


April 17, 2024

TO: Members of the Board of Trustees

FROM: Anne D'Alleva, Ph.D. 
Provost and Executive Vice President for Academic Affairs

RE: Innovation Faculty Hires & Entrepreneurial Ecosystem Initiative at the University of Connecticut (UConn)

RECOMMENDATION:

That the Board of Trustees approve the Innovation Faculty Hires & Entrepreneurial Ecosystem Initiative at the University of Connecticut (UConn).

BACKGROUND:

Pursuant to 10a-104c, as amended by Public Act 21-111, *An Act Authorizing and Adjusting Bonds of the State for Capital Improvements, Transportation and Other Purposes, Establishing the Community Investment Fund 2030 Board, Authorizing State Grant Commitments for School Building Projects and Making Revisions to the School Building Project Statutes*, the University of Connecticut will provide rationale and justification for bond authorizations included in Public Act 21-111 for the University's faculty hiring plan.

The bond funding authorized in Public Act 21-111 followed the enactment of Public Act 19-154, *An Act Concerning Various Initiatives at the University of Connecticut* (now codified as 10a-104c), which encouraged UConn to increase its entrepreneurship and economic development activities and specifically required: (1) The Board of Trustees to develop a new faculty recruitment plan to increase research and new business ventures; (2) UConn's president to oversee development of a plan regarding technology transfer policies and entrepreneurship and innovation at UConn; and (3) UConn's president and Board of Trustees to build and foster a culture of innovation and entrepreneurship at UConn.

In 2020 and 2022, UConn completed its Public Act 19-154 requirements by submitting to the General Assembly bold faculty hiring plans to improve tech transfer, entrepreneurship, and innovation. Funding provided in Public Act 21-111 represents an effort to provide UConn with the resources needed to implement the aspects of these two plans that will have the greatest impact on Connecticut's economy. The full 2024 plan for the Innovation Faculty Hires & Entrepreneurial Ecosystem Initiative at the University of Connecticut (UConn) is attached to this resolution. Implementation of the plan is contingent upon approval of the issuance of funds by the State Bond Commission.

**Innovation Faculty Hires and Entrepreneurial Ecosystem Initiative
At the University of Connecticut (UConn)
April 2024**

This report was developed pursuant to 10a-104c, as amended by Public Act 21-111, *An Act Authorizing and Adjusting Bonds of the State for Capital Improvements, Transportation and Other Purposes, Establishing the Community Investment Fund 2030 Board, Authorizing State Grant Commitments for School Building Projects and Making Revisions to the School Building Project Statutes*. It provides a rationale and justification for bond authorizations included in PA 21-111 for the University of Connecticut’s faculty plan required by 10a-104c.

Executive Summary

Connecticut has long been considered the birthplace of invention, but its “Yankee Ingenuity” must constantly be nurtured to sustain and grow our state’s economy. Connecticut may wish to replicate the successful model used by burgeoning regional economies like Boston, the North Carolina Research Triangle, and the San Francisco Bay Area that are flourishing because of the investment and human capital generated by public and private research universities, and the technological innovations and new businesses they create on a routine basis. It is no surprise that these successful regional hubs continuously fuel discoveries that are transforming industries by integrating IT, sensors, biotechnology, big data, new materials, and automation as well contributing to long-term economic growth in their states.

Since reaching the record high of \$375 million in new research awards in fiscal year 2021, UConn has sustained award levels in excess of \$300M but much more can and should be done. Public Act 10a-104c, enacted in 2019, requires UConn to foster entrepreneurship and develop a faculty hiring plan to attract faculty skilled in creation of new business ventures. This report responds to that mandate and outlines how the bond funds authorized in PA 21-111 will be used for the Innovation Faculty Hires and Entrepreneurial Ecosystem Initiative. Specifically, it would utilize bond allocations of \$46.1 million over 5 years as indicated below to support faculty compensation, lab start-up costs, venture capital, and other aspects of a robust entrepreneurial ecosystem to be successful.

FY22 - \$ 6,460,000
FY23 - \$11,729,200
FY24 - \$14,489,200
FY25 - \$ 9,220,000
FY26 - \$ 4,201,600

UConn plans to hire Innovation Faculty in strategic areas such as data science, fintech, clean and renewable energy, genomics, and advanced manufacturing. The first two years of funding in the amount of \$18.2M has formally been requested be placed on a bond commission agenda to begin the program. The University has already demonstrated its commitment to attract and hire Innovation Faculty and has hired 3 new Innovation Faculty who bring entrepreneurial background and startup experience.

Introduction

State investments have been instrumental in the dramatic growth of UConn and are largely responsible for UConn's meteoric rise to its place among the nation's top 30 public universities in U.S. News & World Report rankings.

The University is a very attractive option for students interested in obtaining a four-year college degree. UConn offers a broad range of academic choices, and students learn from outstanding faculty who are widely recognized for their cutting-edge research and expertise.

More than 57,000 students applied to UConn for the upcoming academic year for 6,050 spots. The University continues to attract a diverse and academically talented freshman class with 192 valedictorians and salutatorians in the current freshman class. The University is proud that nearly 75% of our in-state graduates and 18% of our out-of-state students stay in Connecticut after graduation, where they go on to live, work and contribute to their local communities. In fact, about 149,000 UConn alumni currently work in Connecticut.

UConn is home to some of the most active and innovative researchers in the world. These faculty have a track record in groundbreaking research, innovation, and new business formation that contributes to our state's economy. The Innovation Partnership Building at UConn, which boasts some of the most unique research instrumentation in the country under one roof, is unparalleled in the region. This one-of-a-kind facility helps small businesses and large corporations innovate. Additionally, our business incubation program, aimed at growing faculty and student entrepreneurship activities, has increased dramatically. These incredible successes are a direct result of the landmark state infrastructure investments including UConn 2000, 21st Century UConn, Bioscience Connecticut, and Next Generation Connecticut. Science 1, a world-class teaching and research building funded by 21st Century UConn, opened in 2023 as the University's latest facility with a state-of-the-art 2500 sq ft clean room that allows researchers and companies to engage UConn in microelectronic technologies.

The University remains grateful for the enactment of Public Act 21-111 authorizing bond funds to support the hiring of Innovation Faculty at UConn to enhance our ability to create jobs and new businesses. Specifically, the Public Act provides UConn with access to significant resources over five years to hire faculty who have a track record of turning their research discoveries into new technologies, products, and companies. The expectation is their contributions would further strengthen the University entrepreneurial ecosystem and accelerate formation of world class startups.

It is important to note that the bond funding authorized in PA 21-111 was provided following the enactment of PA 19-154, *An Act Concerning Various Initiatives at the University of Connecticut* (now codified as 10a-104c), which encouraged UConn to step up its entrepreneurship and economic development activities and specifically required:

- The Board of Trustees (BOT) to develop a new faculty recruitment plan to increase research and new business ventures;
- UConn’s president to oversee development of a plan regarding technology transfer policies and entrepreneurship and innovation at UConn; and
- UConn’s president and BOT to build and foster a culture of innovation and entrepreneurship at UConn.

In 2020, UConn completed its PA 19-154 requirements by submitting to the General Assembly a bold faculty hiring plan and an aggressive roadmap to improve tech transfer, entrepreneurship, and innovation. Funding provided in PA 21-111 represents an effort to provide UConn with the resources needed to implement the aspects of these two plans that will have the greatest impact on Connecticut’s economy.

1. Rationale for Investment in Innovation Faculty Hires and Entrepreneurial Ecosystem

Connecticut has historically been known as the birthplace of invention and innovation. Connecticut inventors are responsible for many essential inventions having created the cotton gin, anesthesia, submarine, helicopter, color television, portable typewriter, and a range of industrial technologies. However, the technical proficiency that contributed to Connecticut’s economy has declined dramatically. According to the Kauffman Foundation New Economy 2021 Report, Connecticut ranked below the median in new entrepreneurs, opportunity share of new entrepreneurs, early start-up job creation, and early survival of start-ups (start-ups still in operation one year after creation).

It is time to reverse these trends. UConn’s Innovation Faculty Hires and Entrepreneurial Ecosystem initiative is one concrete way for Connecticut to reclaim its legacy of “Yankee Ingenuity” and job creation.

There is strong support for the need and benefits of funding the Innovation Faculty Hires and UConn’s Entrepreneurial Ecosystem Initiative:

- UConn was home to 56 new start-ups in 2023, and 166 companies have participated in our Technology Incubation Program (TIP) since 2003. Since 2003, TIP start-up companies have cumulatively raised \$1.4B, with \$976M in the last 5 years alone. In 2023, the 56 companies in TIP raised \$35.4M in grants and \$77M in equity and debt, paid \$4.36M in taxes, and employed 303 full-time and 145 part-time employees.
- UConn faculty strength in innovating and entrepreneurship is evident by the numbers, in 2023:
 - 93 invention disclosures and 146 patent applications filed,
 - 26 patents issued,
 - 10 faculty-owned startups formed between 2022 and 2023.

As one example of a particularly noteworthy invention from prior years, UConn researchers Jon Goldberg and Charles Burstone revolutionized modern dentistry by developing a fiber-reinforced material now used by dentists around the world. FibreKor® has the strength of metal, but has the look of natural tooth enamel. This technology was named a Top 100 Invention of the 20th century.

- National benchmarking highlights the research productivity of our current faculty. However, our faculty size is substantially smaller than our peers, so a focused faculty hiring plan is essential to continue our growth in research expenditures and accomplishments. This is why PA 21-111 is so critical to UConn's and Connecticut's future. Increasing faculty, particularly entrepreneurial faculty, will allow us to build on our existing strengths and create even more start-ups and new business ventures.

While UConn has made significant progress, it is committed to doing even more to expand and grow Connecticut's economy through research, discovery, and innovation. If the Innovation Faculty Hires funding is provided, the University can get started on a proven method of attracting new talent and jumpstarting job creation.

There is strong evidence indicating that the path to a more robust UConn and a brighter economic future is the connectivity between industry and research and development, as is currently occurring in the major regional economies of Boston, North Carolina Research Triangle, and San Francisco Bay Area. These regional economies thrive due to the presence of public and private research universities that have brought in investment capital and developed human capital for an increasingly modern workforce and sparked innovation through research for decades. UConn continues to build strong academic-industry partnerships with Connecticut industries and others from across the US.

As shown in the table below, it is clear that some of the top regional economies in the United States are also home to some of the top research institutions. This table reports the National Science Foundation's (NSF) Higher Education Research and Development (HERD) Survey data that tracks research spending by universities. It reveals that the regional economies of Boston, the Research Triangle, and Silicon Valley benefited from \$3.0 to \$4.1 billion in research activity in 2022 by its top three research institutions. By comparison, Connecticut benefited from only \$1.5 billion in research activity. Additional research investments will generate additional economic benefit.

R&D Expenditures 2022 (in \$ millions)

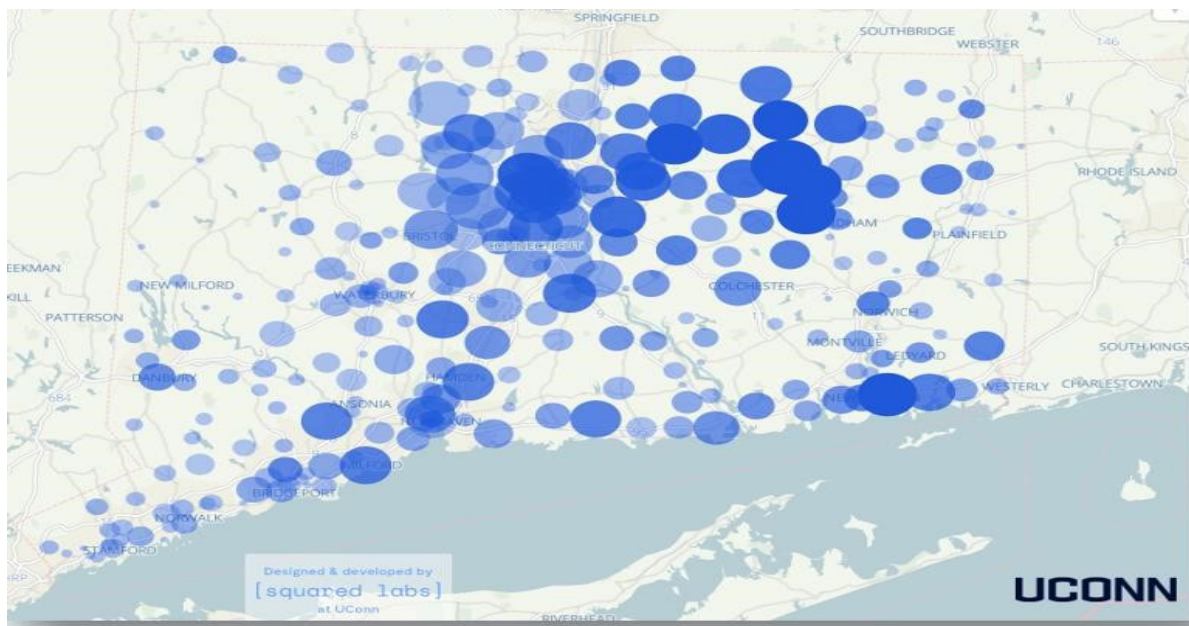
Regional Economy's Top 3 Research Institutions	Total R&D	Life Sciences	Engineering	Physical Sciences	Social Sciences	Non-S&E
Central CT	1,559	1,264	106	69	24	19
Yale	1,191	1,044	37	58	14	9
UConn	368	220	69	11	10	11
Boston	3,023	1,355	587	332	211	195
Harvard	1,308	741	97	119	145	111
MIT	989	128	398	175	54	49
Boston University	725	485	92	38	12	35
Research Triangle	3,335	2,458	313	100	128	88
Duke	1,391	1,175	103	23	41	16
North Carolina-Chapel Hill	1,361	1,021	39	49	78	56
North Carolina State	583	263	171	27	9	15
Silicon Valley	4,172	3,009	349	369	92	119
California-San Francisco	1,806	1,734	-	72	-	-
Stanford	1,385	999	142	102	18	45
California-Berkeley	981	276	207	196	74	75

The table also shows that life sciences is the largest broad field of funded research representing over half of the total. Life sciences R&D spending has also grown by about 25% over the last five years. For all regional economies except Boston, life science research comprises more than 70% of all R&D spending. R&D spending in engineering is a distant second to life sciences with less than 10% of for all regional economies except Boston. Boston's R&D expenditures are more diverse, with 45% in life sciences and 19% in engineering, largely due to MIT's engineering research. Thus, the allocation of R&D in Connecticut's economy is similar to the more successful regional economies in the U.S. It is the amount of R&D investment that differs.

UConn's sustained \$300M+ external research funding is impressive when considering that UConn faculty are competing globally for grant dollars. For every research dollar that UConn attracts in externally sponsored research and spends within the state, 80 cents in economic output is generated elsewhere in the state economy. As research spending grows, the impact of that spending will grow as well.

The second graphic is a screenshot of UConn's Grant Trails website (www.granttrails.uconn.edu/CT), which interactively shows where UConn research grant spending creates economic impact in our state.

Figure 1. UConn's Grant Trails interactively shows you where research grants that are awarded to UConn faculty are spent in Connecticut



UConn’s Technology Innovation Program (TIP) helps launch start-ups ready to transform their respective markets and often dedicated to making public good. Through three locations in Storrs, Farmington, and Stamford, TIP offers start-ups mentorship, lab and office space, educational/networking events, access to students, and a variety of other programming. TIP companies have access to UConn’s top research facilities, resources for pitch development, funding seminars, angel investor forums, UConn library, vivarium and guidance from our entrepreneurs-in-residence.

The more research faculty at a university, the more research it can conduct with sponsored funding. More sponsored research with industry leads to research translation and growth in Connecticut’s economy.

While there is considerable work to be done that the PA 21-111 will support, there is evidence to suggest that there is a growing base of an entrepreneurial ecosystem at UConn to build upon. PA 19-154 required the University to develop a plan to recruit eminent faculty and their research staff to support development in key sectors of the state’s economy and accelerate the pace of applied research and development. It also required the University to closely examine its technology transfer and commercialization efforts and make recommendations on how to strengthen these areas.

Following several state-funded initiatives with congruent goals, including the Tech Park, Science 1, Bioscience Connecticut, and the Next Generation Connecticut capital program, the 2019 legislation asked the University to develop a roadmap for how Connecticut could leverage these tremendous investments with an aggressive strategic hiring plan and a plan to build out our entrepreneurial ecosystem to help fuel the state’s economy.

These efforts a) expand resources for research commercialization, patent protection and monetization; b) have great potential for increasing and opening new areas of our research and development (R&D) base; and c) provide training and career opportunities for our talented graduates to join the workforce in Connecticut. **Strategic Content Areas for Investment**

PA 21-111 is timed perfectly with the adoption of the University strategic plan. Early work on this strategic plan in collaboration with the Vice President for Research, Innovation and Entrepreneurship indicates that the University has existing strength and opportunity to grow substantially in areas that align well with traditionally strong and growing economic sectors in Connecticut including:

- Biomedical sciences and engineering
- Clean and renewable energy
- Cybersecurity
- Data science
- Financial technology (Fintech)
- Genomics
- Health and aging, including a focus on biotechnology and drug discovery
- Materials and advanced manufacturing
- Sustainable agriculture

2. How UConn will Effectively Leverage Funds from PA 21-111

Based on the strategic areas noted above, there is great opportunity for UConn to build on its areas of strength, further develop its national reputation, and increase its capacity to closely align with areas of economic growth for the State of Connecticut.

As part of this approach, the University will utilize the bond funds to create a supportive ecosystem of entrepreneurship for all faculty and a plan to hire new faculty whose interests, expertise, and experiences align with areas of strategic interests as they begin to develop new business ventures based on their discoveries and also relocate their existing startups to Connecticut.

a. Innovation Faculty Hires

UConn's strategy for hiring faculty innovators (referred to here as "Innovation Faculty Hires") is to recruit individual faculty from outside the University who have demonstrated excellence in translational research as evidenced in part by outstanding community-engaged scholarship, significant entrepreneurial efforts, and/or exceptional applied research.

Entrepreneurial efforts may include technology transfer, patent portfolio with validated technologies that are investable ideas with potential for commercialization, patent monetization, licensing and technology commercialization through successful start-up formation as evidenced by receiving external funding from Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) funding and venture investments of at least \$5 million. Outstanding applied research may

include work at technology readiness levels at or beyond the proof-of concept stage, or research requiring substantial clinical or extension effort.

Innovation Faculty Hire searches will draw from a wide pool of qualified applicants including those from non-traditional, non-academic career trajectories (e.g., private industry and community organizations). Faculty hires with industry and/or community experience augment our research and enrich the academic experience for our students, while conferring important benefits to Connecticut citizens. To recruit such eminent scientists, the University must pay salaries competitive with the best universities in the nation and provide competitive start-up resources to build new laboratories and purchase sophisticated scientific instruments needed by the new hires.

i. Criteria for Hires

Innovation Faculty will be unique by design. While they will be expected to participate in the broader research and teaching mission of the University, there will be a clear recognition that their efforts will be focused on research commercialization and development of viable companies. Given the support proposed for these hires, we are confident we will be able to attract individuals with the right background, work experience, and track record of commercialization and company development.

ii. Process for Hiring

UConn is committed to this, and preparation for hiring has already begun in partnership with UConn's academic deans. Three new Innovation Faculty have already been identified and recruited to generate enthusiasm and ensure the expected returns, providing them with the necessary support and infrastructure. Innovation Faculty Hires are clear and built into the hiring plans of our schools and colleges, most importantly there is a clear understanding among each of the deans that Innovation Faculty Hires will differ from traditional hires in a few substantive ways. Specifically, these individuals:

- will often come from both inside and outside of academia, and may not have built their career on traditional publication and grant metrics;
- may come to us through a more traditional national open search, but also may be recruited directly through targeted searches and referrals;
- may require a more extended or abbreviated recruitment period to successfully secure their hiring;
- may be hired with different expectations than many of our more traditional hires, which may include allocation of their duties aligned with providing appropriate time for entrepreneurial activities; and/or
- may be evaluated differently than more traditional hires with emphasis on metrics such as patents, the formation of financially viable companies, large licensing deals with the public and private sectors, and continuing industry partnership directed to joint development and other tangible metrics of impact on the Connecticut economy.
- require commitment from the university to provide the necessary support and infrastructure to make them successful.

Once bond funds are in place, UConn will continue hiring with an open call to deans requesting proposals prior to the start of the fall semester each year. Deans will be encouraged to partner in proposing joint hires across multiple schools/colleges.

These proposals will be reviewed by a committee chaired by the provost that includes:

- vice president for research, innovation and entrepreneurship;
- associate vice president for innovation and entrepreneurship;
- vice president for finance and chief financial officer;
- vice president for diversity and inclusion;
- vice provost for health sciences and interdisciplinary initiatives; and
- two members external to UConn with strong expertise and experience with innovation and entrepreneurship that represent another university in the state and industry.

This committee also will review the progress of each year's hires to support the success of each individual hire and the overall program specific to the articulated innovation and entrepreneurship goals of PA 21-111.

iii. *Potential Targets for Hiring*

While the level of aggressive recruitment that is necessary for successfully securing Innovation Faculty Hires cannot be fully completed until funding is secured and recruitment can be fully launched, UConn continues to identify and have conversations with several potential targets that have been identified who can either be recruited directly or engaged as a resource to refer potential targets for hiring.

b. Lab Infrastructure and Equipment Resources

A key component of attracting faculty is resources for their lab infrastructure and equipment that directly support technology development and commercialization efforts. The type of highly successful and highly specialized faculty members UConn will be trying to recruit will be coming from places that have invested heavily in facilities, labs and equipment that make their research and discoveries possible. The University will be unable to entice faculty to relocate to Connecticut unless we are able to give them comparable labs and equipment. PA 21-111 includes \$20 million for this purpose.

c. Entrepreneurial Ecosystem

PA 21-111 also authorizes funding to support the growth of an entrepreneurial ecosystem at the University. This funding is critical to ensuring that UConn can attract qualified faculty and help them succeed when they arrive. New Innovation Faculty Hires must have the resources and funding needed to allow their new business ventures to grow and flourish and are expected to act as "Influencers" to advise existing UConn faculty as mentors in venture development.

Currently, UConn's entrepreneurial ecosystem is in a growth phase that will benefit tremendously from appropriate funding to entice Innovation Faculty to come to the University and start new companies in diverse areas.

As noted in our Tech Transfer plan, national benchmarking reveals that out of 225 innovation universities, UConn ranked 74th. With this ranking, UConn outperformed five of seven University-designated peer universities¹, underperforming only the University of Georgia (51st) and Purdue University (12th). However, our own benchmarking has demonstrated certain weaknesses within the entrepreneurial ecosystem, which include a lack of: 1) investible start-ups which are not meeting investment thresholds, and 2) internal seed funding needed to allow the de-risking and maturation of technologies, and 3) investment fund that can be used to seed startups along with syndication with other investors. We believe these focused funds are essential to creating start-ups that meet investible thresholds by providing venture support and internal capital to help them mature. As outlined in PA 21-111, we are seeking support for our entrepreneurial ecosystem in the form of three distinct, but complementary funds:

i. Proof of Concept (POC) Funds

This fund provides resources for early-stage proof of concept and technology prototypes. This fund will allow the Office of the Vice President for Research to select promising ideas through a careful vetting process and deploy capital behind these ideas with follow-on funding and project management. This program will also accelerate more disclosures of inventions by faculty and filing of quality patents.

ii. Entrepreneurial Ecosystem Development Fund

This fund supports the underlying entrepreneurial architecture at the University across three distinct components that support: a) technology validation, b) start-up formation, and c) initial federal applications for federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants.

- **Technology Validation:** In most cases, it is necessary to have a second phase of funding beyond the initial POC funding to mature the technology or de-risk it so it becomes attractive for industry and investors.
- **Start-up Formation:** PA 19-154 directs UConn to encourage and make it easy for faculty to start companies. As a way of internal investment, UConn will invest one-time 1:1 match to a faculty start-up of total not to exceed \$10,000. These start-up formation funds can be used for new business launch, including for consulting services to help with business plan and pitch deck, and attending investor conferences. Start-up companies that receive this funding will be closely monitored and supported through the venture development team at the University.
- **Initial federal applications for SBIR and STTR.** A major limiting step in any start-up is securing the first round of funding. Through federal programs like SBIR/STTR grants,

¹ **Peers:** University of Delaware, University of Kentucky, University of Kansas, Indiana University, Purdue University, University of Georgia, Michigan State University; Utah not included due to data limitations.

the start-up companies can apply and receive funding in two phases. However, SBIR/STTR grant awards have become very competitive. Most faculty are not trained to write SBIR/STTR grants and fail in the first few attempts. To address this issue, grant-writing support will be provided; evidence suggests that grant awards on the first attempt increase with this type of resource.

iii. The UConn Venture Fund

The UConn Venture Fund provides venture capital (VC) for University start-ups and will provide access to later stage venture investments. An independent committee will evaluate start-up applications and objectively decide on funding. Notably, the majority of UConn’s public research peers like Purdue, University of Virginia, and University of Massachusetts that have significant entrepreneurial programs are successful because of their venture capital funds. These funds provide needed capital to help business ventures get started. UConn’s lack of venture capital funds is a major gap, and it is even more evident since all major universities surrounding UConn have a university VC fund that allow them to invest in start-ups and secure the financing needed.

3. Timeline and Budget

The budget outlined below provides more details on how UConn will use the funding outlined in the bill.

Faculty Innovation Hires						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Faculty Innovation Hires						
Number of Faculty	2	4	4	0	0	10
Faculty salary & fringe: Request	\$760,000	\$2,029,200	\$2,789,200	\$1,520,000	\$501,600	\$7,600,000
Faculty salary & fringe: UConn	\$0	\$250,800	\$1,010,800	\$2,280,000	\$3,298,400	\$6,840,000
Total faculty cost	\$760,002	\$2,280,004	\$3,800,004	\$3,800,000	\$3,800,000	\$14,440,010
Start up: Split over 2 yrs.	\$2,000,000	\$6,000,000	\$8,000,000	\$4,000,000	\$0	\$20,000,000
Entrepreneurial Ecosystem						
Proof of Concept	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$5,000,000
UConn Venture Capital	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$10,000,000
Entrepreneurial Ecosystem Dev Fund	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000	\$3,500,000
Total Request (excl UConn cost)	\$6,460,000	\$11,729,200	\$14,489,200	\$9,220,000	\$4,201,600	\$46,100,000

Specific to the Innovation Faculty Hires, the total cost of this staggered hiring plan for salary and fringe is \$14.44 million over the five years with the budget request outlined in the table above covering \$7.6 million and UConn covering \$6.84 million over that time period. Moreover, after the 5th year, UConn would fund the entirety of \$3.8 million annually for the 10 faculty as they continue in their positions. We believe this represents a strong commitment from both the state and UConn to this hiring plan. The \$18.5 million allocated to the Entrepreneurial Ecosystem will be combined with the extensive resources already allocated to this goal at the University as indicated below.

4. Existing Resources

In addition to the \$6.84 million of salary and fringe costs that UConn will fund in the first five years of the program (with all salary and fringe costs funded by the University in subsequent years) as noted in the previous section, there are multiple resources and areas of growing strength at UConn that support the success of expanding the entrepreneurial ecosystem and recruiting 10 Innovation Faculty Hires.

a. Existing Leadership Support and Organizational Infrastructure from the Office of the Vice President for Research and within our Schools/Colleges

UConn's current entrepreneurial ecosystem is led by Technology Commercialization Services (TCS) within the Office of the Vice President for Research. TCS also provides several services to start-ups including:

- Team-based support to educate faculty when starting a company;
- Continuous support to faculty from pre-launch, launch, to post-launch;
- Evaluation of the technology, market, and other criteria by the team to help make a sound judgement on starting quality UConn start-ups;
- Introduction to Entrepreneurs-in-Residence (EIR) and access to a dedicated EIR who will work with new company as a business adviser;
- Support for the faculty member to participate in different entrepreneurial programs and workshops offered by TCS and other organizations;
- Prioritization on TIP space for UConn faculty;
- Introduction to VCs, investment banks and 1:1 meetings with VCs;
- Help with writing and editing of SBIR/STTR grants;
- Assistance with pitch deck development and practice session for VC presentation;
- Hosting services for seminars with invited speakers and events to allow interactions; and
- Introduction to resources available in the community like Connecticut Innovations, CT Next, BioCT, etc.

b. Support for Existing Faculty and Staff

UConn is also taking significant steps to reduce barriers to building a sustainable entrepreneurial ecosystem. As one example, to incentivize faculty to create new businesses, the University has substantially lowered the financial barriers to entry; in most cases UConn is paying for the patent filing costs for startups and charging very low option fees to faculty looking to commercialize their ideas. The University has also instituted a model where option and license fees during start-up formation are applied toward patent fees so that there is immediate relief to faculty.

c. Infrastructure and Investments to Support Innovation and Entrepreneurship

There are multiple examples of infrastructure and investments that can be leveraged in supporting the success of the Innovation Faculty hires. Several well-known examples include the Tech Park,

Bioscience Connecticut, and Next Generation Connecticut. The Technology Incubation Program (TIP) is also a foundational support for faculty entrepreneurs and have continuously supported startups since 2003, including even during the COVID pandemic.

By coupling UConn's world-class research resources, facilities, and business support services to a network of experienced investors and entrepreneurs, TIP helps launch start-ups ready to transform their respective markets. Spread across three campuses -- Farmington, Storrs and Stamford -- TIP is a unique incubator program focused on companies that are in biomedical sciences and healthcare, engineering, AI (artificial intelligence), and Big Data. A unique aspect of TIP is its economic impact in the state of Connecticut through job creation, capital raised, and getting out-of-state start-ups to relocate to the state. An example is a new faculty hire Dr. Alexander Aksenov, who has relocated from UC-San Diego to UConn and will have brought his company to TIP.

i. UConn Tech Park

The UConn Tech Park is a high-tech, state-of-the-art applied research facility that promotes expansion of industry partnerships and R&D and economic growth in Connecticut. It comprises 233 acres on our Storrs campus, which are available for industrial development that could benefit from a close relationship to a Tier I public research university. It is home to the Innovation Partnership Building, which houses diverse scientific expertise, industry/academic partnerships, and high-tech equipment.

ii. Innovation Partnership Building (IPB)

[The Innovation Partnership Building at the UConn Tech Park](#) is the University's premier center for cutting-edge research and industry collaboration and innovation. The IPB provides an ecosystem that inspires great ideas, pushing the envelope for next generation solutions. Cross-disciplinary research teams develop novel approaches to critical real-world problems in fields ranging from manufacturing to biomedical devices to cybersecurity.

The IPB strengthens Connecticut's economic future by connecting leading industries with outstanding research facilities and fosters new, innovative partnerships with entrepreneurs and with companies of all sizes.

The IPB is a hot spot of technological assets and intellectual energy where exceptional innovation, collaboration and partnerships deliver the future. Its impressive list of strategic partners have invested more than \$100 million in research. Those partners include Raytheon Technologies, Comcast, Eversource, Thermo Fisher Scientific, Synchrony, Pratt & Whitney, and Collins Aerospace.

d. Resources from Philanthropy and Partnerships

The Werth Institute

A transformative example of philanthropy that provides a significant resource to draw upon is the Werth Institute. From its transformational \$20 million gift, the Werth Institute has been a leading force for entrepreneurship and innovation at UConn. Now with a second major gift of \$7.5 million, the Werth Institute is on pace to be one of the leading entrepreneurship institutes nationally.

In addition to the opportunities available for faculty, it also has led to a dramatic change in the landscape of student entrepreneurship at UConn. While never previously ranked prior to the Werth Institute, these targeted investments have led to UConn being ranked in the top 50 nationally for both undergraduate and graduate entrepreneurship by The Princeton Review.

Also notable, resume.io carried out a study in which it identified colleges and universities from which the founders of companies in the past 20 years had graduated. The table below shows numbers of founders who graduated from Connecticut universities during that time. UConn ranks second only to Yale in the total number of founders.

University	No. of founders	No. of graduates since 2000
Yale	14,353	323,768
UConn	6,747	161,106
Wesleyan	3,693	34,835
University of Hartford	2,253	49,004
Fairfield University	2,009	40,349
Trinity College	1,869	21,274
Connecticut College	1,528	19,673
Southern Connecticut	1,477	51,885
University of Bridgeport	1,437	34,185
Quinnipiac	1,351	38,490
University of New Haven	1,316	43,538
Sacred Heart University	1,132	38,061
Western CT	792	27,329
Eastern CT	622	24,274

e. CTNext Funding

Since 2018, CTNext has invested over \$6.1M in UConn programs and projects. This investment has helped to create a vibrant entrepreneurial ecosystem across the state from Hartford to Stamford.

These funds supported start-ups in such diverse industries as insurance, manufacturing, fintech, and bioscience as well entrepreneurial ecosystem support for our students and faculty.

One recent venture initiative is Future Climate Venture Studio which is an accelerator model that was built as a partnership between OVPR, CTNext and RGA Ventures to accelerate startup companies mitigating climate change and addressing sustainability by providing capital, connections to industry and investors, making them investor ready and providing technical support from UConn faculty to help the companies de-risk the technologies. The program, funded initially for 2 years, included 12 startups in two cohorts and has also led to the launch of 2 new UConn start-ups in the field.

Project	Department	Total Award
Connecticut Intercollege Partnership for Technology Transfer	Technology Commercialization and Industry Relations	\$ 1,468,565
InsurTech Initiative	Connecticut Entrepreneurship Innovation Center	\$ 72,500
Connecticut Global Entrepreneurship Network	Chemical and Biomolecular Engineering	\$ 55,351
Spurring InsurTech in Connecticut	Connecticut Entrepreneurship Innovation Center	\$ 75,000
Ignite Hartford	Connecticut Entrepreneurship Innovation Center	\$ 13,000
Undersea Supply Chain Consortium Project	Mechanical Engineering	\$ 97,500
Entrepreneurial Student & Mentor Partnership	Werth Institute	\$ 125,000
Enhancing the CT Entrepreneurship Network	Chemical and Biomolecular Engineering	\$ 199,747
StamfordNext 2nd Round	Center for Open Research Resources and Equipment	\$ 2,151,560
2020 Connecticut Experiential Entrepreneurship Research Experience for Undergraduates	Engineering	\$ 200,000
Connecticut Intercollege Partnership for Technology Transfer	Technology Commercialization and Industry Relations	\$ 312,357
Connecticut Global Entrepreneurship Network	Chemical and Biomolecular Engineering	\$ 170,000
Innovate Stamford	Materials Science and Engineering	\$ 566,250
UConn Stamford CoAction Lab (CoAction Lab)	Digital Media and Design	\$ 40,500
Entrepreneurial Student & Mentor Partnership	Werth Institute	\$ 125,000
High Value Talents and Mentors (HVTM)	Technology Commercialization and Industry Relations	\$ 153,000
Title Inspiring Industry 4.0 Innovation through University-Industry Collaboration	Mechanical Engineering	\$ 200,000
Connecticut Global Entrepreneurship Network	Materials Science and Engineering	\$ 130,400
Future Climate Venture Studio	Office of Vice President of Research	\$ 600,000
Total		\$ 6,755,730

5. Return on Investment (ROI) Supporting this Initiative

The returns on this new state investment should be significant. One way to measure the returns on this proposed investment is to relate the changes in R&D expenditures to growth in the Gross Domestic Product (GDP). The table below shows how the regional R&D spending of a region’s top research universities is related to regional GDP growth.² The first two columns show that the higher the R&D spending, the higher the regional economic growth rate. The third column shows the ratio of GDP growth to R&D spending, and the Central Connecticut ratio suggests that \$100 million in R&D spending is associated with just a 0.107 percentage point increase in GDP, while the other regional economy ratios range from 0.12 to 0.18 percentage points per \$100 million in R&D, with an average of nearly 0.15 percentage points.³

	R&D Spending, 2019	GDP Growth, 2015-19	Ratio of GDP Growth to \$100M in R&D Spending
Central CT	1,358	1.70%	.107
Boston	2,783	3.48%	.125
Research Triangle	2,921	5.44%	.186
Silicon Valley	3,602	6.13%	.170
Averages	2,722	4.13%	.147

We estimate an ROI of 13.2% on the \$46.1 million investment we seek. By increasing UConn’s R&D expenditure by \$46.1 million, the change in CT’s GDP is estimated to be \$52.2 million.⁴ This increase in GDP materializes as innovation (generated by the increased R&D spending) improves productivity either by enhancing the quality of goods and services, or reducing the cost of their production..

6. Conclusion

The Innovation Faculty Hires and Entrepreneurial Ecosystem Initiative represents a shared vision across the University to apply the energy and expertise of new Innovation Faculty Hires, as well as current faculty and students, to support economic and societal benefit for the state.

While much has been accomplished by stimulating Connecticut’s entrepreneurial ecosystem to support our state’s ability to continue to compete globally, it is imperative that UConn does more to

² The US Bureau of Economic Analysis provides data on GDP by counties. For each regional economy, we averaged the GDP growth rate for the relevant counties.

³ The estimated elasticities implied by the ratio of GDP growth to R&D spending are consistent with the estimates in the research literature. See Hall, B.H., J. Mairesse, and P. Mohnen. 2009. “Measuring the Returns to R&D.” National Bureau of Economic Research, Working Paper 15622. https://www.nber.org/system/files/working_papers/w15622/w15622.pdf.

⁴ The \$46.1 million in R&D investment would represent a 12% increase in UConn’s \$375 million in 2020 R&D spending. Multiplying this R&D spending increase by the estimated elasticity (= % change in GDP / % change in R&D spending) allows us to estimate the percent change in GDP as a result of the increased R&D spending. We estimate that every 1% change in R&D expenditures lead to a .00199% change in GDP, so we expect that the \$46.1M R&D investment will lead to \$52.2M increase GDP. Dividing this increase in GDP by the original R&D investment and subtracting one produces a return on investment (ROI) of 13.2%.

keep Connecticut's economy strong. This initiative leverages a large number of ongoing University efforts supporting entrepreneurship, innovation, and translational research (e.g., Tech Park/Innovation Partnership Building, Bioscience Connecticut, Next Generation Connecticut, Werth Institute, etc.) that will collectively accelerate new business formation and job creation.

Innovation Faculty Hires will target the recruitment of faculty who have demonstrated excellence in translational research as evidenced in part by significant entrepreneurial efforts. Additionally, UConn's entrepreneurial ecosystem will be strengthened so that new start-ups have the supports they need to be successful. Taken together, this approach will help broaden the entrepreneurial landscape of UConn, strengthen its contribution to economic development in the State, improve the lives of Connecticut residents, and foster innovation and new business creation.