MTU
Academy of Sciences and Arts
Academy of Sciences and Arts Dinner and Induction Ceremony
September 15, 2016

Remarks by Bruce Seely
Dean, College of Sciences and Arts

Good evening everyone! My name is Bruce Seely, Dean of the College of Sciences and Arts. I am delighted to welcome you to the 22nd Distinguished Alumni Banquet and Induction Ceremony for the Michigan Tech Academy of Sciences and Arts. We have been doing this for some time now – as evidenced by the 58 plaques depicting distinguished alumni that hang in the hallway outside the College office. My predecessor, Max Seel inaugurated the Academy in 1995, and we look forward to this event. It is a highlight of the College's academic year.

Tonight marks my 9th opportunity to preside over this event devoted to the College's distinguished alumni. Each year, I am uplifted by the accomplishments of our graduates and the mark they have made in the world. But I also know from talking with them that the University they see today is different – and we hope better – than the one they knew. That got the historian in me thinking about *the past, the present, and change*. (Repeat attendees are now realizing that another historical excursion is coming – but I seem unable to escape my roots!) Tonight I'd like to spend a few minutes reviewing change over time by exploring what Michigan Tech was like the year that each of our inductees graduated. I wish I had access to the time travel device that will be a central element in a new TV show this fall in which time travelers will protect the past from outside influences. Alas, I rely upon University catalogs and yearbooks in the Archives to bring the past to life. Even so, these sources allow us to gain a perspective on how Tech and the College have changed over the past 44 years. The shifts are not small.

Our starting point is *1972*, the year Bob Lane finished his degree. Ray Smith was president, the man who envisioned Michigan Tech moving beyond its roots as a mining and engineering school and becoming a university. ME-EM (now the Raymond Smith building) and Chem-Met were

the new buildings on campus. The campus was very proud of its computing center with 3 staff presiding over an IBM 360 Model 44 with 262,144 bytes of core storage; 6 disk drives, 3 tape drives, a high speed printer, a card reader/punch, and a digital plotter. Could it get any better than that?

Tech offered 18 BS degrees in 1972 – only 6 in CSA (*Biology, Medical Technology, Mathematics, Physics, Applied Physics, and Applied Geophysics*) – as well as a BA with 4 options (*Liberal Arts, History, English and Technical Writing*). Also on the books were 16 MS degrees (*Biological Sciences, Math, Physics in CSA);* and 4 PhDs, all in Engineering: Chemistry, Geology, Engineering Mechanics, and Metallurgical Engineering.

The university mission was to educate scientists and engineers, but the catalog further highlighted "a very real responsibility to broaden the horizons of its students, to develop in them a lifelong curiosity, and to give them an understanding of themselves and their fellow men." CSA – only 4 years old -- was crucial to that task.

In 1972, Chemistry and its 20 faculty was located in the College of Engineering. They awarded a BS degree and an ACS-certified *degree that required 18 hours of German-- a reading knowledge of German was expected of ANY chemist!*

Social Sciences on the other hand, had 10 faculty and a BA with the history option. But the faculty also emphasized courses in psychology (there was a rat lab in the first floor of Academic Office Building) and government.

Humanities was larger, with 21 faculty, who offered courses in literature and modern languages, drama, music, theater, and art. Several names will sound familiar to a few of us -- Bill Powers, Dick Goldstein, Art Young, and Harley Sachs. The only degree was a BA with options in English and Technical writing. But the department had identified two goals in line with the mission laid out in the catalog: 1) Skills in writing and communication – "after graduation students must be able to convey their ideas effectively to other people;" and 2) Students needed

to have “some knowledge and the methods of inquiry which are part of the humanistic-social heritage. As future community leaders, students need to be aware of the way men think, to understand the organization of government and society, and to be acquainted with the great ideas and forces that have motivated men through the ages.”

Bottom line: In 1972 Michigan Tech remained an engineering school that showed clearly its roots in mining and metallurgy, but Tech was beginning to change.

By the time Sarah Cowie began her studies in Social Sciences in the mid 1990s, Kurt Tompkins was the president, and Tech was beginning to address global issues in addition to Tech’s traditional responsibility to the state of Michigan. The M&M building was open and the site for the Dow Building had been dedicated.

Tech now offered 26 BS degrees – 8 in CSA units (Applied Physics, Physics, Biology, Clinical Laboratory Sciences, Computer Science, Mathematics, Scientific and Technical Communication, and Social Sciences); also the BA in Liberal Arts and in STC. Students could enroll in 19 different MS programs -- 6 degrees were found in CSA (Bio, Math, PH, CS, RTC and IA) – up from 3 previously. And most notably, CSA finally offered a PhD, with 3 of the 14 programs located in Biology, Physics, and HU (RTC).

Chemistry was still part of the engineering college, and had not changed much. The degrees remained BS, MS and PhD, but the German language requirement was gone. The department had the same number of faculty (20), with Jim Riehl as the chair. Key people included: Dallas Bates, Dick Brown, Bahne Cornilsen, Les Leifer, John Williams, Fred Williams, Sarah Green, Pat Heiden, Marshall Logue and Pushpa Murthy. But discussions were about to start concerning bringing the chemists into CSA with the other science units.

Humanities had grown to 30 faculty, among them such familiar names as Beth Flynn, Bill Powers, Randy Freisinger, Cindy and Dickie Selfe, Diane Shoos, Jennifer Slack, Dieter Adolphs, Craig Waddel, Vicky Bergvall, Patty Sotirin and Karla Kitalong. The technical communication

program was in place at all levels, up to the doctorate. Writing across the curriculum was winding down as a focal point, but numerous certificates had appeared.

Social Sciences had 14 faculty, with Terry Reynolds the chair. Others included Brad Baltensperger, Larry Lankton, Carol MacLennan, Willie Melton, Pat and Susan Martin, Mary Durfee and Kim Hoagland. David Landon and Josiah Heyman were still here – but left for other universities soon after. The MS in Industrial Archeology had recently been implemented – and while the archeology field school was not new, it became the centerpiece of the new and unique industrial archeology program. Projects included excavations at Fort Wilkins, Fayette, and Carp River Forge.

Jumping into the new century, the catalog for 2004-06 included a picture of a smiling Glenn Mroz as the president. Rekhi Hall was about to open.

Tech now offered 32 BS degrees, and the 2 BA options. Fifteen (15) of these undergraduate programs were housed in CSA departments. Newer options included psychology and bioinformatics; chem-informatics was on the horizon. Computer Science had added computer systems sciences and software engineering. The catalog described 31 minors, most offered by CSA departments. Tech awarded 25 different MS degrees and 19 different PhDs, with 12 graduate programs listed in CSA departments. The newest was an MS in environmental policy in Social Sciences.

The catalog also noted that the College focus on adding strong new undergraduate majors and graduate research programs "underscores and articulates a vision of a university that is characterized by the unity of teaching and research." Similarly, the addition of graduate programs marked a transformation from a mission of undergraduate engineering and teaching only to a technological university. Significantly, in terms of departments, faculty, and undergraduate teaching, CSA had become the largest academic unit on campus.

It helped, of course, that by this time, Chemistry was part of CSA. Its undergraduate degree now

included options in chemical physics, environmental chemistry, polymers, and secondary education. Pushpa Murthy was the department chair. The department was proud of its learning center, as well as of the growing list of research apparatus: a GC and a LC mass specs, an Xray diffractometer, a Varian Unity Inova 400 NMR spectrometer, a gas chromatograph, UV and visible light spectrophotometers, a laser-based emission spectrometer, spectrofluorometers and several IR spectrophotometers.

The Humanities department continued to focus on the graduate program in technical communication, but also retained a diverse faculty in writing and rhetoric, philosophy, literature, modern language, English and English education. Fine Arts had spun off from HU by this time, and was just proposing its first degree programs in technical theater, sound design, and entertainment technology.

Social Sciences had added the new MS in environmental policy and was working on developing a PhD in industrial heritage, which came to pass in 2005 with the help of an NSF grant.

Clearly, the College – and therefore the University had changed enormously by 2004. But changes did not stop there. As of 2015, CSA offered 30 BS/BA programs – more than the entire University in 1972 or 1995. And there were 33 concentrations available within those offerings. In addition, 36 minors and 7 certificates are on the books. CSA departments also enrolled students in 22 graduate programs -- again, more than the entire campus in 1972, and 10 more than in 2004. A number of the newest programs are deeply interdisciplinary, such as atmospheric sciences and biochemistry. New programs continue to take shape; even this week the College began reviewing a proposal for a Ph.D in Kinesiology, while Biological Sciences is exploring a joint ecology degree with the School of Forestry.

So change continues. And ending as I started, it is worthwhile to comment on changes in computing as a powerful indicator of changing times in the College. Currently, the centerpiece is Superior, a high performance device in the Great Lakes Research Center. It consists of:

- 84 CPU-based computer nodes, each with 16 Intel Sandy Bridge processors at 2.60 GHz and

64 GB RAM

- 5 GPU-based compute nodes, each with four NVIDIA Tesla M2090 GPUs
- 56 GB/s InfiniBand network
- 48 TB of raw storage space

So what does this walk down memory lane mean? I suggest it demonstrates in the clearest possible fashion that if Michigan Tech really has become the ***technological university*** Ray Smith hoped to create in the mid 1960s, it is largely because of the evolution, development, and growth of the College of Sciences and Arts. That process was just beginning when Bob Lane arrived here, but it has continued steadily ever since. Many key changes are involved – space, equipment, students, but above all ever higher quality faculty willing to drive that transition. Tech is no longer an engineering school with a small supporting cast. It's a technological *university*! Compared to 1972, our current world is much more interesting, marked by synergies and interactions between engineering, science, the humanities, social sciences and business; a time of interdisciplinary work in environment, computing and information, materials, human health and other new horizons. The distinguished alumni invited here tonight witnessed aspects of this transformation, living through it and building lives and careers that offer proof of value of our trajectory of change. I am grateful to them for the reminder they provide to us.

Thank you all for indulging me this historical excursion. I love the annual excuse to wander into the archives – and the opportunity to suggest the relevance of knowing where we came from! But as important as the changes that have marked the College over the past 40 years or so are the ways in which the basic goals and mission of this College and our faculty have *not* changed. In the 1972 university catalog, Dean Dave Geddes wrote that "The College of Sciences and Arts aspires to promote the essence of humanism in order that the engineer and the scientist might weave technology into the fabric of society. To achieve these aims, the College assists students in acquiring ability in clear communication; it seeks to acquaint them with man's greatest ideas and knowledge in the humanities, in the arts, and in the social sciences." (p. 190)

We in the College still believe that our responsibility is to educate (not train!!) "the whole student." It is encouraging that so many of our inductees, including all three joining the Academy in 2016, echoed in forceful terms the importance of this mission. Sometimes we accomplish this task simply by the things students see us do. Thus a noted physics faculty member and former administrator for years played the cello in the Keweenaw Symphony Orchestra; various faculty across the campus sing in the Chamber Chorus; and the physics lab director and Jackson Teaching Center director has sprouted a mustache this fall for his leading role in the community production of *Guys and Dolls*! And we also convey educational messages through our research and scholarship, in our lectures and our publications.

This mission is especially important in technological universities, and CSA faculty are far from unique in embracing these goals. Carnegie-Mellon University, for example, boasts not only the leading computer science program in the country but also a superb performing arts program. Georgia Tech attaches great importance to its non-technological educational efforts. Last year, librarian Ellen Marks shared with me a little volume of essays from Georgia Tech's Ivan Allen College of Liberal Arts entitled *Humanistic Perspectives in a Technological World*(2014). Each contribution portrays faculty determined to insure, through their teaching, research, and creative endeavors, that students in a predominantly science and technology educational environment gain a full appreciation for the wider world within which they will live and work. Georgia Tech faculty do so through their explorations of science fiction, poetry, cinema, communication, design, digital humanities, and literature. Others there choose to discuss how their area of scholarly expertise fits into a technological world. The result is a powerful statement about the value of non-technical fields of study within a technological university.

Importantly, Georgia Tech's senior administration strongly supports that agenda. Jacqueline Jones Royster, Dean of the Ivan Allen College, pointed out that "Our world is a fast-paced technological and scientifically rich environment. At the same time, it is also a place of provocative contrasts and remarkable incongruities among individuals and communities around the globe. [The work in the college] helps all of us to understand these complexities from a human-centered perspective…." (p. 12)

Bud Peterson, the Institute's president commented, "Georgia Tech scientists and engineers deal in the measureable, the observable, the quantifiable, and the testable. We can tell you what, when, and where, how big, how little, how hot, how cold, how fast, how slow… almost anything that you could express in numbers. But the why, the why not, and the what next – answers to these questions represent the invisible, unpredictable, immeasurable context of undergirding the exacting, nitty-gritty work of science. Those perspectives are not science or technology, but they always hover nearby. [We] equip Georgia Tech students to make the connection." (p. 112)

I cannot emphasize how much it matters that Georgia Tech, the premier technological university in the country and the only such institution that is a member of the American Association of Universities (AAU), sets such stock in the exploration of the human side of our technical and scientific world. It is a pleasing to find a common thread with them, since the concerns that guide us in the College are the same. Indeed, CSA faculty attach every bit as much importance to achieving these goals. Georgia Tech is an aspirational peer to our entire University, but in this area, the difference between us lies primarily in larger scale and superior resources Georgia Tech commands, not in their realization.

I suggest that the accomplishments of our distinguished alumni offer strong evidence that CSA has long been meeting the goal of educating the whole person. And for the way our alumni have lived up to those goals, I thank them. They are such great role models for us – and for our students. They show that the efforts made here in the past and still today find fertile ground. So let me congratulate them again for their accomplishments, and thank them for sharing their time and energy with us and our students over the next day or so. We are delighted to have you here as the 59th, 60th and 61st members of the Academy of Sciences and Arts!