Special Telephone Meeting
University of Connecticut Board of Trustees
Committee for Research, Entrepreneurship and Innovation

Tuesday, November 16, 2021

Meeting held by Telephone:

Public Call in #: (415) 655-0002 US Toll
Access Code: 629 930 823

(A recording of the meeting will be posted on the Board website https://boardoftrustees.uconn.edu/ within seven days of the meeting.)

AGENDA

Call to order at 2:00 p.m.

1. Public Participation (limited to agenda items) *

* If members of the public wish to address the Committee during the Public Participation portion of the meeting, limited to agenda items, you must submit a request in writing 30 minutes prior to the start of the meeting by 1:30 p.m. to the following email address: BoardCommittees@uconn.edu. Please indicate your name, telephone number, and topic on the agenda to be discussed. Per the University By-Laws, the Board may limit public comment. As an alternative, you may also submit your comments via email which will be shared with the Committee.

ACTION ITEM:

2. Approval of the minutes of the Special Meeting of the Research, Entrepreneurship and Innovation Committee of October 26, 2021.

PRESENTATION/DISCUSSION ITEMS:

3. Opening Remarks – Dr. Philip Rubin

4. Research Updates and Accomplishments –
   Department of Marine Sciences, UConn, Avery Point
   Annemarie Seifert, Ph.D. – Campus Director, UConn Avery Point
   John Truscinski – Director of Resilience, CT Institute for Resilience & Climate Adaptation (CIRCA)
   J. Evan Ward, Ph.D. – Professor/Department Head – Marine Sciences

5. Innovation Partnership Building Programs & Partnerships in Climate Adjacent Areas
   Pamir Alpay, Ph.D. – Executive Director, Innovation Partnership Building

6. Technology Incubation Program (TIP) Updates
   Mostafa Analoui, Ph.D – Executive Director of Venture Development
   Vivek Ramakrishnan, Ph.D. – Director, Venture Development
   Paul Parker – Director, TIP, Margaret Feeney – Director, TIP Stamford

7. Q&A and Closing Remarks

8. Executive Session (as needed)

9. Adjournment
Call to order at 1:00 p.m.

Committee Vice-Chair Rubin convened the meeting at 1:02 p.m. by telephone. He introduced the new University Senate Representative Professor Edward Weingart, who replaced Professor Janet Pritchard.

1. Public Participation (limited to agenda items)

There were no members of the public who wished to speak on the agenda items.

ACTION ITEM:

2. Approval of the minutes of the Special Meeting of the Research, Entrepreneurship and Innovation Committee of June 29, 2021.

On a motion by Trustee Boxer, seconded by Trustee Cloud, the minutes from the June 29, 2021, Special Meeting were approved.

PRESENTATION/DISCUSSION ITEMS:

3. Opening Remarks – Dr. Philip Rubin

Vice Chair Rubin welcomed all attendees and noted the purpose of this meeting was to review and consider the breadth of research, entrepreneurship, and innovation at the University. The Committee will be provided with an update and a report from different areas promoting research and innovation.

4. Research, Grants & Entrepreneurship – Dr. Radenka Maric, Vice President for Research, Innovation & Entrepreneurship

Dr. Maric provided an update on grants and their impact on UConn along with a comprehensive comparison to other universities. This presentation focused on the breadth, depth and readiness of UConn and our research as well as the economic impact. She also updated the Committee on the NSF meeting and outlined ways to improve the landscape of grant funding to attract outstanding faculty and researchers.
5. Entrepreneurship & Innovation Updates - David Noble, Director of The Werth Institute & Associate Professor In-Residence for the School of Business

Mr. Noble provided a detailed overview of the history, successes, and current programs. He noted that the Werth Institute was establish almost four years ago and four signature programs have been created during that time.

6. Biomedical Engineering Research Accomplishments - Dr. Ki Chon, Department Head & Chair for Biomedical Engineering, School of Engineering

Dr. Chon provided the Committee with an overview of the Department of Biomedical Engineering, which included data and current research highlights of a few faculty members in order to highlight the impacts of UConn technology.

7. Closing Remarks

Dr. Rubin thanked everyone for their informative presentations, which illustrated the increased research activity at UConn. He indicated that a comprehensive and coherent plan needs to be established that ties in all interdisciplinary studies while at the same time engaging faculty and students to become more involved.

Dr. Rubin noted that another meeting will be scheduled in the near future to continue the discussion of research activities and interdisciplinary connections.

8. Executive Session (as needed)

There was no Executive Session held.

9. Adjournment

On a motion by Trustee Boxer, seconded by Mr. Drakonakis, the Committee voted unanimously to adjourn the meeting.

There being no further business, the Committee meeting was adjourned at 1:59 p.m.

Respectfully Submitted,

Nicole E. Barkley
Secretary to the Committee
Committee for Research, Entrepreneurship and Innovation

Presentation:
Research Updates & Accomplishments
Department of Marine Sciences, Avery Point Campus

Annemarie Seifert, Ph.D.
Campus Director, UConn Avery Point

John Truscinski
Director of Resilience, CT Institute for Resilience & Climate Adaptation (CIRCA)

J. Evan Ward, Ph.D.
Professor & Department Head, Department of Marine Sciences

[Special Telephone Meeting, Tuesday, November 16, 2021]
Board of Trustees: Research, Entrepreneurship, and Innovation Committee

The University of Connecticut Avery Point
Presented by
Annemarie Seifert, Ph.D.
J. Evan Ward, Ph.D.
James O’Donnell, Ph.D.
Avery Point is home to:

- UConn’s [Department of Marine Sciences](#)
- [Connecticut Institute for Resilience and Climate Adaptation (CIRCA)](#)
- [Connecticut Sea Grant](#)
- Mystic Aquarium Research Program
  - [Research Experiences for Undergraduate Students](#) (REU)
- [National Institute for Undersea Vehicle Technology (NIUVT)](#)
- [CT Initiative on Environmental Research of Offshore Wind (CIEROW)](#)
- [CT NERR](#) – National Estuarine Research Reserve
- [Naval and Maritime Consortium (NMC)](#)
- [Project Oceanology](#)
Economic Development

• SeCTer – Southeastern CT Enterprise Region
  – 2013: first Economic Development District (EDD) in CT
  – CEDS – Comprehensive Economic Development Strategy

• Connected with regional economic development administrators

• Economic Development Commissioner – City of Groton

• Build Back Better Regional Challenge (BBBRC)
Background

College of Liberal Arts and Sciences
Department of Marine Sciences
J. Evan Ward, Professor and Head

- Marine Sciences Department established on the Avery Point campus in 1979
- Only CLAS department that resides off of Storrs campus
- Staff includes 20 T/TT faculty members, 4 research faculty, numerous research technicians
- Interdisciplinary degree programs
  - Undergraduate degree in Marine Sciences
  - Minors in Marine Sciences and in Marine Biology
  - Graduate degrees (MS & PhD) in Oceanography
Resources

Research capacity:

- R/V Connecticut - 90’ offshore research vessel
- R/V Lowell Weicker - 36’ coastal research vessel
- Remotely operated vehicles and gliders
- SCUBA-diver supported underwater capabilities
- Coastal observing system with buoys and sensors
- Modern research laboratories (dry & wet)
Strengths

*Department of Marine Sciences: A leader in Climate-Change Research*

- Strong interdisciplinary research program
  - Average grant-supported expenditures of $3.6M/year (past 8 yr)
  - Per capita = #2 in CLAS (out of 24)

- Research projects focused on climate change
  - Impacts of climate change on finfish & shellfish
  - Factors governing climate variability over time
  - Sea-level rise and changes in ocean circulation
  - Regional climate change projections to enable ocean planning for the blue economy

- Recent partnership with Ørsted/Eversource & Vineyard Wind
  - CT Initiative on Environmental Research of Offshore Wind

- Partnership with CT Institute for Resilience and Climate Adaptation
Climate Change in Connecticut

Four projections of annual mean sea level at the CT shore – CIRCA’s Sea Level Rise Report (O’Donnell, 2018)

Measurements and model projections (with no CO2 reductions) of annual mean temperature in CT – CIRCA’s PSCAR report (Seth et al, 2019)

Plan for:
Sea level increase up to 20 inches (0.5m) by 2050
Air temperature up to 3°C (5°F) by 2050
Some Consequence in Connecticut

More frequent road flooding, disrupts business, e.g. RT 146
CIRCA

- CIRCA was founded in 2014 with the approval of the BOT (2014 & 2019)
- The mission is to increase the resilience and sustainability of vulnerable communities along Connecticut’s coast and inland waterways to the growing impacts of climate change on the natural, built, and human environment.
- CIRCA is within the Office of the Vice President for Research and has offices at Avery Point
- Executive Committee is chaired by the VPR Maric, and Commissioner Dykes of CTDEEP. Members are: Anagnoustou (ENG), MacDougald (Law), Seth (CLAS), Swallow (CANR), O’Donnell (CLAS), and from CTDEEP, Thompson and Lugli
- Initial funding was $2.5 Million from CTDEEP and $0.5 Million from UCONN
- Won an additional $2.5 Million in State and federal funds in 2016-19
CIRCA Initiatives

• Connecticut Towns need guidance and support for planning and implementation
  – Between 2016-19 CIRCA awarded and administered grants to towns and COGS with CTDEEP funds. (k$745 and k$400 match)
  – Developed sea level, temperature and precipitation, and river flow projections (7 projects k$550, 11 faculty- 4 Colleges)
  – Matching grants (11 projects. k$330 with k$1000 match)

• Resilient Connecticut
  CIRCA and State Agencies Fostering Resilience (SAFR) have embarked on a demonstration regional planning process
  – Funded by HUD through DOH
  – Region planning in Fairfield and New Haven Counties
  Goal: identify projects that towns can’t address alone, and develop implementable plans
Resilient Connecticut

- 2018: CIRCA coordinate CT agencies to win a $54 Million US Dept. of Housing award to protect Bridgeport Project with $8 million to UCONN for Resilient Connecticut - a process to make New Haven and Fairfield Counties resilient to climate change

- Participated in the Governor Lamont’s Council on Climate Change

- 2021: Connecticut Legislature Authorized Resilience Bonds from CT Green Bank, created authority for towns to raise revenue to fund/cost-share projects, and provided $30,000,000 to CT DEEP for resilience projects

- 2021: Connecticut Legislature appropriates $5,000,000 for 2021-23 to continue and expand Resilient Connecticut to other counties

https://resilientconnecticut.uconn.edu
CIRCA Value Example

West Haven: 100 yr flood in 2050
Colors show water depth above land
Scenario 3: elevate road to 11 ft

w/o extension

Extension (red)
CIRCA’s Future Roles

- 70 Projects have already been identified in 2 Counties.
- Bridgeport projects cost approximately $100 million, so extrapolating for all towns leads to an estimate of approximately $3-10 Billion
- The CIRCA strategy is to create a pipeline of projects (in consultation with towns and agencies) to be executed over several decades.
  - Coordinate project concept development and prioritization to maximize co-benefits
  - Use best-practice engagement to develop consensus
  - Track technology effectiveness and assessment
  - Map risk and risk, reduction and develop equitable cost sharing plans
- CT Green Bank is developing approaches to leverage private financing with State and Federal funds.
- Develop best-practice resilience standards for towns/districts to guide finance ratings.
- Better integrate to academic programs and advance technology transfer
Questions & Discussion
Committee for Research, Entrepreneurship
and Innovation

Presentation:
Innovation Partnership Building (IPB) Programs &
Partnerships in Climate Adjacent Areas

Pamir Alpay, Ph.D.
Executive Director, Innovation Partnership Building

[Special Telephone Meeting, Tuesday, November 16, 2021]
State of the Art Equipment

2 REVERSE ENGINEERING (X-RAY TOMOGRAPHY) MACHINES

Xradia Versa 520

6 ELECTRON MICROSCOPES

Titan Themis ACEM

10 3D PRINTERS

IPG Photonics Metal Powder Test Bed

Stratasys Connex350

ADDITIONAL EQUIPMENT:

- 2 X-Ray Characterization Machines
- 2 Optical and digital Microscopes
- 1 Robot/Automation

6 FOCUSED ION BEAM MILLING SEMs

Orion Nanofab

Helios 460F1 Dual Beam

7 MANUFACTURING AND MATERIALS PROCESSING MACHINES

Haas CNC Mill

ICONIC

CNC Router

Haas CNC Lathe

12 MATERIALS TESTING MACHINES

Gleeble 3500

Anton Paar Furnace Rheometer System FRS 1800
Strengths

ENERGY
- Utility Companies
- Energy Storage
- Water Filtration
- Clean Energy
- Sustainability

CYBER
- Cybersecurity
- Hardware Assurance
- Cyber-physical Security
- Big Data
- Information Technology

MATERIALS
- Electron Microscopy
- X-Ray Tomography
- Custom Materials Design
- Aerospace Materials

MANUFACTURING
- Aerospace
- Naval
- Supply Chain
- Manufacturing Simulations

DATA SCIENCE
- Finance
- Insurance
- Engineering

AI/ROBOTICS
- Artificial Intelligence
- Robots
- Machine Learning
- Industry 4.0
PARTNER WITH INDUSTRY

- Innovations that will define the future of their businesses
- Develop joint research grants
- Attract large corporations and SMEs in supply chain
- Shared equipment
- Advanced modeling
- Faculty expertise across disciplines

PARTNERSHIP OPPORTUNITIES

- Industry Contracts
- Joint Research Grants
- Internships for Students
- Scientific/Engineering Support
- Proof of Concept Space
Shared Facilities  
UConn maintained facilities

- NIST SP 800-171 compliant
- Conference rooms
- Conference/event hosting space
- Café/kitchen areas
- Keycard access
Tech Park Research Partners

- UConn Tech Park
- Tech Park Research Partners

Logos of various partners:
- Eversource
- Raytheon Technologies
- NAVSEA
- University of Rhode Island College of Engineering
- Thermo Fisher Scientific
- U.S. Air Force
- AFRL
- DOR
- National Institute for Undersea Vehicle Technology
- Refine
- Collins Aerospace
- Cast
- Synchrony
- Comcast
### Funding Support

$125M+ from industry and federal partners

<table>
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<tr>
<th>Amount</th>
<th>Description</th>
<th>Partner(s)</th>
</tr>
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<tbody>
<tr>
<td>$7.5M</td>
<td>Pratt &amp; Whitney Additive Manufacturing Center (PW AMC)</td>
<td>Eversource Energy Center</td>
</tr>
<tr>
<td>$25M</td>
<td>UCONN - Thermo Fisher Scientific Center for Advanced Microscopy and Materials Analysis (CAMMA)</td>
<td>Synchrony Financial Center of Excellence in Cybersecurity</td>
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<tr>
<td>$2.2M</td>
<td>Collins Aerospace Center for Advanced Materials</td>
<td>DAEDALUS</td>
</tr>
<tr>
<td>$7.5M</td>
<td>Comcast Center of Excellence for Security Innovation (CSI)</td>
<td>Raytheon Technologies</td>
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<tr>
<td>$17.5M</td>
<td>Eversource Energy Center</td>
<td>Eversource Energy Center</td>
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<td>$18.1M</td>
<td>Daedalus Air Force Advanced Manufacturing Initiative</td>
<td>UTC Institute for Advanced Systems Engineering (UTC-IASE)</td>
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<td>$19.9M</td>
<td>National Institute for Undersea Vehicle Technology</td>
<td>Comcast</td>
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<tr>
<td>$10M</td>
<td>UTC Institute for Advanced Systems Engineering (UTC-IASE)</td>
<td>Raytheon Technologies</td>
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<tr>
<td>$2.2M</td>
<td>Reverse Engineering Fabrication Inspection &amp; Non-destructive Evaluation (REFINE)</td>
<td>Synchrony Financial Center of Excellence in Cybersecurity</td>
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<td>$12.2M</td>
<td>Connecticut Center for Applied Separations Technologies (CCAST)</td>
<td>Synchrony Financial Center of Excellence in Cybersecurity</td>
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Eversource Energy Center (EEC)
An industry-academia partnership of Eversource and UConn

“Advance leading-edge interdisciplinary research and technology to assure reliable power during extreme weather and security events”

- **ACCELERATE DEVELOPMENT AND ADOPTION** of clean energy sources, including solar, onshore and offshore wind, and hydropower, green hydrogen, batteries and new energy storage technologies.

- **INVESTIGATE GRID RESILIENCE SOLUTIONS** to ensure preparedness and reinforcement of the power grid to sustain intensified storm hazards under climate change.

- **INVESTIGATE GRID MODERNIZATION TECHNOLOGIES** to ensure constant supply (load) and reliable electric delivery under future decarbonization and renewable energy integration pathways.
EEC Facts
Accelerated Growth in Personnel, Scholarship, Funding

FUNDING
- $37,000,000 in total awards (including $14M of renewed funding from Eversource)
- $20,000,000 in pending proposals (including $10M DOE/WETO grant awaiting availability of funds)
- $1,700,000 in lab equipment
- $700,000 in patent commercialization revenues from DTN Inc. (two additional patents are considered for commercialization)
- $150,000 of annual revenue stream from our Grid Modernization Graduate Certificate Program

DIVERSITY, EQUITY AND INCLUSION
- Faculty and staff: 39% female and 7% underrepresented minority | 50% White, 43% Asian, 7% Hispanic
- Students: 41% female and 8% underrepresented minority | 48% Asian, 42% White, 6% Hispanic, 2% Black, 2% other
Customize and On-Demand Water Treatment Membranes

- We have developed an additive manufacturing process that produces customized membranes that can be tailored to different water treatment needs.
- We can create customized separation membranes for water treatment, industrial gas production, and carbon capture.
- Faculty affiliated spinout company formed to commercialize Technology (membraneX, LLC).
- Multiple research and commercialization efforts with collaborators from UT Austin, Virginia, Argonne National Labs, and industry.
- ~3M+ in total funding.
Decarbonization of Wastewater Treatment with MLA Controlled Anaerobic Digestion

- Anaerobic co-digestion is an effective means of recovering value from food waste and domestic wastewater
- We are using machine learning to develop control strategies to maximize value of products created by digestion while reducing climate-related life cycle costs of wastewater treatment
- $2M in total funding
Committee for Research, Entrepreneurship and Innovation

Presentation:
Technology Incubation Program (TIP) Updates

Mostafa Analoui, Ph.D.
Executive Director of Venture Development

Vivek Ramakrishnan, Ph.D.
Director of Venture Development

Paul Parker
Director, Technology Incubation Program

Margaret Feeney
Director, Technology Incubation Program, Stamford Campus

[Special Telephone Meeting, Tuesday, November 16, 2021]
Moving Innovation from Ideas to Impact

VENTURE DEVELOPMENT & TECHNOLOGY INCUBATION PROGRAM (TIP)
Mission

Educate and develop **entrepreneurial skills and mindset**

Collaboratively assess, guide & support innovators

Support UConn Startups **Portfolio** throughout its life cycle: **Launch to Exit**

Manage **comprehensive startup incubator facility** for UConn startups and other innovative companies

**Collaboration and partnership** with other CT academic, industrial and entrepreneurial initiatives
• Started in 2003
• **155** companies have participated
  - 24% - Faculty
  - 13% - Student
  - 8% - Alumni
  - 55% - Outside
• **Over 60%** success rate
• **Over 70%** of companies stay in CT
• 2 IPOs
LOCATIONS

Storrs
Est. 2003
UConn main campus
4,000 sf

Farmington
Est. 2010, expanded in 2016
Near Jackson Laboratory for Genomic Medicine
25,000 sf

Stamford
Est. 2020
Downtown Stamford
5,800 sf
Data Sciences Focus
• 35,500 sf office/lab space - 95% occupied
  - 44 wet labs    - 64 offices    - co-working space    - dedicated desks

• $956 M funding raised since 2003

• $283 M funding raised in CY20

• 12 companies raised over $1 M in CY20

• 284 employees at end of June 2021

• 71 current companies
GROWTH OVER THE YEARS

Number of TIP Companies

Year: 2004 to 2020

- Farmington Ext Opened
- Stamford Digital Opened 2021

71 startups today
TIP Expansion

• Launched in January 2021
• 23 startups accepted in 1st year cohort
• Added 7 new EIRs to the UConn ecosystem
• Added 5 new Venture Capitalist firms to the UConn ecosystem
• $3.5M raised by TIP Digital companies since joining
UConn Startups: Topline and Current Activities

Training

- High Value Talents & Mentors (HVTM) workshop completed in Sept: 52 innovators + 14 leaders/support

Active Capital Raise

- LambdaVision: $7M
- Bastion: $3M
- Encapsulate: Seed ($150+K)
- QMD

SBIR/STTR

- SBIRs submitted (Diant, Nevive, Potentiometric)
- Under preparation: Encapsulate, MembraneX, Nami Therapeutics

Partnership & Product Development

- Provascor Pharma (Cornovus)
- DiantPharma
- Bastion
- QMD
Highlights

**Active Support**
- **Nevive Therapeutics**: Business plan development, connecting with pharma, recruiting CEO
- **Encapsulate**: Seed round term sheet received from CI
- **6PCT**: Term sheet with UConn completed.
- **AOR Pharma with Licensing Team**
  - Term sheet discussion with Jessica Lubell
  - AOR pharma has already hired Dr. Berkowitz student
  - Collaboration with 6PCT discussions
- **Aerocyonics Imaging**: Restructuring CAP Table
- **FlexHealthinfo**: Leadership and funding

**Pipeline**
- **Ki Chon**: Discussion on company formation for SBIR grant
- **Thanh Nguyen**: Biomembrane
- **Eugene Pinkhassik**: Reactomol, Pharma Manufacturing
- **Jessica Rouge**: New model

**MBA Venture Fellow**
- 3 Fellows selected and engaged