



The Case for STEM

Remarks to the UVM Board of Trustees

David Rosowsky, Provost and Senior Vice President

Science, Technology, Engineering, and Mathematics (STEM) is the collection of academic disciplines that has been associated with the most promising economic development opportunities, finding solutions to the grand challenges we face as a nation, a planet, and a people (water, food, energy, security, health and healthcare), and the most new jobs.

Top universities across the nation have made significant investments in STEM teaching and research facilities to attract the best and brightest students and faculty, to prepare graduates for successful careers, to facilitate new partnerships with industry, and to contribute to the economic development of their state or region.

So critical are STEM graduates to the future of our nation that President Obama has called for 10,000 new STEM graduates every year. Here in Vermont, Governor Shumlin has called for significant growth in the number STEM graduates to fill jobs in the state, to help attract new companies to Vermont with the promise of talented and well-educated university graduates, and to create new technologies and companies that will create new jobs in the state – in manufacturing, in wind energy, in smart grid technologies, in solar power, in aerospace systems, in biotechnology, in e-commerce, in health-care informatics, and in advanced computing.

As Vermont's public research university, we have an obligation to step up – and we are both prepared and excited to do so. We have deep applicant pools in the STEM disciplines, with some of the most well qualified students. If we make it a priority and redirect existing resources and strategically invest new resources, we can double our STEM enrollment.

We are limited by (1) physical facilities (teaching and laboratory spaces), and (2) faculty. We can, and will, commit to adding new faculty in STEM disciplines through strategic redirection of resources and plans for modest growth. However, we cannot simply re-purpose facilities or space. For this, we simply **MUST** make the greatly needed and long overdue investment in STEM.

Our vision is based on a carefully considered, strategically crafted plan that includes a combination of new construction and renovation. Taken together, three buildings – a replacement building for Cook (to house classrooms and offices), a new integrated teaching and research laboratory building, and a selectively renovated Votey Hall – comprise the STEM Complex, totaling more than 250,000 square feet.

Over the last two years, you have heard of evolving plans to construct a new teaching and research complex dedicated to the physical sciences, engineering, mathematics, and computer science. Our facilities at UVM are outdated and outmoded, and many are in need of significant renovations and repair. Each year, the condition and utility of these important teaching and research spaces affects our recruitment of top faculty and our ability to attract top students – especially undergraduates.

We are losing students to colleges and universities around the country and right here in our region with superior teaching classrooms, studios, and laboratories. These are some of the first facilities students and their parents ask to see on campus tours, and often are the feature that makes or breaks a student's decision on choice of university. Science and technology spaces (classroom, labs, maker spaces, design studios, and project spaces) are often cited at the top of the list of facilities that drive students' decisions – over residence halls, libraries, and even student unions.

Therefore, the investment in our STEM teaching and learning spaces at UVM is as much a *strategic* imperative (to expand our STEM programs and create offerings and facilities that attract and engage students from all majors) as it is a *financial* one (to attract top students and prepare successful graduates, to offer a compelling promise and demonstrable return on investment, to and prepare graduates for some of the nation's best-paying jobs in some of the fastest growing industry sectors).

The time is NOW to commit to this ambitious project. We must commit to making UVM a comprehensive, engaging, compelling, and impactful public research university – with national impact and Vermont sensibilities, with national aspirations and Vermont roots – to prepare graduates for success, to prepare integrative thinkers with deep understanding and appreciation for the liberal arts and STEM, and to prepare the future generations of problem-solvers for what are, without question, the most complex problems we have ever faced.

What will be UVM's role in meeting the President's and Governor's challenges? How will UVM partner with the state to create graduates, businesses, and jobs so desperately needed in Vermont? How will UVM position itself to help attract businesses to Vermont, enable new companies to be created, and accelerate the evolving e-commerce and startup cultures in Burlington?

Our answer to these challenges lies not only in the construction of innovative new STEM teaching and research spaces, but in the creation of new curricula and new programs that will inspire and engage students in all colleges – from every discipline – so that ALL of our graduates possess some understanding of engineering, technology, and the physical sciences.

Why is this important? It's important because we seek to train not just critical thinkers, but integrative thinkers. Scientific literacy, technical competency, and an understanding of the role that science and technology play in shaping our society must be considered *core competencies* for a UVM graduate -- as important to an undergraduate education as humanities and the arts, social sciences, writing, cultural competency, and global understanding.

The realization of this vision will benefit ALL students at UVM by substantially enhancing the University's inventory of technology-enabled, integrative, and creative pedagogical spaces available to a vast cross-section of students and classes.

The STEM Complex we envision is not extravagant, it is essential. It is not isolating, it is engaging. It is not boastful, it is optimistic. It is UVM's promise to future students, to the people of Vermont, and to our state's economic health and prosperity.

We envision a STEM facility that serves as a literal and figurative SPINE for the Central Campus. In this central location, the STEM Complex will bridge the magnificent buildings of University Row to the west, with the health sciences complex to the east. Aligned with the long axis of Cook, the STEM Complex will serve as a corridor connecting Museum Row and the Trinity Campus to the north, with the Davis Student Center and the residential life areas to the south.

Imagine what such a facility will inspire and enable. Imagine what it will say to prospective students and faculty, what it will provide for our campus and our state, and what it will allow us to do as a university.

Imagine a building that is as beautiful as it is functional, as forward-looking as it is accessible, and as connected as it is connecting.

Imagine teaching and learning spaces without walls, without barriers, and without limits. Highly flexible, rapidly adaptable, and infinitely reconfigurable – to accommodate changing needs, evolving priorities, and new opportunities.

An icon and an integrator. A beacon attracting and inspiring students from across the University and across Vermont to learn, explore, and discover.

We have engaged in a space planning exercise with faculty and staff from the College of Engineering and Mathematical Sciences and the College of Arts and Sciences to envision such a facility, to contemplate emerging and impactful pedagogical platforms, to imagine the classroom and teaching lab of the future, to learn from best practices at other universities, and plan for our space needs today and into the future. And the results have been astounding – both in terms of campus engagement and in terms of evolving space utilization concepts. There is optimism, there is vision, and there is excitement.

We are ready to move forward with this bold plan. The time is right to commit to this ambitious and critically important project for our university. Later today, we will be asking the BFI Committee to authorize \$75M in debt service toward an overall \$100M total project cost. The remaining \$25M will be from non-debt sources, expected to come primarily from gift funds. The construction of the STEM Complex will eliminate *at least* \$28M in deferred maintenance on the UVM campus.

In addition to the \$75M of debt service, we will also be asking BFI to approve a loan of \$1.5M from Treasury Operations to fund the next phase of the design process, the schematic design. Once the bonds are issued, an equal amount will be transferred from the STEM project account to repay the Treasury Operations account.

We cannot be a great comprehensive university without foundational and deep strengths in the physical sciences and engineering, any more than we can be a great comprehensive university without foundational strengths in the arts, humanities, life sciences, and social sciences.

The STEM Complex will allow the University of Vermont to claim its place among the most relevant and effective comprehensive teaching and research universities in the nation.

In the absence of this facility, it will grow increasingly difficult to fulfill our fundamental mission of providing our students with an outstanding liberal education – one that includes broad knowledge in both the arts and the sciences – one that inspires all dimensions of creativity, discovery and innovation.

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Office of the Provost and Senior Vice President
February 2014