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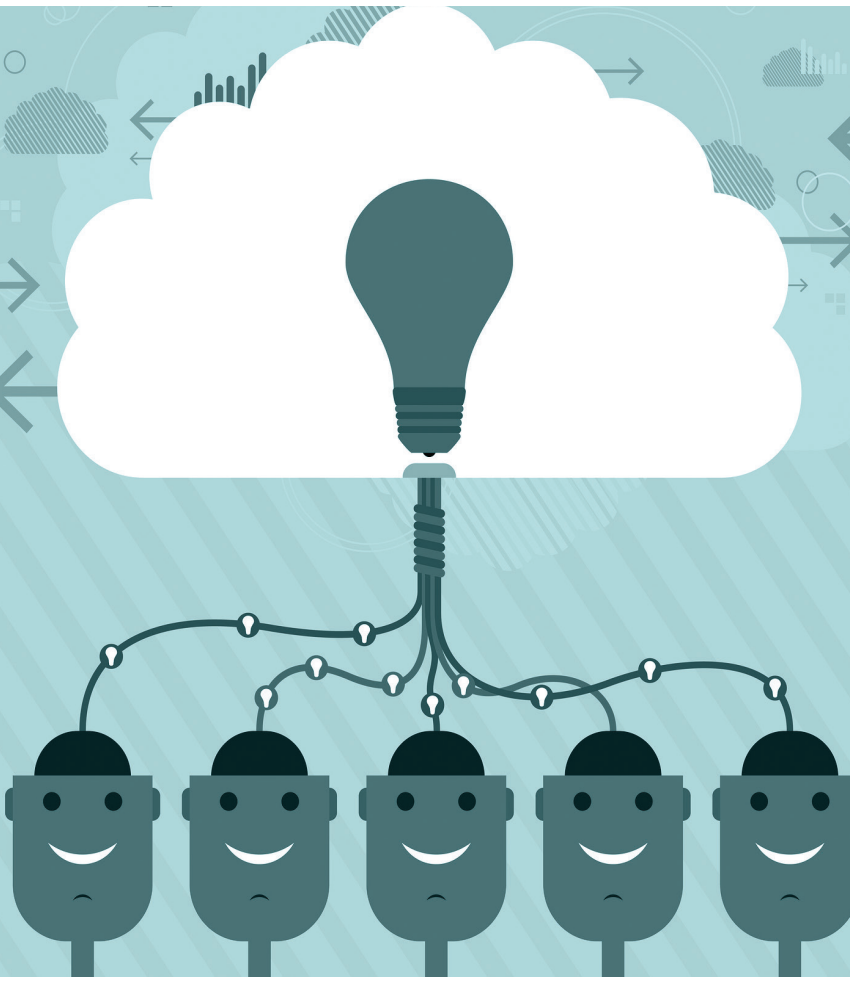
IN MY OPINION

Elias G. Eldayrie,
VP and CIO,
University of Florida

Instructure: Easy-to-Use LMS for Immersive Learning Experiences

Josh Coates,
CEO



Advancing Research through Strategic Partnerships

By David E. Lewis, VP IT and CIO, University of Rochester

The modern university exists in a digital global world where information technology has become a uniquely transformational and pervasively enabling resource. The student of the future has increased expectations for everyday use of technology. The Generation X and Y student learned and used technology; today's millennial student assumes technology. Physicians, researchers, and patients are also increasingly dependent on innovative uses of technology to achieve patient safety, quality of care, and efficiency.

Across higher education and healthcare, there is a major shift in the role of information technology — IT is no longer regarded as a tactical resource, but as a strategic asset that can be leveraged to achieve transformational results. Information technology, properly aligned, can accelerate academic inquiry and healthcare excellence while providing a relevant platform for the next generation of learners. To do so in an environment where IT endeavors are increasingly expensive undertakings for precious University resources requires a cultural shift toward collaboration, community engagement, and transparent communication.

Over the past seven years, we have developed a highly collaborative approach to research computing support at the University of Rochester, anchored by the Center for Integrated Research Computing (CIRC). The genesis of the CIRC emerged from a conversation I had with two researchers about how we might make the research community a better offer in an area where most of our faculty were underserved in terms of computing support and capabilities. Together, we convened a group of our colleagues, who ultimately recommended a new support model that is, in effect, run by IT leadership, but governed and owned by the faculty and deans. It was a truly collaborative effort that has resulted in collective ownership and sustainability going forward.

The results have been impressive: what started as a skunk works project of 17 pilot users on a tiny computing cluster led by two talented computational scientists has evolved into one of the top supercomputing centers in higher education. This effort benefited early on from contributions from faculty users of the Center as well as corporate and state funding.

In parallel with these activities, the University partnered with IBM and New York State to establish the Health Sciences Center for Computational Innovation (HSCCI) dedicated to supporting cutting-

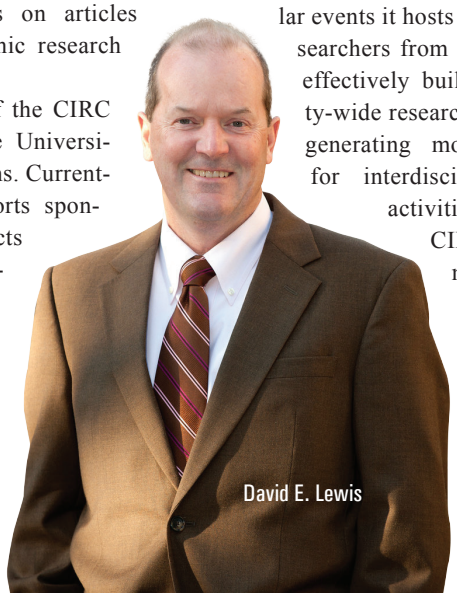
edge health research. This collaboration increased the University's computational capability to support interdisciplinary research and attract and retain research talent. Today, the CIRC provides support utilizing high performance computing and visualization capabilities that brings new insights and accelerated results to the research that is performed at the University of Rochester. In terms of computing capability, that equates to roughly 420 teraflops of computational power and 2.2 petabytes of storage for research data. It enables more than 900 researchers from 40 departments and centers across the University to analyze massive volumes of data and create complex models and simulations that previously would not have been possible, such as a full-scale simulation of the human heart.

While technology is important, a critical factor in the Center's success and exponential growth is its expert staff who work closely with researchers to optimize their use of supercomputing. Most importantly, CIRC staff includes computational scientists who occupy the sweet spot as translators between research needs and the use of technology. They collaborate with researchers to design research projects, advise on data visualization and analysis techniques, and recommend appropriate computational tools and methods. The Center's computational scientists are so involved in the science of the research, beyond technical support, that they often share bylines on articles published in academic research journals.

The existence of the CIRC also strengthens the University's grant applications. Currently, the CIRC supports sponsored research projects with aggregate funding of $50 million annually. Research projects run the gamut of academic disciplines, from medicine to archaeology, engineering to astrophysics. CIRC staff frequently assists researchers with grant applications, even serving as co-principal investigators on some proposals. For instance, the Center's director and the chair of the Department of Earth and Environmental Sciences recently submitted a joint proposal for the National Science Foundation's Research Traineeship Program. Their proposal would leverage the instruction the CIRC currently provides researchers to train the next generation of data scientists.

> **“The ability to provide supercomputing support to faculty researchers can be a key differentiator for research universities**

The CIRC's centricity and the regular events it hosts bring together researchers from a range of fields, effectively building a University-wide research community and generating more opportunities for interdisciplinary research activities. Recently, the CIRC helped connect the chair of the Department of Computer Science with faculty researchers in the Medical Center for their mutual benefit. The chair's undergraduate students gained the opportunity to apply the parallel computing techniques they were learning to real-life problems, and the faculties were able to use the solutions the students developed to advance their research. Similarly, during a discussion with researchers regarding potential uses of the new visualization lab that opened last fall, faculty in the Department of Microbiology & Immunology and the Institute of Optics connected through mutual interests in visualization and health science to develop a new research partnership.


David E. Lewis

To continue to help our researchers stay on the forefront of their respective fields and unlock the potential of big data, we are developing the University's visualization capabilities. Last year, with funding assistance from New York State, we completed construction of a state-of-the-art visualization lab called the VISTA Collaboratory. The lab creates the immersive experience necessary to allow researchers to view and compare large sets of data on one screen or observe fine detail in the context of larger structures. At the heart of the lab is a curved display wall that is 20 feet wide and 8 feet tall with a resolution (50 megapixels) approaching that of IMAX theaters. As a user facility available to industry, I expect this lab will strengthen and expand our existing research collaborations and attract new private sector partners.

The ability to provide supercomputing support to faculty researchers can be a key differentiator for research universities. As we look to the future, the strategic partnerships we have built — between faculty and technical staff, industry and government — have positioned the University to be a leader in the data sciences. The existence of a resource like the CIRC has enabled the University to not only accelerate research, but also develop new majors in the data sciences to educate the next generation of researchers and computational scientists. ET