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## Harvard Helps Build \$168M Supercomputing Facility

By [Akua F. Abu](#), CRIMSON STAFF WRITER

Harvard is taking another stride in revolutionary computing by participating in the development of the Massachusetts Green High Performance Computing Center, a state-of-the-art research computing facility in Holyoke, Massachusetts.

The center is the product of an unprecedented partnership among five of the leading research universities in Massachusetts—Harvard, Boston University, MIT, Northeastern, and the University of Massachusetts system—in conjunction with the state government and private industry.

According to Kevin Casey, Harvard's senior director of federal and state relations, the partnership among the universities naturally sprung from a "galvanizing common need" for enhanced computing power.

"It's a problem that each individual institution and those all across the country are facing and trying to solve on their own, but it's one where you're continually trying to keep ahead of the wave," Casey said. "As you're bringing on new capacity, you're still looking for more and more capacity."

The facility will provide researchers with the computing power necessary to tackle pressing issues in a variety of areas such as global climate change modelling, cyber-security, infectious disease research, drug discovery, and education.

"Today's supercomputers have the combined power of hundreds of thousands of home computers and run quadrillions of calculations per second," said Andrei E. Ruckenstein '77, a professor at BU and the president of the center. "This is what 'super' refers to."

Construction began on August 25 at the former site of Mastex Industries in downtown Holyoke. The Holyoke site was chosen for its central location, hydroelectric power resources, and significant savings in power expenses—electricity costs roughly half the Boston price.

"It's a very frugal and very sensible strategic thing in terms of energy," said James Cuff, director of research computing and chief technology at Harvard. "We reduce the energy costs and that allows us to do more science."

The cost of the two-story, 90,000 square-foot complex is estimated at roughly \$168 million, with each of the universities contributing \$10 million towards development. In addition to other sources, Cisco Systems, Inc. and EMC Corporation also contributed \$5 million and the state government contributed \$25 million.

The facility itself will house the hardware supporting the computational research needs of the universities. But the majority of the research relying on the facility will be conducted remotely, taking advantage of fast-fiber connections and virtual collaborative networks. Researchers will ultimately be able to access enhanced computing power without having to leave their individual campuses.

“The great part about this is, because of the networking connectivity, when our researchers access it, it will feel as if it’s in the next room,” Cuff said.

The center will eventually hold all of the computing hardware used by the University, replacing the six machine rooms and data centers in which computing is currently stored at Harvard.

“It will not exist on campus. It doesn’t need to,” Cuff said, “Computers don’t need to look out the window. They don’t need to be close to their colleagues. They need to be close to each other, which is what we’re doing with this computing space.”

According to Ruckenstein, the facility is unique for its ability to spark cooperation among institutions “infamous for lacking the so-called ‘collaborative gene.’”

“This is an amazing opportunity for our universities to think imaginatively, to challenge our students and faculty, and to connect more meaningfully with industry, government, and society as a whole,” he said.

In advancement of that goal, the member institutions have submitted joint large infrastructure grants and launched a seed-grant program for joint multi-institutional research projects. The center will also be open for use by other universities and both not-for-profit and for-profit research organizations through partnerships with member institutions and leasing of space.

The developers also hope the center will establish a presence in the community. Holyoke is currently one of the poorest cities in Massachusetts, with a poverty rate nearly three times that of the state average. The founding universities are collaborating with Holyoke Community College, Springfield Technical Community College, K-12 Holyoke schools and other community-based organizations to implement educational and outreach activities such as workshops and research symposia.

“We really want to expose the technologies that we’re doing and use it as part of a more global educational mission,” Cuff said.

Construction of the first 10 megawatt phase of the center is expected to be completed by 2013. Subsequent phases will increase the space and power capabilities of the center as well as the nature of the research. In the meantime, developers hope to intensify discussions with the research faculty and larger academic community and develop a common operating model to take advantage of the diverse needs and strengths of partner institutions.

“In the end, this is a tool that is administered by the administration but it’s a tool used by the faculty,” Ruckenstein said. “It’s their tool.”

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