovation.

How does research fit? Michigan Tech is conducting significant basic and applied research as the 4th research university in the state. This has a significant impact on the future economy, while providing jobs now for researchers and support staff. This has a direct impact on the economy of the region and the State. These research efforts, along with your support, bring modern equipment to the classroom and labs so that our students have access to a quality education and they can develop the skills that make them marketable in the workplace.

As reflected in the colored chart before you, Michigan Tech's technology transfer is a leader in the State. Starting in the center, you can see that research spending has increased to \$41M this past year; more on that later. What's important is what comes from it.

It's been said that the research process turns money into ideas, and innovation and commercialization turn ideas into money and jobs. At the bottom of the chart, you can see that Michigan Tech has the highest number of licenses per \$10 million of research in the State as well as the highest number of invention disclosures per \$10 million in research among the State's 4 research universities.

Perhaps even more impressive, nearly 30% of our invention disclosures involve undergraduates as inventors, resulting perhaps, from over 100,000 hours of undergraduate employment due to research. When compared to other national universities, like Renselaer Polytechnic (RPI), Georgia Tech and Carnegie Mellon, we compare favorably on both Licenses and Invention disclosures. **This drive to invent is an intrinsic part of the Michigan Tech Culture – to assist in the industrial development of Michigan.**

Ultimately, of course, those inventions and the licenses stemming from them lay the groundwork for the creation of hundreds and even thousands of good paying jobs. And from the experiences of our alumni, we can safely say that these will lead to additional inventions.

Right from the start, marketability of our students is improved through their involvement in the research and innovation process - Two weeks ago, a record 197 different agencies/companies attended the career fair on campus in

Houghton; 155 companies/agencies/and grad schools conducted interviews over a period of 3 days. These included GM, Ford, Daimler Chrysler, Dow, Intel, Stryker, Boston Scientific, Pfizer, and many smaller firms as well as agencies such as the State Department and grad schools such as MIT.

At this juncture, I would like to spend a few minutes discussing what we at Michigan Tech believe is the purpose of research as it relates to economic development. We believe that the purpose for conducting research is:

- To encourage scholarship and to assist and improve education
- To discover and disclose new knowledge
- To promote the utilization of new discoveries for the public benefit
- To aid, encourage and support industry, particularly within Michigan, and
- To support the research objectives of state and federal agencies.

This is key! These are the same core beliefs that guide us relative to commercialization activities. It is important to underscore that while generating income is good, it is not our primary objective, because we believe that the goal of technology commercialization should not be the maximization of royalty income, but rather the maximization of technological impact in the marketplace where jobs can be created.

This results in the creation of true partnerships with private industry, rather than simply a vendor relationship. This requires a long-term perspective and the agility that I mentioned earlier in structuring contracts, but maximizes the chances of commercial success for Michigan. Michigan Tech believes that far more can be gained from research contracts with commercialization partners than we would gain if we just emphasized royalty income. Not only is the potential payoff to Michigan greater, but these projects contribute to the traditional missions of educating students, advancing knowledge through research, and improving instruction, and results in further opportunities for commercialization.

I'd like to use Houghton County as an example of the impact that Michigan Tech has had on employment. Dr. Jim Gale, a Michigan Tech business professor, estimates that Houghton County has approximately 18,500 jobs. We know approximately 1,000 of these jobs are directly, or indirectly, due to sponsored research activities at Michigan Tech. An additional 97 jobs are in the 12 Smart Zone incubator companies, plus there are an additional number in older Michigan Tech spin-off companies or businesses in the local area licensing Michigan Tech technologies. Thus, somewhere 5 and 10% of the jobs in Houghton County directly, or indirectly, are due to Michigan Tech research and technology commercialization activities. We believe this may be a reason that Houghton County's unemployment rate has dropped below the Upper Peninsula rate, and often the State unemployment average over the last couple of years.

Before that, Houghton County's unemployment rate was frequently above both Upper Peninsula and State levels. On a state level we know that Michigan Tech has an impact as well. Indeed, of the top 50 companies to watch in Michigan, 6 of those companies are connected to Michigan Tech either through their use of Michigan Tech developed technologies, or CEO's that are graduates of Michigan Tech.

Michigan Tech has also developed a close working relationship with neighboring Finlandia University as we complement each other's strengths. We are working together along with K-12 and the business community to help people understand that our community has unique strengths and that if we work together we can energize an entrepreneurial community.

We are stronger working together and as we look ahead we can set the standard for cooperation, not only to support business development, but to ensure it's sustainability by continuing the high quality education that exists, and cultivating a pioneering attitude in our younger generation; values that are synonymous with entrepreneurship.

Educating our youth about risk taking, creativity, responsibility and adaptability is the responsibility of both the education system and the community at large. Several years ago, Michigan Tech worked with the National Science Foundation to become a pioneer in establishing the Undergraduate Enterprise

Program. Primarily industry funded, the Enterprise student teams act like businesses to solve specific problems provided by businesses.

Not only have the solutions been creative and often immediately applicable, but the program provides these undergraduates with invaluable research experience as well as entrepreneurial and business experience. Today there are over 600 undergraduates participating in some 24 teams, adding momentum to a growing culture of innovation in our community. Students and graduates support the recent development of a dozen companies in Houghton and Hancock. Last week we announced the Institute for Technological Leadership that will provide the icing on the cake, so to speak, with innovation training for our students, funded by a \$2 million gift from one of our alumni.

Ultimately, the answer to the question of “**what will keep business development sustainable in our community and our state?**” is more accurately stated as “**who will keep business development sustainable in our community and our state?**” The answer is -- people with all of those skills and attributes that I just mentioned. It is not a question of people thinking in terms of “them and they”, more or less waiting for something to happen....its a question of people believing that through a personal attitude that emphasizes “me and we” that we’ll create a sustainable business environment.

Finally, going back to the research productivity sheet that you have, it is interesting to note a few last numbers. You can see that our major federal research sources are the Departments of Energy, Transportation, Defense and the National Science Foundation. This contrasts with Michigan's other three research universities that all have medical Schools.

Importantly...13% industry funding at Michigan Tech puts us in the top 20 national research universities relative to the percentage of research funded by industry.

Clearly, at Michigan Tech we conduct cutting edge basic research, create the technology that is spawned by such research and then work with the private sector to commercialize such technologies.

Expanding upon the successes of the enterprise program, the Smart Zone, and other economic development activities, Michigan Tech recently completed the construction of an Advanced Technology Development Center, funded by Ford Motor Company and the Federal Government's Economic Development Agency, which will provide much needed additional instruction, research and incubator space.

Rather than outsourcing innovation, we at Michigan Tech believe very strongly that we should intensify efforts to expand innovation within our

community, our State, and our country. And in that regard we have an advantage. I began my presentation with some sobering facts about the supply of scientists and engineers and the lack of interest on the part of our young people in STEM skills.

What are we doing regarding student interest and the numbers of engineering and science graduates in Michigan? For the second year in a row, Michigan Tech has organized the YES (Youth in Engineering and Science) EXPO at Ford Field on October 26. Over 16,000 students from 140 school districts, home schools, girl and boy scout troops and some 70 exhibitors from businesses and colleges will be in attendance at the YES EXPO. We feel this is a valuable step in reaching out to young people grades 8 through 12 to introduce them to the exciting opportunities for careers in science, engineering, technology and math.

What about engineering graduates in Michigan? For the latest national information available, 2000-01, Michigan ranks in the top 10 (with California, New York, Texas, Pennsylvania, and Florida) in terms of the number of engineering graduates. This is an advantage over other states, but the competition is worldwide, not nation wide. We need more engineers and scientists to compete and in particular graduates that understand the process and business of innovation and encourage them to build their businesses here.

At Michigan Tech we are taking the initiative to utilize creative approaches such as partnerships between universities, businesses, and community partnerships like the Smart Zones and the YES EXPO, to create and sustain new businesses and energize these young people.

Let me leave you with this thought and quote. Because we believe that the combination of education and business, research and innovation will enable us as a state and a nation to effectively, and successfully compete in this global economy where ideas move at the speed of light, and capital moves to people with ideas. “We” have to keep developing people with ideas, because “we” as a state and a nation cannot afford to outsource innovation.

The quote comes from that same Business Roundtable Report which was published in July of this year: *“We must not disregard our history nor forget who we are. We are the people who pioneered in the air, built the first mass production assembly line, discovered vaccines for polio, harnessed the power of the atom, first set foot on the moon, and developed the best private and public biomedical research enterprise in the world. We are still that same people, still equal to the challenge if only we resolve to meet it.”*

We are Michigan Tech are resolved to meet that challenge!

With that Mr. Chairman, I would like to turn to Alan West who has done nothing short of a spectacular job in so successfully growing the Michigan Tech Smart Zone which has received State wide recognition and beyond.