February 26, 2020

TO: Member of the Board of Trustees
FROM: Thomas Katsouleas
RE: Technology Transfer Plan

RECOMMENDATION:

The Board of Trustees approve the Technology Transfer Plan as required under Public Act 19-154 to increase the impact of UConn’s technology commercialization and entrepreneurship efforts.

RESOLUTION:

“Be it resolved that the Board of Trustees approve the Technology Transfer Plan: A Roadmap to Innovation and Entrepreneurship at the University of Connecticut.”

BACKGROUND:

Public Act 19-154 requires that the University develop a plan for technology transfer as well as an associated plan concerning faculty hiring and an assessment of student entrepreneurship space needs in order to facilitate UConn’s ability to be on par with high performing universities engaged in innovation. The act mandates either approval of the Technology Transfer Plan or a request for modifications by the Board of Trustees (BOT) by March 1, 2020. The President is provided thirty days after receiving a request for modifications to submit a revised plan to the BOT. The Technology Transfer Plan includes the student space assessment and was provided to the BOT on December 31, 2019. The Faculty Hiring Plan is due for board approval by April 1, per the Act.

The legislation also requires that UConn comment on any funding increases necessary for implementation of each plan and suggests that the Finance Revenue and Bonding and Higher Education committees may raise bills to implement recommendations for the Tech Transfer Plan. Both the Technology Transfer Plan and the Faculty Hiring Plan include a preamble that provides some context for how the new funding required for full implementation fits into the University’s FY21 budgetary priorities.

The Technology Transfer Plan includes content that is responsive to comments provided by the Board of Trustees Committee on Research, Innovation and Entrepreneurship (REI). Approval of the plan by the Board of Trustees was recommended by a consensus of the REI committee at its January 23rd meeting.
The Technology Transfer Plan was developed by the Office of the Vice President for Research (OVPR) with input from the Provost’s Office. OVPR first conducted an extensive effort to benchmark UConn tech transfer policies and compare its metrics over five years to peers and those universities widely considered to be leaders in technology transfer and entrepreneurship. An OVPR best practice review included interviews with the top 25 Institutions named in a Milken Institute study Concept to Commercialization the Best Universities for Technology Transfer, an onsite panel review with a select group of individuals associated with national tech transfer leaders and a literature review. The analysis and reviews met the requirements of the law and the plan recommends actions consistent with the law. The plan carefully outlines those actions that can be undertaken with existing resources and those that require additional funds.

Key components of the Tech Transfer Plan include:

- Current data and future plans for tech transfer benchmarking
- Recommendations for updating policies
- Actionable measures
- A focus on startups
- Comments on the faculty hiring plan
- Enhancement of our alumni mentor network
- Space for student entrepreneurs
- Assistance to other CT institutions of higher education
- Goals and funding recommendations to foster faculty and student entrepreneurship

Goals within the plan address the need to:

- Increase and simplify tech transfer support for university startups for strong IP platforms
- Provide experienced, informed, and enthusiastic champions to support and guide faculty through commercialization process
- Provide financial resources for UConn faculty and student innovators to advance startups
- Build internal and external networks to improve and communicate performance of university efforts and success of its companies

In the past few months UConn has gained recognition for its increasingly successful innovation activities. The University ranked 46th in Princeton Review/Entrepreneur Magazine Top 50 Undergraduate Programs for Entrepreneurs and ranked 90th in the Reuters Top 100: The World's Most Innovative Universities; based on patents filed, success rate of patents and commercial impact.
Technology Transfer Plan: A Roadmap to Innovation and Entrepreneurship at the University of Connecticut

Preamble

The University of Connecticut submits this report in response to Public Act 19-154 which requires UConn to develop a plan for technology transfer and entrepreneurship. The cost estimate of this plan, as required by the Act, is included in on page 29.

Given the financial challenges UConn and the state are facing, we would like to provide some context for how this plan—which requires significant new funding to be implemented—fits into the University’s FY21 budgetary priorities, which are to:

- **Appropriations** - Maintain the FY21 appropriations to UConn and UConn Health as approved in the biennial budget;
- **Bonding** - Allow our planned and approved capital projects to move forward with no deferrals or cuts to the UConn 2000 Capital Program and secure support funding for critical deferred maintenance projects at UConn Health; and
- **Fringe Benefit Costs** - Address the unsustainable legacy costs currently charged to the University by the state, which impact our students and families, research and clinical competitiveness.

If these budgetary priorities are supported, the University will be in a position to begin implementing this plan. However, due to the understandable but significant state cuts totaling more than $40 Million since FY16, without additional funding beyond that described above, the University will need to reassess what portions of this plan can be achieved.

Executive Summary

This plan represents a shared vision from the University and state leaders to apply the energy and expertise of UConn students and faculty in technological innovation and entrepreneurship for economic and societal benefit. While much has been accomplished by stimulating Connecticut’s entrepreneurial ecosystem to support our ability to continue to compete globally, it is imperative that UConn be fully integrated into Connecticut’s economic development strategy by leveraging its resources and successes to help drive the state forward as a leading innovation hub. Guided by Public Act 19-154, the University has investigated policies, practices, and programs at top research universities, and has benchmarked UConn’s performance to develop a well-informed plan to support this aim.

Leveraging the University’s primary role as a research and educational institution, UConn’s plan will facilitate innovation and entrepreneurship to convert research into intellectual property and
technological companies. Our analysis recognizes the strengths gained through historically high levels of state infrastructure support, and identifies weaknesses and threats indicating that the recent budgetary instability of university operations has impeded research progress. However, we also see new opportunities on the horizon with institutional strengths in areas such as Biomedical, Artificial Intelligence, Digitalization, Materials, AgBio, Software, Clean Energy, and Imaging; this suggests that promising results are possible. Furthermore, the rapid growth of data science presents a unique opportunity for UConn to become a research leader and a commercialization power in this space. For a variety of reasons, not the least of which is Stamford’s unusually high density of Fortune 500 companies\(^1\), we propose the expansion of a data science initiative and incubator seeded with industry-friendly and entrepreneurially-minded faculty in Stamford to complement strengthening initiatives in Storrs and Farmington and making a smart investment in the future of our students, our institution, and our state. This new effort will provide a pipeline of startups, and the workforce needed to provide solutions demanded by existing sectors. The scope of the data science initiative and incubator will be determined down the road in conjunction with our deans.

Adding to these opportunities, UConn’s new President, Tom Katsouleas, is highly experienced in the commercialization process and best practices for enhancing technology transfer. Thus, there exists the leadership necessary to pursue diverse opportunities for statewide and regional cooperation in venture development. Moreover, federal agencies, such as the National Institutes of Health which established the National Center for Advancing Translational Sciences (NCATS), are placing greater focus on new programs and grant funding for commercialization.

In April 2017, the Milken Institute released a report entitled Concept to Commercialization-The Best Universities for Technology Transfer, which ranked universities based upon their performance in four commercialization metrics: Patents Issued, Licenses Granted, Licensing Revenue, and Startups Formed. The report utilized a four-year average of these metrics as reported in the Association of University Technology Managers (AUTM) Annual Licensing Survey. Of the 225 universities and research institutions that were reviewed in the report, UConn ranked 74\(^{th}\). With this ranking, UConn outperformed five of seven University-designated peer universities\(^2\), only underperforming the University of Georgia (51\(^{st}\)) and Purdue University (12\(^{th}\)). UConn was recently ranked #46 by the Princeton Review for its undergraduate programs in entrepreneurship -- quite impressive given that it was only the second year the University participated in the survey. However, our own benchmarking has demonstrated weaknesses in revenue creation and in the ability to create scalable startups that can impact the state economy which is largely due to lack of proof-of-concept and pre-seed funding.

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\(^1\) When the number of Fortune 500 companies are calculated on a per capita basis, the Bridgeport-Stamford-Norwalk MSA ranks 1st nationally (4.77 Fortune 500 companies per 500,000 people)

\(^2\) 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.
Rankings are an important reflection of many contributing factors – resources, quality, proven outcomes, responsiveness, etc., and the positive economic effects that can result. It is important to note that the success of technology-driven innovative companies requires strong intellectual property (IP) backed by legal protections and data to attract investors. While UConn will support these companies, we also recognize that many companies, such as those developing software and consumer products, base their strategies on market fit before determining the specific technologies that would be built. UConn will provide services to support the development of both types of companies.

This plan will address these foundational issues with the adoption of new policies and practices informed by: a literature review of recent studies; interviews with the top 20 institutions in the Milken report; and an in-person panel review with eight national technology transfer leaders (Appendix E and Appendix F). These efforts indicated specific requirements for sustained long-term growth and are reflected in a detailed Action Plan and metrics. However, it must be made clear at the outset that UConn does not currently have the funding to implement the entirety of this plan. New resources will be required for full implementation.

Throughout the plan we emphasize student entrepreneurship, faculty entrepreneurship, research grants that translate into the commercialization of technology, industry collaboration, and engagement in regional economic development. We also build on the growing number of existing activities supporting innovation and entrepreneurship at UConn and leverage our relationships with leading global research universities. It is important to note that the total amount of new funding required to implement this plan is approximately $46.5 Million over five years including capital and operational costs. A budget is provided to outline these costs.

UConn plays a significant role in fostering an environment that enables a robust entrepreneurial economy, but it cannot do so alone. According to Connecticut’s Innovation/Entrepreneurial Ecosystem Roadmap developed by CTNext in 2018, the following are key challenges facing Connecticut:

- Lack of entrepreneurial culture limits ability to scale/grow companies
- Agglomeration of national risk capital markets threatens ability to finance deal flow
- Perceived lack of talent to support innovative firms
- Deal flow is not robust or “sticky” to economy
- Connecticut is not perceived as a desirable location for high-growth companies

UConn’s growing ecosystem is an active part of the larger state ecosystem. [...] Going forward as partners with CTNext and Connecticut Innovations, the state agencies responsible for building an ecosystem that supports startup development and provides risk capital for startup growth, the University will seek to become a national leader as envisioned in PA 19-154.
UConn’s ability to impact the state economy will be limited by the extent to which these challenges are overcome at a state level. However, with UConn, Connecticut Innovations and CTNext acting as united partners, we are confident that success is indeed possible.

Introduction

UConn is proud to serve the state of Connecticut as a leading research and educational institution. Through this plan, we will leverage this primary institutional role and our nationally-recognized expertise by facilitating innovation and entrepreneurship with a new capacity to convert research into Intellectual Property (IP) to produce and support products and services sold by technological companies. This plan responds to the requirements of Public Act 19-154 to investigate policies, practices, and programs at top institutions, to benchmark UConn’s performance, and to create a plan to increase technological innovation and entrepreneurship at UConn for economic and societal benefit. Universities are becoming ever more important in their role in the accelerating transition from basic science to a “knowledge-based economy.” UConn is trying to adjust to identify the means to commercialize the small subset of projects that appear suitable for further development. Of special concern among faculty is the growing tendency to encourage academic “innovators” to develop spin-out companies “on the side.” This is a difficult step. Faculty have technical ability, but many lack of relevant management experience. Commercialization in an academic environment is a complex process. As we seek to capture more fully the value of commercialization at UConn, it is important to consider the following characteristics of IP created at universities:

- Invention seldom occurs as a single event, and it typically takes years of research and experimentation.
- University inventions seldom occur within the context of a well-defined problem; rather it is typical for faculty who push the envelope of science, medicine, or engineering to develop technology "solutions" independent of market defined needs or problems.
- Most university IP is considered "raw technology" – it is incomplete, unrefined, and years from being formulated into products or services ready for commercial markets.
- Faculty inventors optimize their research in anticipation of rigorous peer review for publication and additional funding, not commercial outcomes.
- As in research where a small proportion of the faculty are responsible for most of the funded projects, in technology commercialization, a small fraction of the faculty are responsible for the majority of the marketable inventions.
- Basic research is foundational to IP generation, and its funding is widely available through federal agencies. Translational research is the first step in converting basic research and its emerging IP into a market-compatible product, and funding is highly competitive through very limited sources.
Critically important to the success of all technology driven innovative companies is the ability to build a strong IP platform backed by the legal protections and data necessary to attract funding and to compete in the marketplace. This patent protection requires extensive resources for technology transfer within a university including staff and external partners with deep scientific and business expertise in diverse areas who can identify promising technologies. An ability to oversee patent prosecution to ensure coverage on all key features of an invention is also critical along with funding for patent prosecution, development and proof-of-concept work to demonstrate a technology’s value early on in the commercialization process. While UConn will support these companies with robust technology transfer resources, we also recognize that not all companies will rely on IP. In fact many, such as those developing software and consumer products, are based on market fit long before determining the specific technology that would be built. UConn will provide services to build both types of companies.

Public Act 19-154 seeks to harness the power of UConn expertise and IP to propel the University to top-ranked status as an institution for innovation and entrepreneurship. Rankings are an important reflection of many contributing factors: resources, quality, proven outcomes, and responsiveness, and the positive economic effects that can result. This plan addresses these foundational issues and strengthens UConn’s commercialization infrastructure for an increased impact on the state economy.

Comparative Analysis

In April 2017, the Milken Institute released a report entitled Concept to Commercialization-The Best Universities for Technology Transfer, which ranked universities based upon their performance on four commercialization metrics: Patents Issued, Licenses Granted, Licensing Revenue, and Startups Formed. The report utilized a four-year average of these metrics as reported in the AUTM Annual Licensing Survey. Of the 225 US universities and research institutions included in the report, UConn was ranked 74th. With this ranking, UConn outperformed five of its seven University-designated peer universities, only underperforming the University of Georgia (51st) and Purdue University (12th). As in the Milken study, our own benchmarking using both the AUTM survey and normalized research spending data to compare UConn’s tech transfer operation against peers and icons\(^3\) showed weaknesses in revenue creation and in the ability to create scalable startups that can impact the state’s economy. Due to the importance of

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\(^3\) Icons: Arizona State University, Massachusetts Institute of Technology, Stanford University, Columbia University, University of Pennsylvania, Johns Hopkins University. Those institutions named as icons, are those that tech transfer officers have traditionally viewed as tech transfer powerhouses.
research to technology transfer, we also compared UConn’s average research expenditures to those at peer and icon institutions. (see Appendix A for the full data set)

Research
- For FY13-FY17, UConn is the second lowest in research expenditures of the Peers, only exceeding the University of Delaware. Four of the Peers, the University of Delaware, UConn, the University of Kansas, and the University of Kentucky are below the average and median research expenditures of the group, with UConn’s research expenditures lying at approximately half of the average and median. Of particular note, the average and median research expenditures of the Icons for FY13-FY17 were approximately three times higher than those of the Peers. Doubling research in the next decade is one of President Katsouleas’ goals as he recognizes the direct correlation between research, societal and economic benefits.

Inventions
- Of the Peers, only Purdue exceeds the average and the median of the Icons with 54 disclosures per $100 Million in research expenditures. Only UConn, Indiana University, the University of Georgia, and Purdue University exceed the average and the median for the Peer Group with 39, 41, 42, and 54 average annual disclosures received per $100 Million in research expenditures, respectively.
- UConn’s invention disclosure yield is just below the standard technology transfer measure,\(^4\) producing 70.6 disclosures as compared to the 72 expected based on its research expenditures for FY13-FY17. UConn exceeds four members of the Peers in invention disclosure yields relative to the standard measure.

Patents
- When normalized to $100 Million in research expenditures, UConn is second only to Purdue University among the Peers for the average number of patents issued annually during the FY13-FY17 period. UConn also exceeds the output of four of the six Icons, with only the Massachusetts Institute of Technology and Stanford University yielding more.
- Despite its excellent performance in patents issued relative to the Peers and several Icons, UConn’s patent expenditures as a percentage of its research expenditures in FY13-FY17 is below the average and median of the Peers and only half of the average and median of the Icons.

Licenses
- UConn is the fourth highest amongst the Peers in the annual number of licenses and options executed per $100 Million in research expenditures in FY13-FY17, though it is still below the average for the group; UConn is also below the median, although only slightly. It should be noted that the

\(^4\) As a general rule, one invention is typically disclosed for every $2.5 Million in research spending. Both a 2009 publication and a 2011 study validated this number, and a recent review of activity of research from 1991 to 2015 at Columbia University reaffirmed it.
exceptionally large number of licenses and options executed by University of Georgia relative to the remaining Peers and all of the Icons does impact the overall average for the Peers significantly. UConn exceeds both Massachusetts Institute of Technology and Johns Hopkins University in license and options executed per $100 Million in research expenditures in FY13-FY17.

- UConn has the second-lowest normalized license revenue levels of the Peers for FY13-FY17, exceeding only the University of Delaware. UConn performs below both the average and the median for the Peers, as do Michigan State University and Purdue University.

Startups

- UConn exceeds both the average and median of the Peers in the annual number of startups formed (as defined in the AUTM Annual Licensing Survey) per $100 Million in research expenditures in FY13-FY17, ranking third. Of note, when normalized to $100 Million in research expenditures, UConn outperforms Icons Johns Hopkins University and the Massachusetts Institute of Technology, which is known for its proliferation of startup companies.

UConn’s research horsepower has provided novel ways for us to critically assess how our product responds to the needs of the marketplace.

John Hoffert, Chief Operating Officer, Enviropower Technologies

SWOT Analysis

A strong plan requires first knowing what you are good at, what can be improved, and the internal and external context for change. The following analysis presents this situation.

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5 START-UP COMPANIES: As used in the AUTM Survey, start-up companies are new companies that were dependent on licensing an institution’s technology for their formation.
### Strengths
- Comprehensive university, largest public institution in Connecticut
- Increasing recognition of high quality research
- An established team for technology transfer
- Engaged faculty outperforming peers for disclosures, patents, and licenses
- Recent progress in venture development
- Promotion Tenure and Reappointment (PTR) process recognizes commercialization and entrepreneurial activity (Appendix G and H)
- Well-established, high quality incubator with a diverse portfolio of companies
- Tech Park supporting steady growth of industry relationships

### Weaknesses
- Limited local capital
- Inadequate proof-of-concept and translational funding
- Mainly due to the lack of local capital and proof-of-concept funding, a history of underperformance in revenue and startups
- Faculty entrepreneurship was only recently rewarded through PTR, and requires cultural change across UConn for full recognition to be achieved
- Insufficient staff/resources to support venture development and tech transfer
- Limited number and use of local, regional, and alumni experts to assist in startup process

### Opportunities
- Focus technology transfer resources on strengths
- Leadership supportive of technology transfer
- Opportunities for regional cooperation and venture development
- A dedicated Proof-of-Concept Fund and Seed Fund focused on very early opportunities
- UConn’s geographic reach across Connecticut
- Collaboration and partnerships outside of Connecticut— including leading global research universities – that support UConn efforts
- Quality, affordable lab space for start-ups
- Federal agencies increasing focus on translational funding
- Cultivate partnerships with local, regional VCs/angels/family offices/biotech/Pharma/insurance for capital, networking, recruitment

### Threats
- Loss of key faculty and innovators
- An unstable university budget situation due to fluctuating state support
- Potential issues with faculty retention and recruitment given the impact of the high fringe benefit and F&A rates on grant activity
- Commitment of resources to tech transfer efforts impacted by budget
- Federal deficits and other priorities could decrease financial support for research

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6 With a 53% faculty rate and 65% professional rate UConn’s rates are respectively 16 and 24 percentage points higher than the average rates for our peers of 37% and 41%.
Rankings and Continuous Review

Given the dramatic impact of university research on national, regional, and local economies, as well as its contribution to the improvement of the human condition, university technology transfer best practices are a frequent topic of studies, reviews, and reports.

Although the Milken Institute Concept to Commercialization-The Best Universities for Technology Transfer report is only released sporadically (the previous report was in 2006), the methodology used to rank the institutions is outlined in detail. This enables UConn to track our ranking on an annual basis, upon the release of the AUTM Annual Licensing Survey results.

A March 2019 report by the University of Michigan’s Economic Growth Institute entitled Maximizing Innovation and Technology Commercialization of Federal Research Investments: Best Practices at Innovation and Economic Prosperity Universities assesses the best practices of institutions designated as Innovation and Economic Prosperity (IEP) Universities by the APLU. Of the 241 member institutions of the APLU, only 59 have received the IEP designation.

While not a ranking, per se, the APLU designation is granted to “institutions that have demonstrated a meaningful, ongoing and substantial commitment to economic and community development, growth, and economic opportunity” and represents a holistic view of the value and success of a university’s technology transfer and venture development efforts. At UConn, we found this study to be informative and aspirational. For this reason, we have aligned our action plan with the four key IEP categories: culture, champions, incentives, and collaboration. This long-term plan will allow us to ultimately seek to acquire this elite designation.

To respond to Public Act 19-154 (PA 19-154), UConn will use AUTM data and the Milken methodology to conduct annual reviews as described below in order to achieve APLU IEP designation. UConn was recently ranked #46 by the Princeton Review for its undergraduate programs in entrepreneurship -- quite impressive given that it was only the second year the University participated in the survey. We will continue to participate in the Princeton Review process.

UConn recently completed a comprehensive benchmarking review against peers and a cadre of universities recognized as leaders in technology transfer and venture development (Appendix A). In addition to an analysis of standard commercialization metrics, we also conducted interviews to identify best practices amongst leading universities and an external panel review with national experts (Appendix E). The results of this benchmarking exercise were used to develop the actionable measures to be undertaken by the University to address the goals of PA 19-154. An assessment of the progress...
and success of these initiatives will be made through an annual review of UConn’s commercialization metrics. As results emerge, this assessment will be used to inform adjustments in business practices. In addition, at three-year intervals we will review UConn’s technology and startup portfolio to assess its promise and value. The outcomes of this assessment will be utilized to determine the success of our policies and practices. Adjustments will be made should the assessment indicate the plan has not yielded the desired results. UConn will also support continuous improvement through guidance from expert panels that we will convene periodically.

Technology transfer success depends on many key requirements that can accelerate the trajectory of a startup such as CEO and technical talent, funding, public recognition and strategic partners. UConn programs support these needs, as well as Connecticut’s need for incubator space for startups, and the state’s evolving strategy for growing the bioscience industry. UConn has long been the driver of economic development and innovation, bolstering the state’s talent pipeline and conducting nearly $270 Million in academic research activity each year. In the last five years, with state and private investment we have: expanded entrepreneurship programs and facilities for students on university campuses, increased the emphasis on commercialization among research faculty, and expanded the availability of funding to create university startups.

In Figure 1, in order to demonstrate the breadth of resources offered at UConn we have mapped the stages of where a selected group of UConn’s more than 50 entrepreneurship programs specifically assist in startup development. By offering a continuum of resources from ideation to commercialization that meet the key needs of faculty, graduate students and undergraduate entrepreneurs, UConn aims to increase our impact on the state’s innovation economy.

“UConn provides my business with an advanced level of expertise in research that I need to advance my product.”

Wade Moore, Moore Engineering
As a university, UConn has historically enjoyed incremental results supported by the combined efforts of technology transfer, the university venture development arm, and the Technology Incubation Program (TIP). While not a comprehensive list, specific cases that speak to our progress and which are at various stages are noted below. \(^7\)

- **Alphachromics** was formed in 2010 to leverage a portfolio of electrochromic polymer technologies developed by Professor Gregory Sotzing with applications in optical products such as eyewear, wearable electronics, and decorative surfaces, but dissolved after failing to raise sufficient funding to support its commercialization plans. Despite this disappointing, yet common, outcome for startups, in 2013 UConn signed an agreement with a global electronics company producing $750 Thousand in revenue for two Sotzing technologies. Sotzing’s portfolio has benefited from $978 Thousand in research support from several industry partners. These technologies are now maturing and UConn is optimistic that commercial products are forthcoming.

- **Vestaron** was formed in 2004 to commercialize an environmentally friendly pesticide disclosed in the late 90’s by former UConn Health Professor Glenn King. The company announced in September 2018 that it launched its first two approved products.

- **ImCorp** was formed in 1995 by Professor Matt Mashikian to commercialize technology invented at UConn to detect breakage in utility cables. The company has made the Inc. 5,000 fastest growing company list eight times. However, in order to achieve dramatic revenue growth, the company pivoted to a services model, which means that the university is not receiving royalties. However, the founder has contributed to the University with an endowed scholarship. The company is based in Manchester, CT and employs over 80 people most of whom are UConn graduates.

- **UConn Health Professor Leo LaFrancois** (deceased) developed the IL-15/IL-15a immunotherapy, which was disclosed in 2004, licensed to a biotech company in 2008, and entered Phase I clinical trials in 2015. The trials made it an attractive buyout option and it was subsequently purchased by a large pharmaceutical company.

- **Renzulli Learning**, a company which specializes in customized education solutions based on a high-engagement enrichment model created by Professors Joseph Renzulli and Sally Reis of UConn’s Neag School of Education, was acquired in 2010 by Compass Learning, Inc. the leading provider of personalized educational technology solutions.

- A new antibody, invented by UConn’s Michael Lynes, to prevent a patient’s immune system from attacking its own body and potentially causing irreversible damage was recently licensed to New Haven company, Biohaven Pharmaceutical Holdings.

- New sterile versions of barberry shrubs were created by UConn plant scientist Mark Brand and new sterile burning bushes created by UConn plant scientist Yi Li to prevent the spread of these

\(^7\) We are unable to report revenue for each example as royalty reports are considered proprietary information under our license agreements; licensees for business reasons would not want those figures to be public.
robust, invasive species. Professor Brand is also responsible for developing many other cultivars sold in nurseries across the US.

While such case studies are informative, it is our intent that in the future we will utilize quantitative and qualitative factors to assess the value of UConn innovative activities.

Action Plan

It is important to note that while UConn is fully committed to the objectives outlined in our action plan, many of the actions necessary to achieve the metrics associated with each objective will require additional resources. Those that do require additional resources are called out in blue. Furthermore, the proposed increases in resources are based on the plan as proposed. However, if research expenditures escalate more rapidly than expected, the resultant increase in inventions, patenting and startup formation would potentially necessitate a further increase in new resources to meet all of the action plan’s objectives.

**Culture - UConn promotes a culture of excellence, which values technological innovation and entrepreneurship, provides outstanding services to faculty, and serves to increase the quantity and quality of faculty commercialization activities and ventures.**

**Goal: Increase and simplify tech transfer support for university startups.**

**Objective 1 Startup Creation** - Align the operations of Technology Transfer and Venture Development under the leadership of a new Associate Vice President (AVP) for Innovation and Entrepreneurship to increase the current base of startups as defined by AUTM.

Execution:

- Institute a unified review procedure for all inventions with updated guidelines and internal and outside experts providing timely and detailed vetting of startup opportunities. *(Requires New Funding)*
- Enroll a robust cadre of experts (see Leadership Network) to participate in a prescribed and timely vetting process and to provide startup support. *(Requires New Funding)*
- Implement a triage process for new and existing university startups that: a.) defines service plans and assigns resources to all startups; b.) regular reviews of business progress; and c.) assists with funding, leadership, partnership development and exit strategies beginning Dec 2020. *(Requires New Funding)*
- Utilize specific criteria to set expectations for servicing all companies, including those with no UConn IP, through varied service levels and company commitments. *(Requires New Funding)*
- Institute a seamless process with the Werth Institute to engage alumni mentors for external support of disclosure review and startup formation.

Measures:
Total new startups vetted by internal and external experts per year over our current base of AUTM-defined startups, with a minimum of three annually for the first five years

Total companies served, graduates from the ecosystem service structure, total Full Time Equivalents (FTEs) employed, funding acquired by companies serviced annually (over ten years)

Total technology opportunities reviewed annually through the new process and the percentage reviewed within a turnaround period of four weeks

Total new startups by 2025

Completion: as above, by Executive Director of Venture Development and Director of Technology Transfer

Objective 2 Startup Access to IP - Enhance startup success by simplifying early contract negotiations with a new policy that offers university startups a limited time License Option Agreement. This approach allows faculty to obtain IP rights quickly and to begin startup development prior to establishing the full business team typically needed for the complex negotiation of a long-term License Agreement.

Execution:

- Create a well-vetted, standard, time-limited License Option Agreement with no upfront or maintenance fees, small initial and delayed payments for patent prosecution expenses, and any other terms deemed useful in supporting university startups by June 30, 2020.
- Provide transparency and set expectations by making public detailed information on typical option agreement terms beginning June 2020.
- Allow for customized terms in option agreements that address the specific scope of activity proposed by faculty inventors.
- To ensure that all startups are credible and able to advance the technology, apply best business practices as option holders seek to become licensees. Implement a collaborative structure for negotiations and a consistent compliance effort for startups and conventional licensees.

Measures:

- Increase in License Options annually
- Improve licensee success with 100% compliance with terms and conditions
- Increase in the percentage of startups funded by outside sources
- Improve recruitment of UConn graduate and undergraduate students in startups and retention rate in Connecticut

Completion: as above, by Executive Director of Venture Development, Director of Technology Transfer, Licensing Directors

Objective 3 Intellectual Property Portfolio - Invest in efforts that build a strong portfolio of IP by supporting increased faculty participation in commercialization
Execution:

- Establish both a live and online commercialization orientation by fall 2021 with details on the commercialization process from disclosure to startup formation and a policy ensuring that all new faculty participate within the first year of hire. *(Requires New Funding)*
- Expand content and deliver to all schools and/or departments ongoing educational programs with “lab to market” guidance. *(Requires New Funding)*
- Simplify the Invention Disclosure process with an online Invention Disclosure Form by June 30, 2020 followed by launch and training of faculty.
- Work with leadership, the faculty union, and the University Senate to continue to identify methods to incentivize inventors beyond our existing PTR policy and the policy on revenue sharing which already exceeds the state’s mandated minimum of 20 percent. *(see “Champions” Objective 1)*
- Promote and reward the accomplishments of entrepreneurial faculty with recognition programs such as a President’s Innovator of the Year Award with a cash prize to be used for further development of technologies.
- Increase the quantity and quality of one-on-one relationships between Technology Transfer staff and faculty enabling transparency and trust in the process. *(Requires New Funding)*
- Develop and implement a digital monitoring tool regarding patents, publications, mentoring, venture capital activities etc. *(Requires New Funding)*

Measures:

- A 5% annual increase in Invention Disclosures as compared to the five-year average for FY15-FY19 (77 invention disclosures), reaching 90 by the end of FY22, with a subsequent 10% increase each year thereafter.
- A 25% increase in meetings between Licensing Directors and faculty, particularly with faculty who have not previously engaged in commercialization activities, with a 5% increase in each year thereafter.
- Informational commercialization programming delivered at all schools, institutes, and colleges annually.

Completion: as above, by Vice President for Research, Innovation and Entrepreneurship, AVP for Innovation and Entrepreneurship, Director of Technology Transfer, Licensing Directors

**Objective 4 Communications** - Frequent, Transparent, and Informative Communications to All Audiences

Execution:

- Immediately identify a few startups and technologies that demonstrate success to frequently and broadly promote so that investors and industry begin to look to UConn for partnership opportunities. *(Requires New Funding)*
- Create a quarterly electronic newsletter that, after one year, becomes a monthly newsletter to be distributed to all faculty; increasing distribution to interested external audiences. *(Requires New Funding)*
Prepare and distribute widely an annual report that, for the first three years, focuses on yearly performance and results resulting from changes outlined in this Strategic Plan. *(Requires New Funding)*

Distribute a press release for every major license and coordinate press releases with licensee companies; evolve a set of messages that are emphasized in the news releases. *(Requires New Funding)*

Create opportunities in college, institute, and alumni outreach material to emphasize the role that Technology Transfer plays in those units and constituencies.

Drive audiences to the Innovation Portal and revise Office of the Vice President for Research (OVPR) Venture Development and Technology Transfer website to become a rich, crisp, and inviting source of information. Add social media and video content as a second stage of revision. *(Requires New Funding)*

Develop new web opportunities to offer easy access licenses for software and apps, and to offer access to IP that is being made publicly available.

Develop and disseminate clear and concise informational process statements about the changes that ensued from the Technology Transfer Plan. For example, what are the reasons for an option agreement, how does it work, and what are the next steps.

Develop and execute a coordinated process for communicating to civic, business, and political leadership and representative organizations about the role, importance, and change in UConn technology transfer.

Measures:

- Newsletter created by July 2020, annual report released July 2020
- Website updated by June 2020 with social media and video enhancements by January 2021
- Initial process statement by July 2020
- Coordinated news releases
- Creation and continual revision of presentation materials that can be used to address different audiences and constituencies

Completion: January 2021, various groups led by AVP for Innovation and Entrepreneurship

**Champions** - Champions guide an institution and support its faculty for successful innovation and entrepreneurship.

**Goal:** Provide experienced, informed, and enthusiastic champions to support and guide faculty researchers towards and through the commercialization process.

**Objective 1 The Imprimatur of the President** - Establish the President as UConn’s leading voice and advocate for innovation and entrepreneurship and deploy the President’s cabinet university-wide in support of this effort.

Execution:

- Identify themes and venues along with specific messaging for the President to advocate for faculty innovation, commercialization, and startup formation. *(Requires New Funding)*
Position the Provost, deans, and department heads as engaged leaders supporting the President’s role by helping faculty to balance academic responsibilities with commercialization interests; taking an active role to promote and support commercialization including communicating and guiding implementation of the new PTR policy.

Create a Faculty Ambassador Program with experienced UConn inventors from commercially active schools and/or departments working to motivate and advise early career faculty.

Standardize practices associated with critical policies impacting faculty engagement in entrepreneurship, including merit review and implementation of the new PTR policy, which considers inventive and entrepreneurial activity.

Continue to identify methods to recognize entrepreneurial and interdisciplinary research as part of the upcoming 5-year strategic planning exercise and reexamine long-standing policies and operating procedures across the university with an eye toward rewarding entrepreneurial faculty through the PTR process, merit awards, as well as providing financial incentives. Develop strategies to enhance translation by starting to value translation.

Measures:

- Implementation of a supportive messaging plan, in collaboration with University Communications, for the President to reach the university leadership and the broader community with targeted communications.
- Meetings in each school/college to provide deans and department heads with informational resources to guide faculty inventors and to reduce barriers to commercialization.
- Guidance issued on policies impacting the availability of faculty to work on commercialization and startups, e.g., sabbatical, consulting, teaching release, conflict of interest and commitment, use of equipment and facilities, roles of students and technical staff, and access to additional IP generated by the faculty inventor.
- Consistent practices for implementation university-wide of the new PTR policy at all campuses ensuring recognition of commercialization accomplishments as scholarly works in accordance with the updated view of commercialization within the academic community.

Completion: June 30, 2020, by President, VP for Research, Innovation and Entrepreneurship, Provost, OVPR Manager of Research Communications, Executive Director of Venture Development, Director of Tech Transfer

Objective 2 Faculty Inventors and Entrepreneurs - Increase the base of faculty experienced in industry research and development, technology transfer, and startup creation.

Execution:

- Recruit academic entrepreneurs as research faculty as well as postdoctoral researchers able to further startup creation. (Requires New Funding)
- Develop a world-class data science initiative and incubator where companies are supported by industry-friendly and entrepreneurially-minded faculty with critical cross-disciplinary expertise (e.g., artificial intelligence, data visualization, cybersecurity/data integrity) to back the growth of multiple industry “pillars” including biotech, healthcare, fintech and insurance, through startup creation and talent development. (Requires New Funding)
- Implement a campus wide collaboration including the Vice President for Research, Innovation and Entrepreneurship and Provost working to identify methods and standards that integrate
commercialization experience and commercially relevant research with high academic standards consistent with the new Faculty Hiring plan as required in the Act.

- Utilize the Deans’ Council for dissemination of updates on emerging industry interests that could be aligned with faculty hiring goals.
- Include the AVP for Innovation and Entrepreneurship as a presenter at all new faculty orientation sessions.
- Include the Vice President for Research, Innovation and Entrepreneurship, AVP for Innovation and Entrepreneurship or representative from Technology Transfer and/or Venture Development in search process as leading job candidates emerge.
- Collaborate within the OVPR to enable technology partnerships at the UConn Tech Park that build on existing industry partnerships and create new ones.
- Pursue opportunities to grow the University endowment in support of faculty innovation and entrepreneurship.
- Provide a one-stop service for faculty to receive direction on Conflict of Interest as relates to tech transfer and startup activities and explore the need for a policy on Conflict of Commitment.

Measures:

- Standards and processes developed and instituted for faculty hiring
- New endowed chairs in scientific areas of interest to industry
- Funding established to support a new data science initiative and incubator in Stamford

Completion: June 30, 2020, Provost, Vice President for Research, Innovation and Entrepreneurship

**Objective 3 Translational Research** - Support translational research as the first step in university commercialization with access to internal and external non-dilutive funds for startups.

Execution:

- Provide coaching and support for the development and submission of Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) proposals. *(Requires New Funding)*
- Pursue grant opportunities for participation as a node in the NSF I-Corps program
- Identify and recruit promising faculty translational projects to apply to the SPARK Technology Commercialization grant for scientific and business evaluation

Measures:

- Double SBIR/STTR awards over three years/two grant cycles
- Increase SBIR success rate in Phase 1, 2, and Fast Track; total raised
- Increase percentage of SPARK projects that become companies
- Continue as an NSF I-Corp site and seek award for NSF I-Corps Node

Completion: Start in 2020, with milestones at 2023 and 2026, by Executive Director of Venture Development, Director of Technology Transfer, Connecticut Center for Innovation and Entrepreneurship (CCEI)

**Objective 4 Venture Funding** - Appreciably increase venture equity funding for UConn startups
Execution:

- Provide services to double venture equity funding in three years (two cycles) by supporting development and review of professional pitch decks, vetting, formation and engagement of management teams, initiating prospective customer interviews, attendance at trade shows, providing introductions to Venture Capitalists (VCs) and accredited investors, advising on term sheet negotiations and follow-on funding. *(Requires New Funding)*

Measures:

- Total angel and venture dollars raised by companies

Completion: Start in 2020, with milestones at 2023 and 2026, by Executive Director of Venture Development

**Incentives**: Incentives and resources facilitate and accelerate technology commercialization and venture development.

**Goal**: Provide financial resources for UConn faculty and student innovators.

**Objective 1 Seed Investment Funding** - Launch a significant UConn seed investment fund to address the severe gap in external funding and critical need for solid business proof of concept to attract outside investors/partners

Execution:

- Identify sources, secure and structure a $10 Million UConn Seed Investment Fund with a 10-year vesting period and evergreen model to be the first dollars in UConn startups. *(Requires New Funding)*
- Model after top tier and peer universities like MIT’s recently launched Engine Fund, UC Berkeley’s SkyDeck Fund, or those at University of Arizona, University of Pennsylvania, Purdue, and University of Virginia.
- Coordinate and collaborate with the Werth Institute.

Measures:

- Launch the fund and its review/investment processes/teams
- Total and size of investments
- Dollars leveraged as seen in follow-on investments
- Return on investment (ROI) (Venture Capital with alternative metrics for social/non-profit startups)
- Viability of fund as an evergreen model

Completion: Fund committed by 2021, start investment immediately, by President, UConn Foundation, Vice President for Research, Innovation and Entrepreneurship, Executive Director of Venture Development, and Director of Technology Transfer

**Objective 2 Proof of Concept Grant Funds** - Exponentially increase the size of UConn SPARK Technology Commercialization Fund and UConn Program in Accelerated Therapeutics for Healthcare (PATH) for increased proof of concept support for faculty innovators translating research into products.
Execution:

- Provide $1 Million annually for an updated SPARK Technology Commercialization Grant Program operating as a Proof-of-Concept Fund modeled after the Yale Blavatnik Fund, the Tech Launch Arizona Asset Development Fund, and others to provide external validation of scientific and business opportunities for faculty inventions. *(Requires New Funding)*
- Identify opportunities to increase PATH support to faculty in therapeutics areas.

Measures:

- Committed financial support to increase funding
- Percentage of SPARK projects that transition to become companies
- Percentage of PATH projects that transition to become companies or license technology positioning it for increased support from university or state sources

Completion: Funds committed by 2021, start investment immediately, by President, UConn Foundation, Vice President for Research, Innovation and Entrepreneurship, Executive Director of Venture Development, and Director of Technology Transfer

**Objective 3 Angel Network** - Develop a UConn Alumni & Friends Angel Network

Execution:

- Continue the ongoing engagement of donors and alumni by the Werth Institute and the UConn Foundation to formally develop and launch an angel network for early stage/pre-revenue investment in student and faculty entrepreneurship. *(Requires New Funding)*
- Address Connecticut’s lack of consistent and steady access to active early-stage investors by engaging individuals who will make investments that range from $10 Thousand-$250 Thousand in early-stage companies. *(Requires New Funding)*
- Maintain relationships with entrepreneurs to monitor suitability and readiness and advise on what is needed to obtain funding to enable consistent deal flow that the network will need to be viable. *(Requires New Funding)*

Measures:

- Total number of angels identified and on-boarded into the network
- Number of alumni mentors that invest in UConn companies
- Total number of events with VC and angel community hosted at UConn and available for UConn entrepreneurs
- Average amount of funding received by startups that are deemed suitable by our external partners

Completion: June 30, 2020 and ongoing, by Werth Institute, Executive Director of Venture Development, UConn Foundation

**Objective 4 Experiential Learning to Build Talent and Startup Financial Capacity** - Increase funded companies while developing a strong cohort of talented technology leaders that can help to stem Connecticut’s brain drain.
Execution:

- Support the President’s Transformative Learning Initiative for undergraduates that stresses experiential learning and mentorship for all undergraduates by establishing linkages to entrepreneurial and talent development offerings.
- Leverage the expertise of Venture Development and Technology Transfer to support student entrepreneurship by collaborating with the Werth Institute to support student educational and business competition activities, mentorship, and incubation space (for students’ companies that pass the Werth Institute vetting process).
- Leverage the graduate business student population to help student and faculty entrepreneurs build advisory and financial networks through a for-credit, experiential education class.
- Utilize graduate teams to prepare entrepreneurs to transition from concept to startup to venture, accelerating the business-side development of startup teams while they develop the technology to create value.
- Focus on the elements that UConn programs are missing today for startup fundraising; realistic financial projections, go-to market strategies, and building executive teams.
- Build on CTNext’s highly successful Technology Talent Bridge program and the Innovate Stamford internships.
- Recruit an aggressive business-development-oriented person to drive and lead an effort to sell and connect students and companies for increased experiential opportunities. *(Requires New Funding)*
- Explore establishment of a student-managed fund in seed-stage venture development for professional interaction and engagement between students and VCs around potential investments.

Measures:

- Total number of startup teams that have successful pre-seed and seed rounds
- Internships in startups including 100 in Stamford annually
- Number of MBA students that join startup executive teams
- Number of MBA students that have jobs in the startup investment ecosystem three, five, and seven years out
- Total program participation by Venture Development and Technology Transfer (mentor, judge)
- Total Entrepreneurs-in-Residence (EIRs) provided for support by Venture Development
- Total student companies in TIP (and their associated metrics)

Completion: Course and method of instruction completed first quarter of 2020. Instructor recruited and funded by May 2020. Teams from Innovation Quest, CCEI Summer Fellows, Engineering’s Third Bridge Program, and OVPR TIP program recruited and participate in pilot class during the Fall of 2020; proposal for student-managed fund; by Werth Institute & Graduate School of Business; ongoing support from OVPR. By Werth Institute, Executive Director of Venture Development, Director of Technology Transfer

Collaboration- *Internal and external collaboration with corporate and entrepreneurial communities, state and federal agencies, and other universities fills institutional gaps and enriches commercialization and startup opportunities.*
Goal: Build internal and external networks to improve performance of university efforts and the success of its companies.

**Objective-1 Technology Marketing** - Increase corporate and community awareness of UConn innovators and technologies in order to improve the frequency and quality of technology marketing efforts for startups and licensing.

Execution:

- Create a robust paid internship program to support technology transfer efforts with an initial focus on technology marketing, hiring two interns by end Q2FY21 and building the program to four interns over time. *(Requires New Funding)*
- Strategically increase industry conference attendance with a targeted approach identifying those that should be attended by Technology Transfer and Venture Development staff, with a goal to maximize coverage, while maintaining reasonable costs. *(Requires New Funding)*
- Promote opportunities, successes, and active inventors at UConn by building on our relationship with University Communications and external public sector partners to increase earned media posts, university coverage, and social media posts. *(Requires New Funding)*

Measures:

- 50% increase in executed Option Agreements and License Agreements in FY21 as compared to the five-year average FY15-FY19 with a subsequent 10% increase each year thereafter.
- 10% increase in License Revenue in FY21 as compared to the five-year average FY15-FY19 with a subsequent 10% increase each year thereafter.

Completion: as above; by Executive Director of Venture Development, Director of Technology Transfer, Licensing Directors, OVPR Manager of Research Communications, University Communications

**Objective 2 State-wide University Collaboration** - Enable other Connecticut universities that lack internal support programs for innovation entrepreneurship to launch new startups based on their own IP or on IP that such universities jointly hold with others institutions, including UConn.

Execution:

- Open and promote UConn educational events to such universities.
- Provide access to equipment and instrumentation in UConn core labs to support R&D needs of startups and other innovative technology companies.
- Build on START Preliminary Proof-Of-Concept (PPOC) Fund and use Venture Development and Tech Transfer teams to deliver services.
- Provide forums to share best practices with universities state-wide that seek to establish new or build on current technology commercialization programing.

Measures:

- At least one new startup per year based on collaboration with other universities in Connecticut over the period of this plan
- Startup performance (# of such startups, funding performance)
Host an annual state-wide university forum on best practices by January 2021
Completion: As above, by Executive Director of Venture Development, Director of Technology Transfer

Objective 3 Build on the success of the Husky Mentor Network developed by the Center for Career Development for a more robust network of alumni entrepreneurs able to support student and faculty entrepreneurship through expanded alumni connections

Execution:

- Develop a distinguished, diverse group of mentors specifically for student and faculty entrepreneurs to address a lack of support from successful executive teams. It will help to provide deep industry knowledge of needs and problems where value can be created, which currently impedes the consistent execution of entrepreneurs’ vision. *(Requires New Funding)*
- Recruit from alumni and industry professionals a deep network across numerous technologies and industries to act as advisors, coaches, and mentors and regularly advise student and faculty entrepreneurs, including serving on startup advisory boards and executive teams. *(Requires New Funding)*
- Work with The Center for Career Development and Venture Development to recruit and convert mentors to become leaders in UConn companies.
- Develop standardized and accessible (web-based) mentor training to assess and align mentor’s skills and understanding, and to ensure mentees have realistic expectations. *(Requires New Funding)*

Measures:

- Total number of judges and industries represented (current total # >100)
- Total number of mentor engagements with UConn entrepreneurs
- Average number of advisory and leadership roles filled with student startups that have crossed a threshold into viability

Completion: Immediately and ongoing. Review annually with at least 50% growth in the first two years, by Werth Institute & CCEI

Objective 4 Outside Expertise - Expand our network of EIRs and business leaders through external national and international contacts and by collaborating with Werth and the Alumni Network to provide a vast group of domain experts and seasoned business leaders for student and faculty startups.

Execution:

- Recruit highly experienced “visiting entrepreneurs” to join UConn for specified time periods, up to one year, during which they advise startups, work within classes, and bridge their experience and networks to enhance the development of our entrepreneurship culture, including in keeping course content current and dynamic. *(Requires New Funding)*
- Expand, maintain, and grow a pool of EIRs to support due diligence, launch, and grow UConn startups. *(Requires New Funding)*
- Tap the Alumni Mentor Network and external parties as a source of experienced executive business leaders to fill in specific roles within startups and complement UConn scientific teams. *(Requires New Funding)*
- Create a network of domain experts with unique expertise required to evaluate technologies in specific areas, help Technology Transfer and inventors to determine commercialization pathways, and make connections with people who work in those pathways. *(Requires New Funding)*
- Further develop international research collaboration with technology transfer and commercialization possibilities *(Requires New Funding)*
- Build study abroad opportunities for UConn students that are focused on innovation and entrepreneurship

**Measures:**
- Staffing provided for network coordination ensuring a strong process for matching mentors and mentees
- Total vetted and engaged EIRs and domain experts
- Assessment of their annual contribution
- Total leadership positions (CEO, CFO, CTO etc.) filled within UConn startups
- Assessment of study abroad learning outcomes

Completion: Starts in 2020, ongoing and measured annually, by Executive Director of Venture Development, Director of Technology Transfer

**Objective 5 Technology Incubation Program (TIP)** - Maintain current high quality of UConn TIP as a state economic development resource and expand capacity where demand exists.

**Execution:**
- Recruit, support, and graduate high quality companies
- Design, resource, and launch of TIP Stamford incubator planned in partnership with Innovate Stamford and CTNext *(Requires New Funding)*
- Support a new data science initiative and incubator or in Stamford (see Objective 2 Faculty Inventors and Entrepreneurs)

**Measures:**
- Entry and buildup of first cohort of UConn, non-UConn startups in Stamford (Y2-3). Fully occupied and operational (Y3-5)
- Total TIP companies
- Percentage of successful TIP graduations
- Aggregate capital raised, revenue, employment
- Annual satisfaction surveys
- Percentage of promising non-CT companies attracted
- UConn vs non-UConn startups metrics delineated for tracking purposes

Completion: Ongoing; AVP for Innovation and Entrepreneurship, Executive Director of Venture Development with Executive Director of Innovation, External Engagement and Industry Relations
Objective 6 *Periodic Informational Programs* - Provide seminars, workshops, meetup sessions, and forums, including public external events to inform faculty members, researchers, key administrators, industry and other interested ecosystem participants about processes, issues, and opportunities associated with technology commercialization (emphasis on startups) and university expertise.

Execution:

- Using examples of national and local opinion leaders, design and execute programs that inform, entertain, and demonstrate best practices of technology commercialization and startup development.
- Deliver hands-on training through nationally funded programs, internal custom-designed sessions, and public external events to bring together key investors and corporate partners, and to showcase UConn startups.
- Offer seminars and workshops for industry to promote faculty expertise and consulting capacity.

Measures:

- Total annual educational modules delivered to schools, departments, and institutes
- Total annual workshops and programs
- Total annual external events
- Satisfaction survey results on quality of presenters/presentations
- Outreach strategy deployed to attract appropriate participants

Completion: Immediately and ongoing, by Executive Director of Venture Development, Director of Technology Transfer

Objective 7 *Student Entrepreneurial Spaces* - Provide a long-term space plan to operate a centralized hub for student entrepreneurs in Storrs and at all campuses, which will leverage the multitude of existing facilities for student entrepreneurs – Werth Tower Meetup Space, Werth Wilbur Cross offices, Library Maker Space, Tech Park POC – (See Appendix J)

Execution:

- Utilize recently formed committee to continue to evaluate locations that have been identified.
- Develop a plan to address the needs based upon the President’s and Provost’s inputs and resource allocation.
- The Werth Institute and OVPR will provide input to ensure that both student and faculty needs are considered and met.
- Utilize the plan to outfit the selected space as a location to further promote experiential learning, practical skill development, and community building. *(Requires New Funding)*
- Create an interface with the many other experiential learning programs on campus through a unique branding effort.

Measures:

- Site selected and funding provided

Completion: Plan delivered by the Werth Institute, Office of the CFO, University Planning, Design and Construction as part of this Strategic Plan.
Objective 7 *Engage with state government and private sector leaders for talent creation and retention*

Execution:

- Participate in evolving public-private partnership where technology-company thought leaders from Stamford are seeking to drive increased engagement between companies and state government.

Measures:

- Newly funded statewide CT’s Innovation Fellowship Program for talent retention
- Increase number of students educated at UConn staying in Connecticut due to CT’s Innovation Fellowship Program
- Coordinate with EIR programs currently at CI, university tech transfer offices and VC firms
- Leverage in-progress programs and programs in development via BioCT and CTNext

Completion: Ongoing; by VP for Research, Innovation and Entrepreneurship, Executive Director of Venture Development, Director of Technology Transfer, Werth Institute

**Key Metrics**

All projected increases will be relative to current baseline data (e.g. historical averages or the most recent year). Also, Tech Transfer goals shall not be at the expense of startup formation. Adjustments will be made as necessary. Those in blue in particular are dependent on the availability of new resources.

**Technology Transfer**

- Receive 1.25 invention disclosures/$2.5 Million research expenditures
- Double leveraged funding tied to SPARK/START/PATH funding and licensed technology in five-year increments *(Requires New Funding)*
- Increase disclosures, patents managed per FTE
- Societal benefits of UConn technologies

**Venture Development**

- Launch additional three new and externally vetted startups °per year for the first five years *(Appendix C) *(Requires New Funding)*
- Double SBIR/STTR grants in three years (two cycles) *(Requires New Funding)*
- Double venture equity funding in UConn companies in three years (two cycles) *(Requires New Funding)*
- Incubator occupancy at least 90 to 92% along with TIP goals (# of companies, % successful graduation, raised capital, revenue, employment, attracting promising non-UConn and non-CT companies) *(Requires New Funding)*

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8 While AUTM only accounts for startups that are developed specifically to commercialize a university-owned technology, startups supported by Venture Development as proposed in this plan will also include student companies and companies with no university IP.
Fully functional Stamford incubator and integrated in TIP in three to five years (Requires New Funding)
Seed Investment Fund of $10 Million established (Requires New Funding)
Societal benefit of UConn startups

Werth Institute
- Student companies
- Students participating in Werth Institute member programs.
- Number of Werth Institute members programs that are created (special emphasis on collaborative programs across units)
- Students in Entrepreneurship specific classes
- Students applying to startup programs including GetSeeded, Accelerate UConn, InnovationQuest,
- Creation of new startup programs for students
- Student Companies receiving outside investment, launching products
- Alumni student connections
- Endowed Scholarship Funds specified to entrepreneurship
- Number of Werth Institute members programs that are created (special emphasis on collaborative programs across units)

Joint
- Total number of faculty involved in commercialization and startups
- The estimated aggregate value of UConn’s company portfolio (Requires New Funding)
- Total number of jobs created in Connecticut by UConn companies and those affiliated through TIP (Requires New Funding)
- Number of small Connecticut companies that increased revenue or jobs with assistance from UConn (Requires New Funding)
- Percentage increase in students educated at UConn that stay in the state over the next five years
- Faculty and student satisfaction rates (annual surveyed results)

Organization

Led by the President, a new vision for innovation and entrepreneurship will be implemented by the Vice President for Research, Innovation and Entrepreneurship, the Provost, and their designees. The new Board of Trustees Innovation, Entrepreneurship, and Research Committee that includes successful entrepreneurs will provide input and oversight.

As an academic unit, the Werth Institute reports to the Provost, while Technology Transfer and Venture Development report to the Vice President for Research, Innovation and Entrepreneurship. Significant collaboration already occurs, and will continue through the President’s leadership and an internal Innovation and Entrepreneurship Committee, which convenes monthly and includes the Provost, the Director of the Werth Institute, the Vice President for Research, Innovation and Entrepreneurship and key deans. In the near future, this committee will also include a new AVP for Innovation and Entrepreneurship, the Vice Provost for Academic Affairs and the Vice Provost for Academic Operations.

As a recently established entity, the Werth Institute remains focused on students and will evolve as growth occurs. The Technology Transfer group is well-established, and Venture Development was recast
within the OVPR just three years ago. The following is our new structure that integrates Tech Transfer and Venture Development for implementation of this plan and provides leadership to promote innovation and entrepreneurship among both faculty and students university wide.

**Leadership Structure**
Financial Resources

Current Technology Transfer and Venture Development Budget

<table>
<thead>
<tr>
<th>Budget Item</th>
<th>FY21</th>
<th>FY22</th>
<th>FY23</th>
<th>FY24</th>
<th>FY25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Prosecution (outside IP Counsel)</td>
<td>$900,000</td>
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<tr>
<td>Royalties to Inventors and Administrative Units</td>
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<td>SPARK Technology Commercialization Grant Fund</td>
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<tr>
<td>PATH Translational Research Program</td>
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<td>$200,000</td>
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<td>Salaries, fringe, and operating needs of staff such as travel and supplies.</td>
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<td></td>
<td></td>
<td>$1,560,000</td>
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<tr>
<td><strong>Total Current Spending</strong></td>
<td><strong>$3,560,000</strong></td>
<td><strong>$3,560,000</strong></td>
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</tbody>
</table>

The Werth Institute is not included above as it operates through an endowed $22.5M private donation. The budget below only represents the increased funding to UConn needed to carry out this plan which may require additional support from the state.

<table>
<thead>
<tr>
<th>Technology Transfer and Entrepreneurship Plan</th>
<th>FY21</th>
<th>FY22</th>
<th>FY23</th>
<th>FY24</th>
<th>FY25</th>
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<tbody>
<tr>
<td><strong>Total Technology Transfer and Entrepreneurship budget</strong></td>
<td><strong>$5,366,580</strong></td>
<td><strong>$26,930,424</strong></td>
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<td><strong>$7,343,893</strong></td>
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<td>Operating budget</td>
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<td>Tech Transfer Staff &amp; Interns</td>
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<td>Werth Staff and TIP Incubator Manager</td>
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<td>Data Sciences Initiative and Incubator11</td>
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<td>Visiting Entrepreneurs</td>
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<td>Non-personnel expenses</td>
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<td>SPARK Proof of Concept Fund Increase</td>
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<td>New Seed Investment Fund</td>
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<td>Entrepreneurship Space Development</td>
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<td>20,000,000</td>
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</tbody>
</table>

9 The source of these dollars is primarily a percentage of fiscal and administrative (F&A) cost (aka, indirect charges) obtained from federal research grants to UConn and the University one-third share of license revenue (per University policy).
10 These dollars are a share of tech transfer revenue to the University and are spent according the University Royalty Sharing Policy; split equally between inventors (personal compensation to reward them for their inventive activities) and funding to their labs, departments, and/or schools for additional research.
11 Does not include funds required for space renovations.
UConn and Connecticut’s Innovation Ecosystem

UConn’s growing innovation ecosystem (Appendix I) is an active part of the larger state ecosystem. For example, the UConn Innovation Fund is administered and funded jointly with Connecticut Innovations (CI) and CI’s Connecticut Bioscience Innovation Fund supports selected UConn startups. Often these companies seek funding through other CI investment mechanisms after successfully completing these programs. Additionally, CI’s subsidiary, CTNext, offers programming and competitive funding at the earliest stages of startup development, which has boosted many UConn entrepreneurs. UConn contributes through joint programs like those funded by CTNext Innovation Places and the START program. The University also supports internal and external entrepreneurs by operating programs like TIP. Collaboration with other research leaders like Yale and The Jackson Laboratory for Genomic Medicine have been a key component of our efforts. For instance, Biopipeline CT is a joint program with Yale, but equally important are the SBIR/STTR, Food and Drug Administration (FDA) workshops, and many other seminars that occur both at UConn and Yale and which are open to the larger ecosystem.

While Connecticut’s ecosystem is relatively new, and cannot be compared to those regions where established leaders like MIT and Stanford call home, it is growing rapidly. The University wholeheartedly supports efforts to respond to Connecticut’s Innovation/Entrepreneurial Ecosystem Roadmap which indicated that the state continues to face many challenges as it seeks to build an environment that can support an entrepreneurial economy:

- Lack of entrepreneurial culture limits ability to scale/grow companies
- Agglomeration of national risk capital markets threatens the ability to finance deal flow
- Perceived lack of talent to support innovative firms
- Deal flow is not robust or “sticky” to economy
- Connecticut is not perceived as a desirable location for high-growth companies

“This [Lambdavision] all started in Dr. Birge’s laboratory on North Eagleville Road in Storrs,” “Since then, UConn has been incredibly supportive in the development of our technology, providing access to top tier scientists, facilities, and resources. We could have relocated out of state, but we chose to keep our company in Connecticut in Farmington, which gave us access to other innovation hubs in New York and Massachusetts,” she continues. “Connecticut also has talented employees and resources like Connecticut Innovations to help us get the technology off the ground – no pun intended.”

Nicole Wagner, CEO of LambdaVision.
Going forward as partners with Connecticut Innovations and CTNext, the state agencies responsible for building an ecosystem that supports startup development and provides risk capital for startup growth, the University seeks to become a national innovation leader as envisioned in PA 19-154.
Appendix A: Quantitative Analysis

Tech Transfer

A 2017 Milken study entitled The Best Universities for Technology Transfer\(^\text{12}\) used a methodology that includes data on traditional sector-specific metrics, such as patents issued, licensing, licensing income, and startups formed to identify top performers. The study normalized that data based on a four-year average of research dollars. In this study, UConn ranked within the top third nationally, at 74 of 225 institutions.

In the following charts, we benchmark UConn’s tech transfer operation against peers and icons,\(^\text{13}\) utilizing the most recent annual AUTM survey and normalizing data for research spending, as in the Milken study.\(^\text{14}\) However, due to the importance of research to technology transfer, we start with a look at average research expenditures at peer and icon institutions.

\(^{12}\) https://assets1c.milkeninstitute.org/assets/Publication/ResearchReport/PDF/Concept2Commercialization-MR19-WEB.pdf

\(^{13}\) Icons: Arizona State University, Massachusetts Institute of Technology, Stanford University, Columbia University, University of Pennsylvania, Johns Hopkins. Peers: University of Delaware, University of Kentucky, University of Kansas, Indiana University, Purdue University, University of Georgia, Michigan State University

\(^{14}\) Those institutions named as icons, are those that tech transfer officers have traditionally viewed as tech transfer powerhouses. Four of the six are in the Milken top 10 (Columbia #2, Stanford #5, Penn #6, MIT #8). Arizona State (Milken #21) was added because of notable interest by media and local opinion leaders. Johns Hopkins (Milken #33) was added because it has the highest research expenditures of AUTM survey respondents for FY13-FY17, other than MIT, which is already in the Milken Top 10. Universities that report as a conglomerate “system” have not been included in any analyses.
Peers vs. Icons-FY13-FY17 Average Annual Research Expenditures

- Peers
- Icons

<table>
<thead>
<tr>
<th>University of Delaware</th>
<th>University of Connecticut</th>
<th>University of Kansas</th>
<th>University of Kentucky</th>
<th>Indiana University</th>
<th>Michigan State University</th>
<th>Purdue University</th>
<th>Arizona State University</th>
<th>Columbia University</th>
<th>University of Pennsylvania</th>
<th>Stanford University</th>
<th>Johns Hopkins University</th>
<th>Massachusetts Institute of Technology</th>
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<tr>
<td>$200,000,000</td>
<td>$400,000,000</td>
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<td>$1,500,000,000</td>
<td>$2,500,000,000</td>
<td>$3,000,000,000</td>
</tr>
</tbody>
</table>

Average vs. Median
Purdue is not included as it does not report their patent expenditures.
Peers vs. Icons-FY13-FY17 Average Departure from the
"One Invention Disclosure/$2.5M in Research Expenditures Rule"
Peers vs. Icons-FY13-FY17 Average Annual Patents Issued per $100M in Research Expenditures

Peers

Icons

Michigan State University
University of Delaware
Indiana University
University of Georgia
University of Kansas
University of Kentucky
Purdue University
Johns Hopkins University
University of Pennsylvania
Arizona State University
Columbia University
Massachusetts Institute of Technology
Stanford University

Average
Median
Peers vs. Icons-FY13-FY17 Average Patent Expenditures as a Percentage of Average Research Expenditures

Peers

Icons

University of Delaware
University of Kansas
Michigan State University
University of Connecticut
University of Kentucky
Indiana University
University of Georgia
Johns Hopkins University
Arizona State University
University of Pennsylvania
Stanford University
Massachusetts Institute of Technology
Columbia University

Average
Median
Peers vs. Icons-FY13-FY17 Average Annual Licenses/Options Executed per $100M in Research Expenditures

University of Kentucky
University of Delaware
Indiana University
University of Connecticut
University of Kansas
Purdue University
University of Georgia
Massachusetts Institute of Technology
Johns Hopkins University
Stanford University
Columbia University
University of Pennsylvania
Arizona State University
Peers vs. Icons-FY13-FY17 Average Annual License Revenues Received per $100M in Research Expenditures
Peers vs. Icons-FY13-FY17 Average Annual Startups Formed per $100M in Research Expenditures

- **Peers**
- **Icons**

---

<table>
<thead>
<tr>
<th>University Name</th>
<th>Peers Average</th>
<th>Peers Median</th>
<th>Icons Average</th>
<th>Icons Median</th>
</tr>
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<tr>
<td>Purdue University</td>
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<td>Johns Hopkins University</td>
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<tr>
<td>Stanford University</td>
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<td>Columbia University</td>
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<td>2.0</td>
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<tr>
<td>Arizona State University</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Total New Startups in 2017 and 2018 (after formation of Venture Development function in UConn) includes all UConn startups served, including those that fall within and outside definition of AUTM.
Chart does not include faculty consulting companies, or student companies that were created as part of a class activity or business competition.

Total 6-year sum of UConn startups between 2012-2016: 15
Total 2-year sum of UCONN startup for 2017-2018: 22

Academic Distribution of UConn Startups

UCHC: Schools of Medicine and Dentistry
CLAS: College of Liberal Arts and Sciences
ENG: School of Engineering
CAHNR: College of Agriculture, Health and Natural Resources
Sector Distribution

- Human Health: 65%
- SW/HW/AI/BigData: 11%
- ENG/MatSci: 13%
- Animal Health: 5%
- AgBio: 3%
- EdTech: 3%

ENG/MatSci: Engineering and Material Sciences
SW/HW/AI/BigData: Software, Hardware, Artificial Intelligence, Big Data
AgBio: Agriculture, Nutrition and Plant Sciences
EdTech: Educational Technology
Appendix B: Venture Development FTE Comparison

Our comparison includes universities that were selected as examples of leaders and peers with a focus on the startup development. Also, since such data is not reported to AUTM or published, we relied on the universities willing to share their internal information with us. In certain cases we had to contact different divisions of a university and cross-validate the data for accuracy. It must be noted that not all universities were willing to share such info.

Based on one senior/mid-level FTE, how many new ventures are created per year in your university?

Notes:
- Only senior/mid-level FTEs counted (Dir, Assoc Dir, and Manager).
- FTE count does not include EIRs, admin support and students.
- Ventures created in a given year will become part of portfolio companies to be managed until their exit.

Source: AUTM, Milken, and direct input from Venture/Tech Transfer leaders within the universities.

### Comp Group: Top Universities and Peers, Data from AUTM, Milken, Direct Input from Senior Leaders of each University

<table>
<thead>
<tr>
<th>University</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
<th>2012-16 average NewCo</th>
<th># of Senior Staff in Venture Dev</th>
<th>Milken Rank</th>
<th>University</th>
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<tr>
<td>U of Utah</td>
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<td>16</td>
<td>16</td>
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<td>14</td>
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<td>U2</td>
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<td>17.8</td>
<td>3</td>
<td>12</td>
<td>U4</td>
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<tr>
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<td>14</td>
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<td>11</td>
<td>13</td>
<td>4</td>
<td>13</td>
<td>U5</td>
</tr>
<tr>
<td>U Minnesota</td>
<td>17</td>
<td>16</td>
<td>15</td>
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<td>3</td>
<td>23</td>
<td>U9</td>
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<tr>
<td>Univ. of Pittsburgh</td>
<td>13</td>
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<td>6</td>
<td>9</td>
<td>9</td>
<td>9.6</td>
<td>3</td>
<td>24</td>
<td>U10</td>
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<table>
<thead>
<tr>
<th></th>
<th>Average</th>
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<td>UConn 2012-16</td>
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<tr>
<td>UConn2017-18*</td>
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<td></td>
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</tbody>
</table>

FTE Needed to match top cohort 3.1
FTE Gap to maintain this level 2.5

Senior staff count excludes EIRs, admin support, students.

UConn 2017-18 Average: 11 Startups (AUTM and non-AUTM)
Appendix C: Venture Development Vetting Process

Startup: Key Ingredients and Process

- The vetting process is led by Venture Development and includes UConn Tech Transfer, Entrepreneurs in Residence (EIRs), and external technical/business/investment advisors.
- The venture team is committed to a fast turnaround, with clear action items, including next steps.
- Each researcher/innovation will receive support consistent with where they fit.

Key elements to be assessed:

- Is there an Innovation?
- Evidence and Data
- Scope and time of work / research to date with significant milestones achieved noted
- Status of IP & FTO
- Market analysis including competitive assessment
- Top level business plan
- Team
  - Scientific Team: Credentials and level of commitment to startup
  - Business Team: Credentials and level of commitment to startup
  - Gaps
- Funding needs and sources
- Facility / Operational Needs
- Any key Concerns / Issues raised by potential Venture Founder
Appendix D: Technology Incubation Program (TIP) Company Data

The following charts are indicators of the performance of TIP companies and the demand for incubator space and services at UConn.

TIP Funding/Revenue Metrics

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<th>Equity &amp; Debt</th>
<th>Revenues</th>
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</tr>
<tr>
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<tr>
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<tr>
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<td>$7.00</td>
</tr>
<tr>
<td>2008</td>
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<td>$7.00</td>
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<td>2009</td>
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<tr>
<td>2010</td>
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</tr>
<tr>
<td>2011</td>
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<td>$5.00</td>
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<td>2012</td>
<td>$4.00</td>
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<td>$3.00</td>
</tr>
<tr>
<td>2013</td>
<td>$4.50</td>
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<td>$1.00</td>
</tr>
<tr>
<td>2014</td>
<td>$3.00</td>
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<td>2015</td>
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<td></td>
</tr>
<tr>
<td>2018</td>
<td>$8.00</td>
<td>$100.00</td>
<td></td>
</tr>
</tbody>
</table>
Number of TIP Companies

7     12    12    13    16    16    20    21    22    23    24    26    32    35    39

7     12    12    13    16    16    20    21    22    23    24    26    32    35    39
Appendix E: Best Practice Review

Policy and Best Practice Review

UConn’s current Intellectual Property and Commercialization Policy [https://policy.uconn.edu/2015/10/08/intellectual-property-and-commercialization-policy/] was adopted in 2015 and was designed to ensure compliance with State and Federal laws. The policy does not address specific business practices utilized to commercialize IP or other policies impacting innovators. For this reason, we reviewed IP and commercialization policies as well as related policies and best business practices at UConn and leading institutions in order to meet the objectives of PA 19-154.

As mentioned above, UConn also completed comprehensive benchmarking, interviewed staff from leading universities, and held a multi-day external panel review to inform this plan. A summary of the findings from these activities follows along with key learnings from an associated Literature Review.

Interviews

The following indicates UConn’s status related to best practices employed at top universities for technology commercialization. The listed policies and practices are those that were noted as critical in interviews with the top 20 universities ranked in the April 2017 report by the Milken Institute, Concept to Commercialization-The Best Universities for Technology Transfer.

<table>
<thead>
<tr>
<th>Policy/Practice</th>
<th>UConn Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy and Sustained Top-Down Support: A clear university-wide mission with explicit support from the President down to academic/research/unit leaders.</td>
<td>All innovation and entrepreneurship activities report to the President who provides leadership, direction and implements his vision through the Vice President for Research, Innovation and Entrepreneurship, who is responsible for faculty tech transfer and venture development, and the Provost, who is responsible for academic programing for entrepreneurship. Our new strategic plan for innovation and entrepreneurship supports a top down approach that encourages all University leaders to be engaged and supportive.</td>
</tr>
<tr>
<td>Culture: It is woven into the fabric of the university’s mission, along with teaching, research, and service.</td>
<td>UConn has established a culture that emerged steadily over several years and continues to grow as new programs and resources are added to our ecosystem that support and encourage faculty and student entrepreneurship.</td>
</tr>
<tr>
<td>Research Focus: High quality research and differentiation are needed to feed the venture/commercialization pipeline.</td>
<td>Based on research spending, UConn performs well for most tech transfer metrics and will improve as research grows. Has not reached levels anticipated due to reduced budget and faculty hiring limitations.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Long-term commitment and resources are necessary to create a diverse portfolio with staggered timeline for return on investment (ROI).</td>
<td>The limited and incremental nature of early stage resources available at UConn and in Connecticut do not enable sustained progress for company/technology development. Proof-of-concept and seed investment money is needed for this purpose.</td>
</tr>
<tr>
<td>Efforts led by leaders and teams with experience in academia, research, venture development, and investment.</td>
<td>While our National Science Foundation Innovation Corps (NSF I-Corps) site supports this capability, UConn would benefit from greater participation from serial entrepreneurs and a more diverse mentor pool.</td>
</tr>
<tr>
<td>Recruitment and support of young faculty with entrepreneurial mindset is critical.</td>
<td>A new Promotion, Tenure, and Reappointment (PTR) policy enacted in 2018 allows for recognition of commercialization efforts to support faculty engaged in entrepreneurship. Additionally, hiring faculty with this mindset is a core tenet of the faculty hiring plan UConn has developed in response to PA 19-154.</td>
</tr>
<tr>
<td>Active engagement with investment, corporate, and business communities fuels success.</td>
<td>Underway via new venture development and external relations roles, but UConn’s geographic location presents challenges with VCs.</td>
</tr>
<tr>
<td>Availability of broad and rich investment capital and corporate presence is needed.</td>
<td>This is a recognized need state-wide.</td>
</tr>
<tr>
<td>Proof-of-concept, seed, and side-car funds serve to fill the gap between academic innovation and expectation of institutional investors.</td>
<td>More proof-of-concept money beyond current SPARK, PATH, and START funding is needed and will fuel a robust pipeline for seed and side-car funds.</td>
</tr>
<tr>
<td>Internally and externally active technology transfer teams are essential.</td>
<td>More external focus is needed and is currently being pursued.</td>
</tr>
<tr>
<td>Where a strong innovation ecosystem does not exist, the university must fill the gap.</td>
<td>UConn has successfully created its own innovation ecosystem and is active in the state’s ecosystem as well, but both remain lacking in terms of players with investment capital and entrepreneurial experience.</td>
</tr>
<tr>
<td>Within the ecosystem, there are various sources of internal funding for establishing companies and seed funding.</td>
<td>SPARK and our NSF I-Corps site support faculty startups and while other programs exist for student ventures, more are needed for both types of entrepreneurship.</td>
</tr>
<tr>
<td>It is critically important to nurture faculty relationships and contacts.</td>
<td>This is the historical focus of our tech transfer group yet our staff resources have been inconsistent in key areas.</td>
</tr>
<tr>
<td>Link tech transfer and venture development under common reporting.</td>
<td>Both report to the Vice President for Research, Innovation and Entrepreneurship right now and a new Associated Vice President for Innovation and Entrepreneurship is being recruited to further integrate the two units.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Exercise flexibility in license and sponsored research terms.</td>
<td>The goal of UConn Technology Transfer has always been and continues to be the culmination of license and sponsored research negotiations in an agreement that has maximal benefit for all stakeholders: the company, the University, and the faculty member.</td>
</tr>
<tr>
<td>Software and apps are a growing market for quick, small hits.</td>
<td>The recent hiring of a Licensing Director to focus on Electrical Engineering and Computer Sciences will increase the ability to explore this area more thoroughly.</td>
</tr>
<tr>
<td>Market aggressively but in highly specific market sectors.</td>
<td>While marketing efforts have always been focused on relevant market sectors, they have not been aggressively pursued. Proposed changes in workload and/or personnel are intended to increase and strengthen future marketing campaigns.</td>
</tr>
<tr>
<td>Royalty sharing policies at leading institutions include variations that benefit inventors. At Brigham Young University, which has exceptionally high tech transfer revenue relative to its research expenditure base, the royalty sharing policy was very favorable for faculty with revenues received by licensing split at 45% for the inventor(s) as personal income and the university at 55% for research support.</td>
<td>UConn has a royalty sharing policy that provides one third of net revenue to inventors as personal compensation which we have found to be competitive. An increase may be a strong, motivating factor for faculty researchers, but would come at a loss to the University.</td>
</tr>
<tr>
<td>Incentivize faculty through Promotion, Tenure and Reappointment rules.</td>
<td>New PTR policies enacted in 2018 recognize commercialization efforts to support faculty engagement in entrepreneurship.</td>
</tr>
<tr>
<td>Clear mission, objectives, and goals are important for performance.</td>
<td>The mission statement of UConn Technology Transfer and Venture Development has the overarching goal of bringing innovative technologies to the marketplace for the benefit of society. A set of common metrics is used by UConn and the majority of technology transfer offices to measure performance in achieving this overarching goal; these metrics are self-reported.</td>
</tr>
</tbody>
</table>
in the annual AUTM licensing survey from which many of the data in this report were obtained.

<table>
<thead>
<tr>
<th>A robust cadre of student fellows and interns add value to technology transfer and provide an educational experience to business and science/engineering students.</th>
<th>Student volunteers have been utilized only very rarely in the past. A concerted effort to build a strong internship program moving forward is a top priority.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set appropriate expectations for faculty and administrators regarding what success will look like.</td>
<td>The vast majority of technology transfer offices (84-87%; Brookings Institution) do not bring in enough licensing revenue to cover their operating expenses. How to effectively convey the message that the ROI on technology transfer is more than just dollars is a common topic of discussion amongst technology transfer offices, particularly in lean financial times. In spite of the daunting figures, technology transfer is clearly still viewed as a valuable endeavor by many research institutions.</td>
</tr>
<tr>
<td>Ensure that policies and processes within the University are designed to simplify and remove barriers to encourage the faculty members and expedite processes.</td>
<td>Clear conflict of interest policies were noted to be most critical. UConn has several resources that help guide faculty through the conflict of interest disclosure and management processes. Committees, such as the Financial Conflicts of Interest in Research Committee, include broad representation from across the institution to provide informed guidance.</td>
</tr>
<tr>
<td>Use of no-cost or low-cost, fast-track, online licensing portals are especially useful for apps and software.</td>
<td>Being explored at UConn.</td>
</tr>
<tr>
<td>Leverage successful student ventures for the recognition they bring to an institution despite the fact that they do not generate revenue for the University.</td>
<td>Underway at UConn through stories, videos, social media – led by University Communications, the School of Business, and the Peter J. Werth Institute for Entrepreneurship &amp; Innovation.</td>
</tr>
</tbody>
</table>

**External Panel Review**

In addition to phone interviews, we invited technology transfer and venture development leaders to join us at UConn. The experts were asked to share their advice on what steps the University could take to accelerate technology commercialization after having reviewed data on UConn’s historic performance. Leaders from the following organizations participated in this review:

- MIT
- University of Utah
- Arizona State University
Emory University
Innovation Works (serves University of Pittsburgh and Carnegie Mellon University)
BioGenerator (serves Washington University)
Elm Street Ventures (serves Yale University)

All of the selected panelists also shared prior relevant experience from their time working in industry as entrepreneurs or investors, and at other leading institutions including UCLA, University of Illinois Urbana Champaign, University of Pennsylvania, Pennsylvania State University, and the Georgia Research Alliance. These external experts provided the following feedback which informed the University’s Action Plan detailed in this report.

Requirements for Sustained Long Term Success

A five-year strategic plan supported by University leadership aimed at increasing impact with both quantitative and qualitative metrics:

- Consolidation of tech transfer and venture development
- Focus on startups as a means to generate tech transfer revenue
- Development of a “portfolio approach” to manage caseload and prioritize resources for the highest return
- Assess and align FTEs with top institutions and strategic goals

Establish a translational research fund modeled on similar funds at other universities

- Proof-of-Concept funding is needed to spur outside investment
- Utilize business rather than academic milestones and investors as evaluators/advisors

Consider the density of high quality research in commercialization strategies

- Recruit faculty with research that will contribute to tech transfer (integrated into UConn’s Faculty Hiring Plan)
- Recognize that Connecticut’s out-migration affects faculty recruitment and retention and thus tech transfer
- Endowment growth is an opportunity to be explored to improve/increase research as well as tech transfer

Immediate Opportunities

Revise various Tech Transfer practices, including but not limited to the following:

- All inventions should be evaluated for startup potential
- Solicit detailed input from external parties on all inventions disclosed
Require all faculty to meet business standards prior to receiving a startup license and support services

Apply best practices for licensee compliance of startups and conventional licensees

Build industry relationships

Revisit Venture Development’s role:

Determine criteria for resource allocation, such as startup potential to generate equity/revenue, jobs, and economic impact

In regard to capital/investment, make clear that the role of Venture Development is as a catalyst/advisor while confirming that it is the responsibility of the companies to raise funds

More direct service, less ecosystem development

Increase communication on tech transfer and venture development both on campus and externally.

In addition to hearing from leading institutions and programs, we reviewed many recent studies and reports on technology commercialization. AUTM data suggests that over 20 years, university licenses have contributed between $320 Billion and $1.33 Trillion to industry gross output. However, a number of studies suggest alternative views on the value of tech commercialization, how to measure that value, and the appropriate university approach. For example it is important to consider the societal impacts and outcomes of university research. While societal impacts may occur through commercialization of innovative products such as new diagnostics or therapies, not all beneficial outcomes are commercial opportunities. At UConn university researchers that evaluate female soldier stress, study food security, help shape smart cities and investigate health disparities are providing great value to society. Further, it is important to underscore the need for continued support from the federal government for basic research in order to achieve both societal and commercial outcomes. Basic research provides the foundation for discovery.

Participating Institutions

Tech transfer and venture development leaders from the following institutions participated in an in person one-day review:

- MIT
- University of Utah
- Arizona State University
- Emory University
- Innovation Works (serves University of Pittsburg and Carnegie Mellon University)
- BioGenerator (serves Washington University)
- Elm Street Ventures (serves Yale University)

Each of the selected panelists also shared prior relevant experience from work in industry, as entrepreneurs, investors and at other leading institutions including UCLA, University Illinois Urbana
Champaign, University of Pennsylvania, Pennsylvania State University and the Georgia Research Alliance.

Phone interviews utilizing a standard group of questions occurred with the following institutions from the Top 25 Milken University Technology Transfer and Commercialization Index:

- Columbia University
- University of Florida
- Brigham Young University
- Massachusetts Institute of Technology
- Cornell University
- Arizona State
- University of California San Diego
- University of Minnesota
- University of Illinois Chicago
- University of Texas System
- New York University
- University of Utah
- University of California Los Angeles
- University of Washington

Less formal but valuable discussions also occurred with:

- University of Georgia
- Northwestern University
- Purdue University
- Yale University
- Carnegie Mellon University
- California Institute of Technology
- University of Pennsylvania
Appendix F: Literature Review

A 2014 study in the Yale Journal of Law and Technology\textsuperscript{16} questions the value of patenting in the high tech sector. Based on a survey of faculty in high tech disciplines (Computer Science and Engineering, Electrical and Computer Engineering) at 20 universities that are known leaders in these fields, the study said:

- Patenting on university campuses may not be profitable and that such effort earns a negative rate of return with a loss of more than 3\% on funds invested in high tech.
- Patent rights and commercialization does not appear to motivate researchers in high tech fields to produce more or better research.
- Universities continue to patent despite limited results, in hopes of winning the “lottery,” which has been the case in only rare, highly publicized patent licensing successes. This bases global policy on outliers rather than the norm.
- Aggregate licensing revenue is often dependent on small numbers of licenses that are those outliers – more than 70\% of the reported royalty total for those institutions reviewed in this study were generated by less than 3\% of the licensors – the top 9 licenses provided 85\% of revenue.
- Costs and benefits of patents vary greatly across industry with high tech and biotech industries at opposite ends of the spectrum.

In 2107, the Association of Public Land Grant Universities\textsuperscript{17} examined how university technology transfer is evolving. Their findings indicate that universities are moving beyond a revenue-driven, transactional technology transfer approach. Their role now includes integrating the efforts of technology management offices into the broader engagement activities of institutions, becoming active in regional and national innovation ecosystems, preparing students for today’s disruption economy, and driving economic and social prosperity. In a paper supported by the National Academy of Inventors, Technology Transfer for all the Right Reasons\textsuperscript{18}, James K. Woodall and Tobin L. Smith recommend:

- Visible policies that restrict working with entities not intending to commercialize
- Innovative, effective approaches to IP management to speed up processes and ensure technology is made available to develop quickly at a reasonable cost


\textsuperscript{17} http://www.aplu.org/library/technology-transfer-evolution-driving-economic-prosperity/file


\textsuperscript{18} https://www.aau.edu/sites/default/files/AAU%20Files/Key%20Issues/Intellectual%20Property/Technology%20Transfer%20For%20All%20The%20Right%20Reasons.pdf
• Reaffirm university commitment to the public interest (including economic development)
• Anticipate and help manage technology transfer related conflicts of interest
• Ensure broad access to research tools for inventors
• Enforcement should be carefully considered
• Develop appropriate measures of success for intellectual property management and technology transfer with clear procedures and a set of non-revenue indicators as part of IP management policies and practices to ensure public benefit

In a June 2016 presentation, Best Practices in Commercialization and Technology Transfer\textsuperscript{19}, Stephen Ezell, VP Global Innovation Policy at the Information Technology and Innovation Foundation suggested the following for university technology transfer success:

• Develop platforms/communities that provide services, facilities, and networks necessary for innovators and entrepreneurs to de-risk and commercialize new technology
• Create mentorship programs for Principal Investigators that teach grantees to identify valuable product opportunities that can emerge from academic research
• Incentives and messaging from leadership are vital to influencing cultures
• The focus should be on societal impact and outcomes; not about licensing income

In an article in the Licensing Journal,\textsuperscript{20} “Commercializing the Full Value of Academic Technology Transfer: Some Lessons Learned,” John Fraser:

• Questions if licensing income is the best metric because it overlooks key concerns in academic settings where the core mission is teaching, research, and community
• Suggests that technology transfer should be measured more broadly to include increased financial support for research, products services introduced, number of companies and jobs created, induced investment in product development and impact of facilities, tech parks and incubators in the areas around the academic center
• Notes that the age of a technology transfer program matters; if less than five years old it should count traditional metrics, older than five but less than ten years should have less emphasis on this and more on outputs such as research contracts; over ten years outcomes such as number of products should be measured.
• Suggests that financial outcomes are only one aspect of return on investment—enhanced university reputation, student enrichment, national and international reputation, etc. should also be considered
• States that clearly written policies accelerate activity
• Notes that technology transfer offices act as conduits between university research, the proof-of-concept stage, and company product development

\textsuperscript{19}http://www2.itif.org/2016-turkey-tech-transfer.pdf?_ga=2.63110379.511347801.1538767940-1685814642.1538767940

\textsuperscript{20}https://www.research.fsu.edu/.../communicating-the-full-value-of-technology-transfer.
• Asserts that timing is a major factor in technology transfer—the time from disclosure to licenses is typically over three years; 12 years from patent to developed drug with approval from FDA, for example.
• Concludes that it is almost impossible for universities to replace declining state and federal funding through technology transfer operations

The Milken Institute’s Concept to Commercialization-The Best Universities for Technology Transfer study makes recommendations for a national agenda including:

• Maintain basic scientific research funding. Basic research provides long-term economic benefits by allowing universities to take on research that has a low probability of quick commercial success, but the potential to deliver a value in other ways and to create whole new industries.
• Incentivize technology transfer through a new federal commercialization fund. The federal government should increase research funding under a special commercialization pool. Universities demonstrating greater commercialization success in the market should receive higher funding in this program.
• Increase technology transfer capacity through federal matching grants. The federal government should establish a matching grant program with states to fund an increase in staff and resources in technology transfer offices (TTOs). Higher rates of academic entrepreneurship are essential to revive declining startup rates and productivity across the economy. New firms have higher productivity as they are at the cutting edge of technology.
• Increase technology transfer efficiency by adopting best practices. At the state level, policies should be implemented that incentivize the adoption of best practices in commercialization at public universities, including TTOs. Efficiency gaps between universities outside of the top 25 in the Technology Transfer and Commercialization Index should be narrowed.
Appendix G: Tenure Language at Universities

Supporting Information

Sanberg et al. 10.1073/pnas.1404094111

Table S1. Language used to incorporate entrepreneurial activities in tenure and promotion documents at universities

<table>
<thead>
<tr>
<th>Institution</th>
<th>Date Founded</th>
<th>Public/Private</th>
<th>Tenure and promotion language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auburn University</td>
<td>1855</td>
<td>Public</td>
<td>&quot;Evaluation of research. Other indicators of research productivity which can supplement one's record include external grants and the creation of intellectual property, copyrights, and patents&quot; (1).</td>
</tr>
<tr>
<td>Carnegie Institute of Technology at Carnegie Mellon</td>
<td>1900</td>
<td>Private</td>
<td>&quot;Research: Measures of excellence in this area include the quality, volume, and impact of publications, including papers, monographs, books, and research reports; evaluation of research by others; patents; prizes and awards for research; solicited and invited lectures; the amount of financial support; and the contribution of the candidate's work towards the needs of society&quot; (2).</td>
</tr>
<tr>
<td>Clemson University</td>
<td>1889</td>
<td>Public</td>
<td>&quot;2.3 Scholarship (refereed scholarly work is weighed much more heavily, as indicated by the following possible supporting evidence: 2.5.) Patents awarded&quot; (3).</td>
</tr>
<tr>
<td>East Carolina University</td>
<td>1907</td>
<td>Public</td>
<td>&quot;Research/Creative Activity: Patents&quot; (4).</td>
</tr>
<tr>
<td>Florida Atlantic University</td>
<td>1961</td>
<td>Public</td>
<td>&quot;Evidence of achievement in the appropriate discipline(s), where appropriate, patents and research grants&quot; (5).</td>
</tr>
<tr>
<td>Florida Institute of Technology</td>
<td>1958</td>
<td>Private</td>
<td>&quot;Research/Scholarly Activities, list and describe briefly any disclosures of inventions or resulting patents&quot; (6).</td>
</tr>
<tr>
<td>Florida International University</td>
<td>1965</td>
<td>Public</td>
<td>&quot;Research/Scholarly/Creative Work. Patent Disclosures/Applications/Awards: Patent disclosures, applications, and provisional and final patent awards should be listed. If there are co-investigators on the disclosure, application or award, these should be indicated&quot; (7).</td>
</tr>
<tr>
<td>Kent State University</td>
<td>1910</td>
<td>Public</td>
<td>&quot;Evidence of the scholarship of discovery, integration, application and teaching, as well as university citizenship. In addition, candidates are expected to provide documented evidence which may include, evidence of outstanding achievement, such as awards, patents, and copyrights&quot; (8).</td>
</tr>
<tr>
<td>Lehigh University</td>
<td>1865</td>
<td>Private</td>
<td>&quot;Publications and Creative Activities: Creative Activities: Original designs, plan, inventions, and patents&quot; (9).</td>
</tr>
<tr>
<td>Lincoln University</td>
<td>1866</td>
<td>Public</td>
<td>&quot;Scholarly Research/ Creative Activity and Professional Achievement: Documentation of externally funded grants and inventions and patents...&quot; (10).</td>
</tr>
<tr>
<td>New Jersey Institute of Technology</td>
<td>1855</td>
<td>Public</td>
<td>&quot;A complete curriculum vitae documenting publications and patent applications since appointment or last promotion. Applications for, and granting of patents and copyrights are recognized as a measure of importance and/or peer evaluation of the work in the field&quot; (11).</td>
</tr>
<tr>
<td>North Dakota State University</td>
<td>1890</td>
<td>Public</td>
<td>&quot;The development and public release of new products or varieties, research techniques, copyrights, and patents or other intellectual property...&quot; (12).</td>
</tr>
<tr>
<td>Northeastern University</td>
<td>1854</td>
<td>Private</td>
<td>&quot;...the receipt of patents represents professional recognition of research activities, in some fields technical, procedural, or practical innovations made clinically or professionally are evidence of productive scholarship&quot; (13).</td>
</tr>
<tr>
<td>The Ohio State University</td>
<td>1870</td>
<td>Public</td>
<td>&quot;2. List of creative works pertinent to the candidate's professional focus. Inventions and patents, including disclosures, options, and commercial license...&quot; (14).</td>
</tr>
<tr>
<td>Oregon State University</td>
<td>1868</td>
<td>Public</td>
<td>&quot;Authorship of a patent in the faculty member's field is considered as evidence of creative scholarship&quot; (15).</td>
</tr>
<tr>
<td>The Pennsylvania State University</td>
<td>1855</td>
<td>Public</td>
<td>&quot;Other evidence of research or creative accomplishments as appropriate (patents, new product development, new art forms, citation index analysis, etc.)&quot; (16).</td>
</tr>
<tr>
<td>Purdue University (Consumer Sciences and Retailing)</td>
<td>1869</td>
<td>Public</td>
<td>&quot;Benchmarking Excellence: Patents and license agreements resulting from research done while at Purdue&quot; (17).</td>
</tr>
<tr>
<td>South Dakota State University</td>
<td>1881</td>
<td>Public</td>
<td>&quot;Examples (non-exhaustive) of publications or activities of research, scholarship, and creative activity...patents&quot; (18).</td>
</tr>
<tr>
<td>Stevens Institute of Technology</td>
<td>1870</td>
<td>Private</td>
<td>&quot;Scholarly activities...patents&quot; (19).</td>
</tr>
<tr>
<td>Institution</td>
<td>Date founded</td>
<td>Public/private</td>
<td>Tenure and promotion language</td>
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</tr>
<tr>
<td>Texas A&amp;M University</td>
<td>1876</td>
<td>Public</td>
<td>&quot;Patents or commercialization of research, where applicable&quot; (20). Patents are listed under &quot;Other Research, Scholarship, or Creativity Accomplishments,&quot; in the faculty summary table (21). &quot;Evidence of research and creative activity includes print or electronic publications, non-print presentations, funded grant applications and reports, patents and other intellectual property, curatorialships, and artistic productions and performances. Textbooks and innovative instructional materials having significant value beyond this campus may be considered contributions to research and creative activity&quot; (22). Although scholarly work takes many forms, including design, basic and applied research, and other creative activities, a faculty member's effectiveness can be demonstrated by such achievements as...</td>
</tr>
<tr>
<td>Texas Tech University</td>
<td>1923</td>
<td>Public</td>
<td>&quot;Although scholarly work takes many forms, including design, basic and applied research, and other creative activities, a faculty member's effectiveness can be demonstrated by such achievements as... patents, and the like. The quality of the individual's scholarly approach, capacity for independent thought, originality, and productivity of scholarship must be addressed&quot; (23).</td>
</tr>
<tr>
<td>The University of Alabama at Birmingham</td>
<td>1959</td>
<td>Public</td>
<td>&quot;The University of Alabama at Birmingham has established policies and procedures to ensure that all scholarly works are properly acknowledged and promoted. The promotion and tenure review process, as outlined in the University's Faculty Handbook, is designed to address the specific criteria and standards established for promotion and tenure. The promotion and tenure process for the College of Business includes a review of the candidate's scholarly work, teaching, and service...&quot;</td>
</tr>
<tr>
<td>University of Arkansas at Little Rock</td>
<td>1027</td>
<td>Public</td>
<td>&quot;The promotion and tenure process at the University of Arkansas at Little Rock is designed to ensure that all scholarly works are properly acknowledged and promoted. The promotion and tenure review process, as outlined in the University's Faculty Handbook, is designed to address the specific criteria and standards established for promotion and tenure. The promotion and tenure process includes a review of the candidate's scholarly work, teaching, and service...&quot;</td>
</tr>
<tr>
<td>University of Arizona</td>
<td>1005</td>
<td>Public</td>
<td>&quot;Promotion and tenure reviews, as detailed in the criteria of individual departments and colleges, will recognize original research contributions as well as investigative and applied forms of scholarship that involve cross-cutting collaborations with business and community partners, including translational research, commercialization activities, and patents.&quot; (23).</td>
</tr>
<tr>
<td>University of Colorado Denver</td>
<td>1912</td>
<td>Public</td>
<td>&quot;Research and/or Other Scholarly Activities...&quot;: Patent or patent applications (20). &quot;Publications and Creative Works&quot;: &quot;H. Patents.&quot; (28).</td>
</tr>
<tr>
<td>University of Houston</td>
<td>1927</td>
<td>Public</td>
<td>&quot;Generation of intellectual property: List any patents issued or pending including patent number, date of filing, and status (provisional, non-provisional, issued)&quot; (27). &quot;Publications and Creative Works&quot;: &quot;H. Patents.&quot; (28).</td>
</tr>
<tr>
<td>University of Illinois at Urbana–Champaign</td>
<td>1857</td>
<td>Public</td>
<td>&quot;Original Designs, Plans, Inventions, Software and/or Patents&quot; (29). &quot;Full recognition, both in evaluating tenure and promotion cases, will be given for a broad range of entrepreneurial, outreach and creative activities in which faculty engage. These activities may enhance any of the criteria on which faculty are measured - teaching, research and service... Examples are...&quot;</td>
</tr>
<tr>
<td>University of Maryland System</td>
<td>1858</td>
<td>Public</td>
<td>&quot;Full recognition, both in evaluating tenure and promotion cases, will be given for a broad range of entrepreneurial, outreach and creative activities in which faculty engage. These activities may enhance any of the criteria on which faculty are measured - teaching, research and service... Examples are...&quot;</td>
</tr>
<tr>
<td>University of Michigan School of Music</td>
<td>1817</td>
<td>Public</td>
<td>&quot;Full recognition, both in evaluating tenure and promotion cases, will be given for a broad range of entrepreneurial, outreach and creative activities in which faculty engage. These activities may enhance any of the criteria on which faculty are measured - teaching, research and service... Examples are...&quot;</td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>1851</td>
<td>Public</td>
<td>&quot;Include significant publications and, as appropriate, the development and dissemination by other means of new knowledge...&quot;</td>
</tr>
<tr>
<td>University of Nebraska at Omaha (Medical Center)</td>
<td>1850</td>
<td>Public</td>
<td>&quot;Evidence of Scholarly Activity&quot;...&quot;A complete listing of patents, pending patents, and any licensed products is also required in this evaluation...&quot; Scholarly activity should be accepted in its broadest sense, and should not be viewed solely as basic or clinical research as acknowledged traditionally... recognize as scholarly activity the development of innovative teaching methods, the synthesis of new concepts based on data already published by the candidates or others, technology transfer successes, software design, website design, or other activities related to information sciences, etc.&quot; (22)</td>
</tr>
<tr>
<td>University of North Carolina – Greensboro</td>
<td>1891</td>
<td>Public</td>
<td>&quot;Research and creative activities may include, but are not limited to, the following:... Developing innovative solutions that address social, economic, or environmental challenges...&quot;</td>
</tr>
</tbody>
</table>
Table S1. Cont.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Date founded</th>
<th>Public/private</th>
<th>Tenure and promotion language</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Saskatchewan</td>
<td>1907</td>
<td>Public</td>
<td>&quot;Evaluation of research, scholarly and/or artistic work for tenure and promotion at all ranks will address the quality and significance of the work. Evidence will include the peer-reviewed publications and presentations referenced above, but may also include other works (e.g., artistic works, performances, research related patents, copyrighted software and academic visual materials)&quot; (34).</td>
</tr>
<tr>
<td>University of Southern California</td>
<td>1880</td>
<td>Private</td>
<td>&quot;While patents cannot replace peer-reviewed publications in a candidate's dossier, they are a sign of impact and productivity and will be considered accordingly&quot; (35).</td>
</tr>
<tr>
<td>University of South Florida</td>
<td>1956</td>
<td>Public</td>
<td>&quot;Other Creative Activities, Patents and Licensing, Entrepreneurial activities of significance&quot; (36).</td>
</tr>
<tr>
<td>University of Wisconsin Madison</td>
<td>1848</td>
<td>Public</td>
<td>&quot;Evidence of research performance and of a candidate's standing in a discipline includes... Patents or evidence of intellectual property. The case must be made as to the quality and level of contribution of the candidate's present work&quot; (37).</td>
</tr>
<tr>
<td>Utah State University</td>
<td>1886</td>
<td>Public</td>
<td>&quot;Research or creative endeavors encompass a wide variety of scholarly activities that lead to the advancement of knowledge and/or original contributions in the arts and humanities. Documentation supporting such activities must include peer recognition of their value and may include, but is not restricted to... Intellectual contributions represented by patents, inventions and other intellectual property&quot; (38).</td>
</tr>
<tr>
<td>Washington University at St Louis</td>
<td>1853</td>
<td>Private</td>
<td>&quot;Other kinds of recognition for research may include patents, production or product development contracts, and demonstration of influence through citations, papers, awards, graduate student support, and the ability of the research to attract further funding&quot; (40).</td>
</tr>
</tbody>
</table>

Appendix H: UConn Tenure Form Language

SECTION THREE: RESEARCH, SCHOLARSHIP, AND CREATIVE WORK

(Faculty member should complete Section Three parts A-I)

A. NARRATIVE ON RESEARCH, SCHOLARSHIP AND OTHER CREATIVE WORK (Including for example: art exhibits, musical compositions, or dramatic productions, etc.). Summarize your scholarly/creative goals for the next 5 to 10 years and the activities you have initiated to achieve them. (Narrative should not exceed 500 words.)

B. Published Books, Book Chapters, and Edited Volumes.

List your published work in the standard form used in your field for the categories listed below - note if these are published electronically with a URL if appropriate. (Do not include work in progress or submitted for publication.)

B1. Books or Monographs
Author(s), title, year of publication, publisher

B2. Refereed Book Chapters
Author(s), title, year of publication, publisher

B3. Edited Volumes
Author(s), title, year of publication, publisher

B4. Books or Monographs in Press
Author(s), title, year of publication, publisher

C. Refereed Publications and Submitted Articles.

List all refereed journal publications, then refereed conference proceedings, and then other refereed materials. Include those accepted or submitted and indicate their status. (Consult your department, school or college standards for what counts as “refereed.”)

C1. Published and Accepted Journal Articles
Author(s), article title, journal title, volume, year of publication, page numbers

C2. Conference Presentations with Proceedings (Refereed)
Author(s), title, venue, year, page numbers

C3. Other Refereed Material
Provide detailed description, including author(s), title, venue, year, and page(s) where appropriate.

C4. Submitted Journal Articles
Author(s), article title, journal title, date submitted
D. Other Publications and Creative Products.

List all other publications and creative products/activities that are not otherwise included in Sections Three. A – C. Indicate whether these are refereed or not. These products may include exhibitions, competitions, performances, professional practice/studio work, software, patents, designs, compositions, scholarly editions, posters, artifacts, datasets, catalogues, and other non-refereed publications.

E. Presentations.

List all conference presentations (identify if keynote or invited presentation); invited seminars, scholarly presentations, etc. (Do not list a presentation here if it is listed elsewhere.)

F. Grants and Contracts

List all grants and contracts as principal, co-principal investigator, and senior personnel. List PI and Co-PI for each grant. An example listing of what information should be included is given below:

Title of Project:
Agency/Company:
Total Dollar Amount:
Role: PI, Co-PI, or Senior Personnel
Collaborators: Jane Doe (PI), John Doe (Co-PI), etc.
Period of Contract: month/year – month/year
F1. As Principal Investigator
F2. As Co-Principal Investigator
F3. As Senior Personnel or Contributor
F4. Pending Proposals
F5. Proposals Submitted
F6. Proposals not funded

G. Other Scholarly and Creative Accomplishments

List all other scholarly and creative accomplishments such as invention disclosures, start-up companies, etc. that are not listed elsewhere.

H. Societal and Policy Impacts

Present a brief list of the broader impacts of your scholarship, and elaborate on them in your personal statement; include testimony before legislative committees or other public bodies, expert witness roles, and press and media coverage, if appropriate.

I. Other Professional Activities

List other professional activities, such as consulting, temporary employment, and visiting professorships.
1998

**Technology Transfer Office Established:** UConn Center for Science and Technology

Commercialization office created to more aggressively pursue technology commercialization. Focused on evaluation, patenting, marketing, and licensing.

2003

**UConn Research & Development Corporation (UConn R&D):** UConn R&D granted first right of refusal by UConn to license technology discovered in UConn labs. Its mission was to create new business startups based on UConn technologies. Operations were initially funded completely by UConn and UConn Health.

2004

**Department of Economic and Community Development (DECD) Prototype Fund:** $200 Thousand in funding ($50 Thousand per project – 1 year – with possibility of up to $75 Thousand).

**Technology Incubation Program (TIP):** TIP was established to accelerate the growth of technology-based startups with a strong connection to UConn.

2007

**Connecticut Center for Entrepreneurship & Innovation (CCEI):** CCEI was established to foster student and faculty participation in entrepreneurship and innovation and assist new and existing companies to enhance CT’s business climate.

**IP Law Clinic:** Under the direction of supervising attorneys, students conduct pro bono work with local businesses, including patentability and trademark clearance searches, patent and trademark applications, and interactions with the U.S. Patent and Trademark Office and the U.S. Copyright Office.

2008

**President’s Prototype Fund:** Up $75 Thousand per project in the first year ($150 Thousand total). Projects must involve UConn IP, and applicants must show how the project could attract additional investment capital to commercialize the technology.

2011
TIP Internship Program: Provides qualified UConn students with internships at TIP companies. When the program was launched, stipends for students were split between the employer and the intern’s school/college.

2012

Innovation & Entrepreneurship graduate course: Collaboration between the Schools of Business and Engineering. Teaches product design process combined with business principals required for any viable startup and enterprise in an experiential setting.

Innovation Quest: Encourages innovators to pursue their ideas and get funded for it. Winners meet with business mentors for guidance and support. Open to UConn undergraduate and graduate students. Prizes are $5 Thousand-$15 Thousand.

2013

SPARK (UConn Health): Supports innovative research and early studies that will likely translate into products with potential for commercial application. UConn Health funded 5 pilot grants up to $30 Thousand each in 2013.

3rd Bridge (Engineering): Funded by Connecticut Innovations, this program identifies promising technologies developed in UConn engineering labs and facilitates their path to commercialization. Ranges from $10 Thousand-$75 Thousand per student.

Connecticut Small Business Development Center (SBDC) Relaunch at UConn: The SBDC helps CT businesses start, grow, and thrive by providing free financial and technical assistance to businesses with 500 or fewer employees.

Healthcare Innovations (School of Nursing): Launched to empower and teach students to be innovators and change agents in the healthcare arena. The program integrates concepts of innovation, collaboration and entrepreneurship into select courses in the School of Nursing.

2014

Biomedical Entrepreneurship graduate course: The multi-disciplinary course in biomedical entrepreneurship is sponsored by CCEI. It is a collaboration between the Schools of Business, Engineering, Medicine and CLAS, and is offered to grad students and honors/advanced undergrads.

Entrepreneurship & Innovation Consortium: Collaboration between the Schools of Engineering and Business, Office of the Provost, and OVPR Entrepreneurship. Created to maximize UConn resources by inspiring and mentoring faculty and students and promoting their ventures within and beyond campus.

UConn R&D rebranded (UConn Ventures): UConn R&D becomes part of the OVPR, with operations funded by the OVPR. By 2015, UConn Ventures has no employees.
2015

**SPARK Technology Commercialization Fund (OVPR):** Supports innovative proof-of-concept studies involving UConn discoveries on the path to commercialization. Funding provided by OVPR and School of Medicine. Program administered by OVPR, including 2 step proposal review and quantitative scoring rubric for increased transparency/communication with applicants.

**Program in Innovative Therapeutics for Connecticut’s Health (PITCH):** Program funding is available to scientists from Yale or UConn with compelling projects that meet a new clinical demand or offer a significant improvement over an existing treatment. The program is sponsored by UConn, Yale, and Connecticut Innovations.

**Accelerate UConn:** UConn’s National Science Foundation Innovation Corps (NSF I-Corps) site. It helps to catalyze the transition of UConn discoveries from the lab to the marketplace with a 7-week NSF I-Corps course and $3 Thousand in seed funding. The program is open to all university faculty and students.

**Bioscience Pipeline:** Up to $30 Thousand per project funding, aimed at helping to commercialize biomedical technology innovations. Any early-stage company or faculty and student group associated with a CT university is eligible to apply. Program is sponsored by UConn, Yale, Quinnipiac and Connecticut Innovations and the Bioscience Innovation Fund.

2016

**UConn Innovation Fund:** UConn, Connecticut Innovations, and Webster Bank established the $1.5 Million fund to provide early-stage financial support to new business startups affiliated with UConn. Investments of up to $100 Thousand are available to UConn students, faculty or alumni with an in-state startup tied to research, advanced technologies, or innovations developed at UConn.

**CCEI Summer Fellowship:** Helps aspiring entrepreneurs move out of the conceptual stage of venture development into the marketplace. Ten student or faculty startups spend 8 weeks developing the skills needed to bring new products and technologies to market.

**Wolff New Venture Competition (extended to non-business students):** Features 10-minute presentations by the top 5 entrepreneurial teams from the CCEI Summer Fellowship program. The winner, selected by a panel of venture experts, wins $15 Thousand.

**New Venture Development Model at OVPR:** OVPR Technology Commercialization Services created an Executive Director of Venture Development position to focus on identifying technologies ripe for venture development, recruiting entrepreneurs and staff to lead these startups, and helping to raise early-stage and follow-on funding to grow the companies.

**Quiet Corner Innovation Cluster (QCIC):** This initiative is funded by the U.S. Economic Development Administration, UConn, and Connecticut Innovations. QCIC forms partnerships with select small and
medium-sized technology and manufacturing enterprises (SMEs) in rural Tolland, Windham, and New London Counties. SMEs collaborate with UConn faculty and Technology Commercialization Services to help enhance or expand their product and service offerings.

2017

**UConn Tech Park:** Innovation Partnership Building at UConn Tech Park opens its doors and is now UConn’s premier center for cutting edge research and industry collaboration and innovation. The facility houses 10 industrial research and development centers covering a diverse base, ranging from advanced manufacturing to biomedical devices to cybersecurity.

**Peter Werth $22.5 Million gift, Peter J Werth Institute for Innovation & Entrepreneurship:** The Institute brings together student and faculty programs that foster entrepreneurship and innovation. It facilitates opportunities for students and promotes UConn’s academic, co-curricular, and extracurricular programs. The Institute organizes entrepreneurship speaker forums and hosts an entrepreneur-in-residence to instruct students.

2018

**START Preliminary Proof-of-Concept Fund:** Early-stage translational research funding available to investigators at Central Connecticut State University, Southern Connecticut State University, University of Bridgeport, and UConn. Supported by a grant from the CTNext Higher Education Fund, awards are up to $10 Thousand.

**High Value Talents:** New industry-academic initiative to increase entrepreneurial education and output among the state’s top researchers from UConn, Unilever, Quinnipiac and Wesleyan Universities, and The Jackson Laboratory. With funding through a grant from the CTNext Higher Education Fund, the goal is to increase the number of successful ventures coming out of universities in the state.

**Partnership in Innovation & Education (PIE):** Expansion of the UConn TIP Summer Fellowship Program. PIE aims to help build Connecticut’s future health and technology workforce and to encourage bioscience commercialization in the state.

2019

**InsurTech Accelerator:** Designed to grow the next generation of entrepreneurs and innovators in the insurance industry and the InsurTech space. Funded by a grant from CTNext and coordinated by the CCEI at UConn and the University of Hartford.

**MedTech Accelerator:** To be located at Trinity College’s downtown campus at Constitution Plaza, the MedTech Accelerator is designed to attract medical and health care technology companies to
the city. It is a partnership between Trinity, Hartford HealthCare, UConn’s School of Business and CTNext, the state’s startup support organization.

**Get Seeded:** New initiative managed by CCEI that was developed to give students the opportunity help move their ideas forward by providing them with seed funding and mentorship. Recipients win between $500-$1,000 for successful pitches.

**Program in Accelerated Therapeutics for Healthcare (PATH):** Partnership between the OVPR and the Schools of Pharmacy and Medicine to accelerate the translational pathway for researchers to convert their discoveries to new medical therapeutics. Recipients receive between $500-$1,000 for successful pitches.

**Program in Accelerated Therapeutics for Healthcare (PATH):** Partnership between the OVPR and the Schools of Pharmacy and Medicine to accelerate the translational pathway for researchers to convert their discoveries to new medical therapeutics. Recipients receive between $10 Thousand-$150 Thousand.
Appendix J: Entrepreneurial Village

The Entrepreneurial Village

University of Connecticut Board of Trustees

Committee for Research, Entrepreneurship, & Innovation

Report Provided by the Werth Institute

In Response to

Public Act 19-154

Existing Locations

Currently, the University of Connecticut has a robust number of spaces within the entrepreneurial ecosystem at the Storrs campus totaling over 20,000 square feet. But, their scattered locations create
disconnect, prove it difficult for students to identify where they can go to feel as though they “belong” in entrepreneurship, or where they should begin their own journey. The entrepreneurial ecosystem at UConn would be improved by the creation of a physical entrepreneurial hub for students to connect with each other and program leaders.

The existing spaces as of 12/1/2019 consist of:

<table>
<thead>
<tr>
<th>EXISTING SPACES (~5,000+ ASF)</th>
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</thead>
<tbody>
<tr>
<td>ATL</td>
</tr>
<tr>
<td>Longley (Depot)</td>
</tr>
<tr>
<td>Business School</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Wilbur Cross</td>
</tr>
<tr>
<td>School of Engineering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RESIDENTIAL HALLS (10,000+ ASF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Werth Res Tower</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Residential halls</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COULD BE USED (5,000+ ASF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babbidge</td>
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<td></td>
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If a central entrepreneurial space were to exist for students, the opportunity for and quality of collaboration, ideation and creation grow at a much faster pace. Public Act 19-154 (PA 19-154) primarily centers around creating a culture of entrepreneurialism at UConn that is stronger than it currently exists. Therefore, through the creation of an Entrepreneurial Village, where students can socialize, work, and learn from each other, this cultural change will have a physical home at the center of UConn’s Storrs Campus.

Possibilities at UConn
The Entrepreneurial Village will provide opportunities for students to learn about entrepreneurship and innovation and will provide:

- shared meeting/event space/ flexible space with various technology fit-outs
- landing/offices and workstations for visiting executives, staff, students and faculty
- idea labs
- digital rooms
- cafe
- maker spaces

We have identified a number of different approaches to accomplishing this goal at UConn, and they are listed below.

<table>
<thead>
<tr>
<th>Where</th>
<th>ASF</th>
<th>CC</th>
<th>Notes</th>
<th>Enabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I - Within existing</td>
<td>19,000+</td>
<td>Several locations: Babidge, SoE, School of Business, Willbur Cross, Werth Res Tower, multiple residential halls</td>
<td>Branding needed</td>
<td></td>
</tr>
<tr>
<td>Option II - Plaza Level - i</td>
<td>$10,514M</td>
<td>Estimated by the project design team, includes full gut renovation of the entire floor, two alternatives, basic and expanded</td>
<td>Relocate some staff (L2-15) and staff lounge from Plaza to Level B, reduce Dean’s Office footprint (3 offices less)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plaza Level - ii new construction, some existing</td>
<td>Add new space, 3 bays. Incremental approach.</td>
<td>Relocate Library staff/lounge to Level B (about B-10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Level B - iii TBD</td>
<td>Access from Academic Way</td>
<td>Relocate some stack area (library is in the process of reducing stacks footprint on this floor)</td>
</tr>
<tr>
<td>Option III - Old Student Rec Ctr</td>
<td>9,000-11,000</td>
<td>Location on Hillside Rd</td>
<td>Renovation of existing space, front area only one floor, back areas 2 floors high</td>
<td></td>
</tr>
</tbody>
</table>

**Preferred Option**

After consultation, the Provost’s Office, the Werth Institute, the Dean of the Library, and the Associate Vice President, Master Planner & Chief Architect have determined that the preferred option is to pursue Option II. This would lead to the Entrepreneurial Village locating within the main level of the Homer Babbidge Library, becoming a part of all student traffic flow through the library. This option would
provide 24 hour access to the work space, and allow students and faculty to identify a core part of the University as dedicated to entrepreneurial skill and knowledge development.

The ad hoc committee that evaluated the options and spaces has looked at comparable spaces at other Universities as inspiration and goals for the proposed Entrepreneurship Village at UConn. The Universities researched include, but are not limited to, Northwestern University, University of Utah, Boston University and Yale (see Appendix A).

The Werth Institute will continue to evaluate spaces at all of our campuses. Currently, all of the Hartford campuses are served by Connecticut’s Center for Entrepreneurship & Innovation space at the Graduate Business Learning Center, which is being evaluated for further expansion to meet the needs of the center. In Stamford campus, there are a number of innovation spaces that allow for students to participate in different activities.

Next Steps

At UConn, we have developed a number of next steps as we make progress towards the end goal of pursuing Option II as outlined above.

1. Connect the existing identified spaces through mapping, wayfinding, and uniform branding. UConn will begin this process immediately.

2. During 2020, UConn will hire an architect to begin developing the plans for the three steps of Option II. Architectural renderings and actual costs related to this transformation will be provided to the Committee upon completion of this process.
   a. The Provost’s Office together with the Werth Institute will work to further refine the source of funding for the Entrepreneurship Village, and the construction timeline will be developed during this time.

3. Upon approval of the architecture, funding, and construction plans, the Entrepreneurial Village development will begin inside of the Homer Babbidge library. This project is likely to conclude in 2022.

Initial Cost Structure and Potential Funding Mechanism
We have begun the process of identifying the cost structure and potential funding mechanisms available for Option II. Using general estimates, we believe that $10 Million will begin the transformation of the space that has been identified. This will require moving existing uses into other areas of the library, as well as making the area more suitable for this activity through the opening up of the space and including much more natural light. Completion of the project will require over $30 Million in funding.

Upon receipt of the initial architecture work, we will determine what steps can be taken in phases, as shutting the entire space down at one time is unfeasible.

Funding mechanisms, include but are not limited to, the use of additional state funding through capital improvement bonding, philanthropic fundraising, and the deployment of limited available University funds allocated to the Library improvement.

**Entrepreneurial Village**

We have reviewed the intent and usage of a central entrepreneurial space within PA 19-154. The existing gap is the lack of a large open space for students to spend time at to get to know more about entrepreneurial activities, programs, and projects in Storrs. Currently, the Experience Innovation Expo, where innovative programs can come together in one spot as a resource for students, is run annually to help students find the myriad of student entrepreneurship and innovation programs. The creation of the Entrepreneurial Village at UConn would allow for far greater synergies as all of these programs would identify a place where they know others like them will be.

The ability of student and faculty startups to interact on a regular basis with other curious and smart students and faculty is largely limited due to the lack of a dedicated central space. The Entrepreneurial Village would provide a home base where students and professionals could come together and have a constant fluidity of communications about events, meetings and opportunities. This space would foster the occurrence of happy accidents, where people interact without knowing why to create great entrepreneurial outcomes.

One attractive, central location with great exposure and ample space would greatly increase the knowledge of entrepreneurial events and opportunities on campus while eliminating the use of valuable time to research and connect with each resource by students and faculty. The creation of the Werth Institute was designed to effect this very outcome, and we are seeing the benefits of this and the Entrepreneurial Village would only serve to enhance these effects.
Entrepreneurial Village APPENDIX A

Northwestern University; The Garage

Includes:

- The Cafe
- The Workspace
- The Makerspace
- The Conference Room
- Left Brain
- Right Brain
- The conference room at 1871

The Garage at Northwestern is the heart of innovation, imagination, and collaboration. It is a cross-disciplinary community of students, faculty, staff and alumni who all share a passion for building new ideas. The 11,000 square foot space is carved out of the North Campus parking structure for more than 60 student-founded startups and projects. This space provides a community, space, and network of resources for every Northwestern student to learn, iterate, and grow. (https://thegarage.northwestern.edu/spaces/)
“Lassonde Studios is a five-story home for student entrepreneurs, innovators and creators at the University of Utah. The housing and innovation facility opened in August 2016. It’s the place where students from any major or background can “Live. Create. Launch.” Students can apply to be one of the “Lassonde 400” residents. All students at the University of Utah are welcome to use the Neeleman Hangar, which is the 20,000-square-foot innovation space on the main floor to connect, test ideas, build prototypes, launch companies and learn by doing. Above are four floors of themed residential and dorm space. The building and diverse engagement opportunities are managed by the Lassonde Entrepreneur Institute”. (https://lassonde.utah.edu/studios)
“Centrally located on the Charles River campus, the BUIld Lab IDG Capital Student Innovation Center is your on-campus collaboration space and information center. Students and alumni are encouraged to use the BUIld Lab coworking space for new ventures and collaborative projects. It’s also home to the Innovate@BU programs and staff who can point you in the right direction of innovation resources across the University and City of Boston. Faculty and community members can also request to use the space for classes, workshops, and events.

The BUIld Lab IDG Capital Student Innovation Center includes:

- 8 meeting rooms to be used for meetings, conference calls, and collaborative projects. Capacity ranges from 2-3 to 12.
- Four cubicles available on a first-come first-served basis.
- A kitchenette and eating area.
- Lockers and storage bins that can be used for storing equipment, prototypes, and supplies.
- An open coworking space with 24 hot-desks available on a first-come first-served basis.
- A large lounge area with mobile furniture that can be used for working, small meetings, events, and workshops”. (http://www.bu.edu/innovate/build-your-idea/build-lab/)
“The CEID acts as both an educational resource as well as a focal point for design and engineering at Yale. The 8,700 square foot design lab combines an open studio, lecture hall, wet lab, and meeting rooms. The studio is equipped with 3-D printers, a sewing station, hand-tools, electronics work stations, and a variety of materials for our members to use. Members have 24/7 access to the studio space, as well as to a state of-the-art machine shop, wood + plastics shop, and wet lab while CEID staff are present.

The CEID is also home to a vibrant and diverse community of members. Over the past three years, nearly 3000 people have become members of the CEID, representing over a hundred undergraduate and graduate degrees and all the professional schools on campus. They are supported by talented CEID staff members who provide theoretical and technical expertise on topics ranging from mechanical engineering to graphic design”. (https://entrepreneurship.yale.edu:center/yale-center-engineering-innovation-and-design)
The source of these dollars is primarily a percentage of fiscal and administrative (F&A) cost (aka, indirect charges) obtained from federal research grants to UConn and the University one-third share of license revenue (per University policy).