



**Higher Education and Employment Advancement Committee Testimony**

**John Volin**

**Vice Provost for Academic Affairs**

**February 5, 2019**

Co-Chairs, Ranking Members, and Members of the Committee, thank you for the opportunity to weigh in on the workforce and manufacturing and technologies bills under consideration, specifically:

House Bill 5001, *An Act Ensuring Students In This State Receive High-Quality Skills Training*  
Senate Bill 799, *An Act Concerning Workforce Development*  
House Bill 7027, *An Act Concerning Manufacturing and Technology*

My name is John Volin and I am the Vice Provost of Academic Affairs at the University of Connecticut. With me today is Mike Accorsi, our Senior Associate Dean of Engineering, who will give you an overview of our efforts to assist Connecticut's manufacturing sector.

We appreciate the chance to discuss with you the importance of workforce development and manufacturing and the critical role UConn plays in graduating highly-skilled engineers, doctors, dentists, lawyers, pharmacists, nurses, teachers, scientists, business leaders, and other critical thinkers from an array of disciplines who help business and industry thrive in our state.

UConn is proud that 73% of our graduates who attended a Connecticut high school are working in Connecticut after graduation and 100% of Fortune 100 companies headquartered in Connecticut, recruit and hire UConn graduates.

The University is also doing its part in reducing Connecticut's "brain drain" by keeping more of our state's brightest and most diverse students here for their college experience. Since 1995, undergrad enrollment has increased 63%, or by 9,311 students, from 14,667 students in 1995 to 23,978 in 2018 so there are more spots than ever for Connecticut students. This fall, UConn welcomed 175 valedictorians and salutatorians and this year's freshman class average SAT was 1306. Additionally, 40% of freshmen across all campuses are from minority groups.

To meet the demands of Connecticut employers, we have also made a concerted effort to increase science, technology, engineering and math – or STEM – enrollment. Since the advent of NextGenCT in FY13, STEM enrollment has grown by 3,021 students -- to 10,626. Additionally, Storrs Engineering undergraduate enrollment increased from 1,978 in FY13 to 3,186 in FY19 or 61% in just 6 years.

We are also creating jobs through research innovation and commercialization. More than 600 U.S. patents have been granted based on UConn innovations, with 39 issued last year alone. UConn's Technology Incubation Program at UConn (TIP) is one-of-a-kind business incubator in Connecticut and has supported more than 100 startup companies, contributing to the creation of more than 2,000 jobs supported and sustained annually by the University.

Industry leaders including Pratt & Whitney, Comcast, Eversource, UTC, GE, and many more have invested nearly \$100 million in UConn in areas such as materials science, advanced manufacturing, big data, computer security, and other fields. Companies heavily recruit student talent on our campuses for both internships and full-time jobs to support their growth. In fact, last year 880 employers actively participated in career fairs at UConn that were attended by more 6,700 students.

However, we know there is still much to be done and Connecticut industry needs a highly-skilled workforce to remain competitive. From recent press reports, expected workforce growth over next decade in Connecticut includes:

- Pratt & Whitney (PW) needs to hire 8,000 new employees.
- Lockheed Martin-Sikorsky (LM-S) will grow by 8,000.
- Electric Boat (EB) will increase its workforce by 4,000.
- At least 5,000 additional engineers will be needed by these 3 companies alone (based on assumption that 20% of workforce will be engineers).
- There are at least 500 supply companies to Pratt & Whitney, Lockheed Martin-Sikorsky & Electric Boat that will need to significantly ramp up production.

UConn has a long history of successful collaborations with UTC, Pratt & Whitney, GE, Lockheed Martin-Sikorsky, Cigna, Comcast, Eversource, Electric Boat and many other industry partners.

To give you an understanding of these partnerships, it might be illustrative to provide a few specific examples, such as those we have developed with Pratt & Whitney and Electric Boat.

Because of our rich and deep collaborative history, Pratt and Whitney, UConn established in 2010 a Center of Excellence with the School of Engineering for research in the field of aviation propulsion systems. Through this partnership, the University is working with P&W on fundamental and applied research initiatives that support the design and development of more efficient gas turbine engines. The University's primary focus has been research in the field of advanced sensors, diagnostics, and controls for use in commercial and military aircraft propulsion systems.

Following this successful partnership, the University is also now home to the P&W Additive Manufacturing Innovation Center, one of the most advanced additive manufacturing laboratories in the nation, located at the UConn Technology Park. Additive manufacturing has near limitless potential applications and can be used for a wide range of products – from advanced turbine components for jet engines to personalized prosthetic implants for patients who need them. We also have a strong connection to Electric Boat and are thrilled that 455 UConn Engineering graduates are currently employed at EB. Additionally, more than 80 UConn students interned at EB since last spring and we have many active sponsored research projects.

The University is acutely aware of the pressure on Electric Boat and Connecticut's submarine industrial base to meet the Navy's aggressive production schedule and maintain our nation's naval undersea dominance. The submarine industry in Connecticut must soon be capable of building two Virginia Class submarines per year while simultaneously beginning construction on the larger Columbia class anti-ballistic missile submarine by 2021. To assist our industry in this herculean effort, UConn has partnered with the University of Rhode Island, Electric Boat and the Naval Undersea Warfare Center in Newport, RI to form the National Institute for Undersea Vehicle Technology. This institute will assist industry through basic and applied research and development, accelerated technology transition and workforce development. UConn and URI have also secured an Office of Naval Research grant of \$1.3 million over three years to recruit students in the field of undersea technology. Over 70 students have enrolled in the program which began this fall.

UConn Engineering works closely with industry to determine what curriculum may be needed and recently started to offering a manufacturing minor to undergraduate students. Students in the following programs are actively recruited by Connecticut manufacturers – Biomedical, Chemical, Civil, Computer Science, Electrical, Materials Science, Mechanical and Manufacturing Engineering. Each graduating student performs a two semester Senior Design project typically with an industry sponsor (we conducted approximately 250 projects with approximately 100 industry sponsors). In addition, professional education is offered for working professionals in many areas that support manufacturing.

UConn also has numerous research grants and facilities with expertise in all areas of manufacturing and related fields. Through these grants and facilities, we have served numerous Connecticut companies and helped them overcome manufacturing and technical hurdles.

Several recent federal grants that support manufacturing with Connecticut industry partners are as follows:

- 1) U.S. Department of Energy Clean Energy Smart Manufacturing Innovation Institute, related to “Energy Management Systems for Subtractive and Additive Precision Manufacturing”. This included UConn, UTRC, CCAT, GKN, and EDAC (\$2M with cost share).
- 2) U.S. Department of Defense Advanced Robotics for Manufacturing (ARM) Institute, related to “iWired: Intelligent Wire Harness Robotically Assembled”. This included UConn, UTRC, and ABB (\$1.4M with cost share).
- 3) U.S. Department of Defense ARM Institute related to the “Connecticut Apprenticeship Program in Robotics and Automation” (CAPRA). This included UConn, CSCU, CCSU, CONNSTEP, and ABB (\$350K).
- 4) U.S. Department of Energy “Advanced Manufacturing for Energy Systems” to create an MS and MENG in Advanced Manufacturing for Energy Systems at UConn, with multiple CT industry partners (\$1.25M).
- 5) Air Force Research Laboratory Manufacturing Technologies Award related to “Simulation-Based Uncertainty Quantification of Manufacturing Technologies”. This included UConn, Pratt & Whitney, GKN, and Aerogear (\$5.4M).
- 6) U.S. Economic Development Administration to create the “CT Manufacturing Simulation Center” with multiple industry partners (\$2M with cost share).
- 7) CTNEXT Higher Education Initiative - Connecticut Industry 4.0 Synergistic Platform for Innovation-Rich Education (CT-IN4SPIRE) with UConn, CCAT, UNH, UHa, CCSU and Trinity. Over 80 students at 5 CT universities have enrolled in this new program which

focuses on Industry 4.0 (Advanced Manufacturing) and Manufacturing Ingenuity (\$400K with cost share).

State-of-the-art facilities that are available to Connecticut companies to assist them with technology development and implementation. These include the Institute of Materials Science and the new UConn Technology Park. In addition, the following research centers provide specialized services for manufacturing:

- Thermo Fisher Center for Advanced Microscopy & Materials Analysis
- Reverse Engineering, Fabrication, Inspection and NDE (REFINE) Center
- UTC Aerospace Systems (UTAS) Center for Advanced Materials
- Pratt & Whitney Additive Manufacturing Center
- UTC Institute for Advanced Systems Engineering
- Fraunhofer Center for Energy Innovation
- Connecticut Cybersecurity Center
- Enterprise Solution Center

UConn Engineering, working with many partners across Connecticut, have secured the following three major grants from the U.S. Economic Development Administration to support economic development in the state.

- EDA Regional Innovation Strategies Program - Quiet Corner Innovation Cluster (QCIC) - The QCIC partners with Connecticut SMEs to promote business growth through innovation, enhanced R&D, and updated business capabilities (\$1.5M with support from EDA, Connecticut Innovations(CI) and UConn).
- EDA University Center Program - Connecticut Manufacturing Simulation Center (CMSC)- The CMSC provides high-end simulation and modeling technology to Connecticut manufacturers to promote innovation, economic growth and next-generation workforce development (\$1.5M with support from EDA, CI and UConn).
- EDA Technical Assistance Program - Connecticut Naval and Maritime Consortium - The goal of this project is to establish and support a consortium of Connecticut SMEs who focus on undersea technologies to increase economic development in this sector (\$62K support from EDA).

The understandable budget cuts of recent years may impact the University's ability to do more to meet workforce needs for Connecticut's industrial sectors without additional funding. To provide context – UConn's FY19 appropriation is \$190 million which is \$50 million less than the \$240 million appropriation it received in FY16.

As President Herbst has indicated, we have raised tuition, implemented tens of millions of dollars in reductions – including cuts to every single academic unit – had workforce reductions, restricted hiring, and have stopped growing our enrollment. This means fewer classes, bigger classes, and less financial aid.

We spend 100% of our state appropriation on people. And faculty are our number one personnel cost. Because we have had less state support, our faculty lines in STEM disciplines and across the

University have remained relatively flat since 2014. The result has been that while we have been able to make some tremendous gains in enrollment as I mentioned earlier, we are now at capacity given our budget.

Currently, UConn provides 51% of Connecticut's Engineering graduates. Many Connecticut business leaders would like us to further increase our Engineering enrollment. Even though we just increased Engineering enrollment by 61%, we often get asked why we can't just double the number of Engineering graduates UConn produces each year. We would love to, but we would need to hire scores of new faculty and staff to teach and support all those new students, and dramatically increase our financial aid budget to recruit more of the best. And that would require financial resources we simply don't have right now.

Just remember that other states are already doing what we are just dreaming about:

- Texas A&M plans to increase engineering student body from 19,378 in 2017 to 25,000 in 2025. Between 2012 and 2016, Texas A&M hired 143 tenured/ tenure-track faculty and 272 professional faculty to support growth (1).
- Ohio State College of Engineering added 70 faculty in 2015-2016 and added an additional 50 faculty in 2017, reaching a size of 350 tenured/tenure track faculty (2).

The equation is straightforward: more faculty and staff allows us to recruit and enroll even more students. That means more highly-skilled graduates, most of whom go on to work for Connecticut employers and live in Connecticut's communities. They are the citizens and taxpayers every state in America wants to attract.

UConn is today one of the best public universities in the United States, thanks to investments by the state supported on a bipartisan basis. What UConn's dramatic rise tells us is that, with the right resources, its potential is really unlimited. And more important than any ranking is maximizing the return on the state's investment.

Thank you again for your support for UConn over many years and for listening to us today. We are happy to answer any questions.

1. 425X25 Report. Texas A&M College of Engineering. <https://engineering.tamu.edu/25by25/25-by-25-report>

2. Unprecedented Faculty Growth, OSU College of Engineering, <https://engineering.osu.edu/news/2016/09/dean-williams-unprecedented-faculty-growth>