Next Generation Connecticut

Building Connecticut's Economic Future through STEM

Background & Overview

Connecticut has historically been known as the birthplace of invention and innovation. Connecticut inventors created the cotton gin, anesthesia, the first submarine, helicopter, color television, the portable typewriter and a range of industrial technologies. The technical proficiency that contributed to Connecticut's economy has declined dramatically. According to the Kaufmann Foundation New Economy 2010 Report, Connecticut ranked #14 in high-tech jobs, #15 in patents, #22 in entrepreneurial activity and #37 in non-industry R&D investments. Connecticut's long-term economic competitiveness can be re-invigorated with key investments for pioneering R&D and vital educational programs in the STEM (science, technology, engineering, and math) disciplines. This proposal, *Next Generation Connecticut*, will expand critical STEM activities at UConn and drive innovation, enhancing job creation and economic growth. With these key, targeted strategic investments in facilities, faculty and students, UConn will be an increasingly vital STEM institution, fueling Connecticut's economy with new technologies, highly skilled graduates, new companies, patents, licenses, and high-wage STEM jobs.

Next Generation Connecticut

As part of this ambitious, ten-year plan, the University proposes to hire innovative faculty, build new facilities and enroll talented students, as follows:

- Hire 259 new faculty (of which 200 will be in STEM)
- Enroll an additional 6,580 talented undergraduate students
- Build STEM facilities to house materials science, physics, biology, engineering, cognitive science, genomics and related disciplines
- Construct new STEM teaching laboratories
- Create a premier STEM Honors program
- Upgrade aging infrastructure to accommodate new faculty and students
- Expand digital media and risk management degree programs and provide student housing in Stamford
- Relocate Greater Hartford Campus to downtown Hartford

Proposed Funding

Proposed capital and operating funding for *Next Generation Connecticut* will be allocated incrementally between FY15 and FY24.

Operating ($M)*	**FY15**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**
State Request	$17.4	$33.8	$54.0	$70.3	$80.6	$92.7	$102.4	$113.0	$123.8	$137.0
UConn Commitment	$18.5	$13.1	$20.2	$28.9	$35.4	$41.3	$48.2	$54.8	$62.4	$69.8

*Amounts shown are cumulative & in addition to support of current faculty hiring plan of $79M.

Capital Request ($M)*	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Academic & Research Facilities	$15.0	$35.0	$75.0	$100.0	$100.0	$125.0				
Deferred Maintenance				44.0	104.0	101.0	141.0	71.0	92.0	52.0
Equipment	35.0	10.0	30.5	34.5	35.0	43.0	20.5	20.0	20.0	21.5
Hartford Relocation	30.0	40.0								
Residential Life Facilities	20.0	20.0			12.0			20.0		
Parking Garage # 3							30.0	33.0		
Stamford Campus Housing	5.0	5.0								
Total Request	**$105.0**	**$110.0**	**$105.5**	**$178.5**	**$251.0**	**$269.0**	**$191.5**	**$144.0**	**$112.0**	**$73.5**

* Amounts shown are annual increments and are in addition to the reallocation of existing UCONN 2000 funds.

UConn will commit significant institutional resources to launch *Next Generation Connecticut* by contributing $235M in reallocated UCONN 2000/21st Century UConn funds for the building program and $149M in operating funds to support the academic program components.

Emphasis on STEM

According to a recent study by *Georgetown University's Center on Education & Workforce*, eight million U.S. jobs will be available in STEM fields. Nationally, overall employment is projected to grow 9.6% from 2010 to 2020. Connecticut labor analysis projects a similar trend. For example, the Connecticut Department of Labor, projects the need for 54% more biomedical engineers. But report after report shows that the next generation of American employees will be unprepared for these jobs. Of 34 industrialized countries, American students rank 17th in science and 25th in math scores. This gap between demand and supply limits our nation's ability to solve the complex problems of our time, inhibits the innovation required to remain competitive, and results in severe long-term economic consequences for our country. However, this situation also provides Connecticut with a unique opportunity.

Next Generation Connecticut will have a tremendous impact on the reversal of these trends and grow Connecticut's STEM workforce to enable our state to compete effectively in the global marketplace. According to the National Academy of Engineering, two-thirds of the growth in our GDP has its roots in STEM. The U.S. Bureau of Labor Statistics reports that:

- STEM jobs grew 3 times faster than non-STEM jobs in the last decade
- STEM jobs are projected to continue to grow by 17% ('08-'18), as compared to 10% in non-STEM
- It is anticipated that approximately 20% of the STEM workforce is over the age of 55+ and may retire over the next 10 years.

For these reasons, increasing our STEM enrollment, hiring additional STEM faculty, doubling our research funding, and constructing and renovating STEM facilities comprise the components of this bold proposal.

Return on Investment (ROI)

Next Generation Connecticut will create both construction jobs and sustainable long-term employment. This proposal will also leverage and maximize the state's related investments in Bioscience CT, JAX, UCONN 2000/21st Century UConn and the UConn Tech Park.

- By 2024, *Next Generation Connecticut* will yield:
  - $146M per year in new research awards (118% increase)
  - $285M per year in new business activity in CT (118% increase) resulting from research at UConn
  - 2,190 new or 4,050 total permanent jobs
  - 30,000 total construction jobs through 2024

ROI	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
New Research Awards	$43	$65	$77	$86	$96	$108	$117	$126	$136	$146M
New Business Activity	$84	$127	$151	$169	$187	$210	$228	$246	$264	$285M
New Jobs	643	975	1,158	1,296	1,435	1,618	1,757	1,895	2,034	2,190

Other states (Appendix A) have made similar investments in STEM research, creating jobs and increasing their economies. In each state, positive outcomes have accrued; jobs have been created, with strong ROI. It is now our time and the University is prepared to join the ranks of the top STEM institutions and states in the country.

Return on Previous Investments

Why does the University need an additional infusion for *Next Generation Connecticut*? Due to chronic historic under funding, UConn focused UCONN 2000 and 21st Century UConn on numerous teaching facilities, general utilities, information technology, residence halls, and infrastructure. Additionally, the University constructed science facilities, including the new Chemistry, Information Technology, Pharmacy/Biology, Marine Sciences and Agriculture Biotechnology buildings. Additionally, the University renovated a number of current facilities for Life Sciences, Biobehavioral Science, Education, and Nursing. The University has major projects underway, including our new Engineering and Psychology buildings, and the renovation of our Agricultural research facilities. While these university-wide investments have allowed us to increase STEM enrollment by 115 percent, UConn must do more to produce many more STEM graduates to meet workforce shortages and drive discoveries that will fuel Connecticut's long-term economic growth.

The UCONN 2000 and 21st Century UConn investments are the major contributors to UConn's growing reputation for academic excellence and its emergence as a leader in higher education in the Northeast, drawing top students from Connecticut and the rest of the nation. UConn's rise during the past 16 years has been astounding, the result of strategic state support that was wisely invested in both facilities and infrastructure. Beginning in 1996, UConn's

- Research awards increased by 119%
- Undergraduate enrollment increased by 52%
- Undergraduate STEM enrollment increased by 115%
- Average freshman SAT scores increased by 113 points to 1226

- Undergraduate degrees awarded per year increased by 75%
- Graduate/professional degrees awarded per year increased by 40%

Record numbers of applications from high-caliber students and support for student success resulted in UConn's increase in national rankings from #38 to #21 among public universities, according to *U.S. News and World Report*. UConn currently enrolls 13% of Connecticut's high school seniors and our fall 2012 class, once again, included the largest, most diverse, and most academically talented students ever admitted.

This further investment in STEM will result in dramatic increases in both STEM research and STEM graduates, in turn producing innovations and inventions that will directly contribute to sustainable economic growth for Connecticut.

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Appendix A. State Investment Examples

A. California

United for Medical Research's 2011 study, An Economic Engine shows that in 2010, NIH invested $4,021,000,000 in California, producing 71,633 new jobs. The National Institutes of Health contribute more than $3 billion per year to the state economy through biomedical research facilities. This supports an industry that provides 267,000 California jobs with an average annual wage of more than $71,000 according to the Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center and the Los Angeles Area Chamber of Commerce. The Association of American Medical Colleges reports that the member medical schools and teaching hospitals in the state had a combined economic impact of $41.6 billion (ranked 3rd in the country) and a total employment impact of 238,000 in 2008. California's Proposition 71 authorized $3 billion to support stem cell research and is expected to save between $6.4 and $12.6 billion in health care costs.

Each dollar of spending by the California State University (CSU) system generates another $2.13 to the economy. The CSU system supports 150,000 jobs annually and pays over $995 million in taxes to California.

Each dollar produced in the life sciences sector in San Diego generates $1.10 beyond it through indirect and induced impacts. The life sciences industry in San Diego supports 55,600 jobs and has an economic impact of $5.8 billion dollars (accessing report requires registration).

Within the University of California system, every dollar of state-funded research in 2000-2001 led to an additional $3.89 through federal and private funding. Overall UC expenditures had an economic impact between $14 and $17 billion and supported 370,000 California jobs.

In 2005-2006, the UC Berkeley had a total economic impact of more than $1.5 billion in the Bay Area and supported more than 31,000 area jobs. In addition, UC Berkeley spent $469 million on research and reported 128 inventions.

UC Davis reports that every dollar the state invests in the university returns $5 to the state. UC Davis generated 45,000 jobs for California and contributed $2.7 billion to the state economy in 2001-2002.

UC Irvine has an annual economic impact of $3.6 billion in Orange County and employs more than 17,000 people.

Every taxpayer dollar invested in the University of California, Los Angeles generates nearly $15 in economic impact in the region. UCLA has a $9.3 billion impact on the area and supports 70,000 jobs.

The University of California, San Diego had a national economic impact of $5.1 billion and generated 319,000 jobs nationwide.

The University of California, San Francisco generates more than 23,000 jobs and reported $1.8 billion in sales in 2003.

B. Maryland

Governor Martin O'Malley, joined by scientists and researchers at the Johns Hopkins Institute for Cell Engineering, today unveiled a new vision for the bioscience industry in Maryland. Under the BIO 2020 Initiative, the State of Maryland will invest $1.3 billion in Maryland's bioscience industry over the next 10 years – the largest per capita investment in the biosciences made by any state in the country – to attract and grow biotechnology companies in Maryland. Recognizing potential for the region's growth in the emerging bioscience industry, the GBC has emerged as a leading organization, supporting the development of two bioscience parks. The University of Maryland Baltimore's BioPark on Baltimore's west side and the Science + Technology Park Johns Hopkins, coupled with an 80-acre neighborhood revitalization on Baltimore's east side are projected to generate up to 10,000 new jobs. Through communications and outreach, the GBC also works to educate business, community and political leaders about the regional economic growth potential in the life science industry.

C. Washington

The State of Washington has earmarked a portion of its tobacco settlement dollars to fund bioscience R&D through the $350 million Life Sciences Discovery Fund (SB 5581), and in 2006 began allocating $35 million annually to research projects with economic development potential, including recruitment and facility enhancements. The state projects to leverage $1 billion in additional external research funding over its 10-year lifetime and create 20,000 jobs with about 15 years. The fund adopts a broad definition of the life sciences, encompassing biotech, pharmaceuticals, biomedical technologies, life system technologies, nutraceuticals, and food processing, environmental and biomedical devices. It is governed by an 11-member board of trustees that evaluates grants for their potential health-care impact, future employment impact, and geographic diversity. A 2-1 match from external sources is required.

D. Georgia

The Georgia Research Alliance Eminent Scholars Program was created by business and university leadership to attract the world's pre-eminent scientists to Georgia's universities to lead programs of research and development in areas with the most potential for generating new high-value companies, helping established companies grow and creating new high-wage jobs. With the financial backing of the state legislature in 2010, the state's research universities, private foundations and other supporters, the Eminent Scholars Program is marshalling the required talent and resources and driving an effective strategy for achieving these results. To date, the Alliance has invested some $400 million, which has helped to attract more than 50 Eminent Scholars, leverage an additional $2 billion in federal and private funding, create more than 5,000 new technology jobs, generate some 120 new technology companies, and allow established Georgia companies to expand into new markets.

E. Ohio

The Biosciences industry directly supports over 62,000 jobs in Ohio. Ohio's bioscience employees' average salary is more than $68,0001. The overall average salary for Ohio workers is about $41,000. The biosciences industry paid employees from 1,800 + locations in Ohio more than $4.2 billion dollars in 2009.1 $796 million in NIH-funding supports more than 13,000 in-state jobs.

F. Colorado

The Bioscience Discovery Evaluation Grant Program (BDEGP) was created in 2006 by the Colorado General Assembly to grow the bioscience industry in the state. The BDEGP provides gap funding to advance promising research from Colorado's outstanding research institutions into the market place. The bioscience industry in Colorado is strengthened by such efforts, resulting in long-term job creation and company formation.

The State leverages this investment in the industry by requiring a one-to-one match for both Proof of Concept and Early-Stage Company grants. The economic benefit is realized near-term in the strengthening of our research institutions, the jobs required to fulfill the grant work, and the products and services purchased to complete grant work. Longer-run payouts come in the form of additional capital investment into the technologies and companies, the creation of new companies, and growing businesses adding high quality jobs. Approximately $22.1 million from the BDEGP Cash Fund has been granted and will garner at least an equal amount in matching funds (excluding Commercialization Infrastructure grants). Of 184 grants made or approved under the program by the end of 2011, 96 have completed work while the others are in process. To date, the program successes include the creation of 34 new Colorado companies and the direct creation of 302 jobs. Additionally, these funds have helped the technologies acquire an additional $95 million dollars in grants and investments to further commercialize these bioscience technologies.

G. Florida

United for Medical Research's 2011 study, An Economic Engine shows that in 2010, NIH invested $509,000,000 in Florida, producing 13,741 new jobs. The Association of American Medical Colleges reports that the member medical schools and teaching hospitals in the state had a combined economic impact of $19.4 billion (ranked 9th in the country) and a total employment impact of 147,000 in 2009. Florida's Jackson Laboratory Institute for Personalized Medicine attracts $60,000,000 million annually in NIH grants for their research in genetic therapy. In 2005-2006, the University of Florida had an economic impact on the state of $5.85 billion and supported 74,900 jobs. The University of South Florida has an economic impact of $3.2 billion on the Tampa Bay area. In 2001, the State of Florida's investments in University Research Centers generated nearly 7,000 jobs. The return on investment of state funding of research was 217%. The Scripps Florida Biotech Research Institute is expected to support nearly 6,500 jobs and contribute $3.2 billion to the Gross State Product during its first 15 years.