Michigan Tech Launches New College of Computing

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On July 1, 2019, Michigan Technological University launched its new College of Computing, the first such college in the state of Michigan, and the biggest organizational change at the university in a generation. The development and launch of the college is just the beginning of a university transformation that embraces computing as part of its central mission. Computing impacts the futures of all our graduates and their careers, so we wanted the college to impact every academic unit and research center.

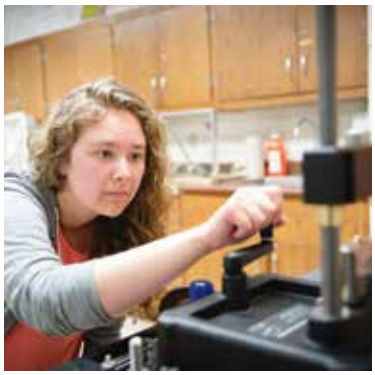
While the roots of change draw on a decade of discussions, the real initiative started in 2017, and in December 2018, University President Richard Koubek accepted the recommendation to found a College of Computing. There were four reasons behind the decision:

1. The first and primary reason was that the world is changing, and we need to respond to and, indeed, lead that change. We were heavily influenced by the concept of the Fourth Industrial Revolution. That includes the ascendancy of cyber technologies, relative to other tools developed in the past 200 years, and the convergence of physical technologies and cyber technologies. Computing plays a central role in all aspects of modern industry; the influence of Big Data, artificial intelligence, cloud computing, robotics, cybersecurity, and the Internet of Things is now firmly established and accelerating beyond any reasonable expectation of just 5 or 10 years ago. Michigan Tech saw the need to prepare our students for 21st century careers, creating new discovery and innovation through research in cyber technologies, and promoting "the welfare of the industries of the state" (a phrase from our founding legislation).

2. The second reason was that downstate computing programs and our own keep growing, so Michigan Tech can expand to meet that demand. It seems natural to us that a university with "technological" as its middle name would be the go-to institution for education and research in the most significant technologies of our time.

3. The third reason was computing education and research could be found in all corners of campus; because it was everywhere it was effectively nowhere. Consolidation and elevation to a dean-level unit would bring computing greater visibility and impact, not unlike that currently enjoyed by the College of Engineering. Indeed, this is our response to the question of why we would create a separate College of Computing in an era of convergent technologies: In order for computing to fulfill its promise across a partner in all applications, which seems to be where we are heading, it first needs to function as a strong and independent entity.

4. Finally, we are not alone. There are positive results from other universities that created similar units such as Georgia Tech, Northeastern University, Rochester Institute of Technology, New Jersey Institute of Technology, the University of Pittsburgh, the University of California-Irvine, and most recently, the Massachusetts Institute of Technology.



The Michigan Tech College of Computing brings together faculty from the Department of Computer Science, formerly in the College of Sciences and Arts, and the faculty from the programs in Computer Network and System Administration, Cybersecurity, Electrical Engineering Technology, Mechatronics and Health Informatics, formerly in the School of Technology. We also offer undergraduate and graduate degrees in Computer Science, Software Engineering and the five other areas cited above.

Like all good academic organizations, we have missions in teaching, research, and service. On the teaching side, one of the innovations that we believe will the biggest impact is that of "convergence programs," that is, academic programs with shared responsibility and shared credit across multiple departments.

That means in addition to our core programs, the College of Computing will have a hand in other degree programs, including:

- computer engineering,
- robotics,
- human factors,
- data science,
- computational science and engineering,
- and new degree programs that combine computing skills with other disciplines like archaeology, sound design, forestry, and other engineering fields in roughly equal proportion.

On the research side, the Institute of Computing and Cybersystems (ICC) is closely allied with the college; the ICC Director is the college's associate dean for research. Not by design but more by serendipity, we discovered that the areas of strength represented in our core and convergence academic programs are exactly the same as those areas of research represented in the ICC: computer systems, cybersecurity, robotics, data science and human-centered computing.

We also see an important service mission in bringing computing to the entire university, through first-year courses in the General Education program and other courses in computational thinking, data analysis and the social and ethical aspects of computing, plus outreach and support for digital literacy in the local community.

Bringing about organizational change at this scale is not an easy process and is still ongoing. In many respects, it feels like we are living in a startup culture, where old ways of doing business are not necessarily the best guides for doing what comes next. Those of us involved in this venture often say that our goal is not to create a strong College of Computing, but rather to create a Michigan Tech made stronger because it has a College of Computing. In order to do this, we need to forge partnerships with our colleagues across campus, leveraging existing capabilities while building visibility for computing as a whole.

To do so requires patience, building trust and a belief that what we are doing is right for the institution in the long run. Our advice for other institutions considering similar changes include:

- Establishing clear goals and a timeline for effecting the change.
- Being fully transparent and allowing plenty of time for all points of view to be heard, and then be bold.
- Do not be afraid to make a few mistakes along the way, provided there is a way to recognize when mistakes are made and mechanisms to make quick and decisive corrections.

Remember that everything we do in STEM education and research—science, computing, engineering, and mathematics—are at their core human enterprises. Success in these fields requires hard work, perseverance, and above all, a conviction that what we do matters.

For more information, see mtu.edu/computing.