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

Tuesday, October 26, 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 1:00 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 12:30 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 June 29, 2021.

PRESENTATION/DISCUSSION ITEMS:

3. Opening Remarks – Dr. Philip Rubin
4. Research, Grants & Entrepreneurship – Dr. Radenka Maric, Vice President for Research, Innovation & Entrepreneurship
5. Entrepreneurship & Innovation Updates - David Noble, Director of The Werth Institute & Associate Professor In-Residence for the School of Business
6. Biomedical Engineering Research Accomplishments - Dr. Ki Chon, Department Head & Chair for Biomedical Engineering, School of Engineering
7. Closing Remarks
8. Executive Session (as needed)
9. Adjournment
UConn Research
Envisioning Tomorrow

Dr. Radenka Maric
Vice President for Research, Innovation and Entrepreneurship
BOT REI Committee Meeting
October 26, 2021
Why research?

• The research done on campuses leads to new ways of understanding the world around us and to scientific and medical advances

• Economic impact

• Reputation and ranking

• Increase undergraduate and graduate enrollment
Research solves problems

Climate change
Human Health
Impact of Research

Brand Recognition and Revenue Generation
Dr. Harry Steenbock
University of Wisconsin Madison

*Discovered that foods irradiated with ultraviolet light prevented rickets in rats*

*Developed and patented a process to irradiate foods, which increased their vitamin D content*

Started the Wisconsin Alumni Research Foundation, WARF to manage his patent

**WARF 2021** $103 million in revenue distributed in grants to UW

$21 million in internal support for UW research
Dr. Robert Cade
University of Florida

Discovered that electrolyte imbalance and low blood sugar lead to heat exhaustion in football players.

Invented: Gatorade

Over $1B in royalties, 1965-2015
Over $283M to University of Florida

https://www.espn.com/college-football/story/_/id/13789009/royalties-gatorade-inventors-surpass-1-billion
Bomb Calorimeter: Invented at UConn’s Agricultural Experiment Station
Dr. Wilbur Atwater

FibreKor® Dental Material – Named a Top 100 Invention of the 20th Century Replaced metal posts in crowns, bridges, and root canals
Drs. Jon Goldberg and Charles Burstone

Catharanthus and Impatiens – Striking colorful plants able to withstand heat and sunlight, developed through UConn’s breeding techniques
Dr. Ron Parker

Grammy Award in the Classical Compendium category
Dr. Kenneth Fuchs
Economic Impact of Research
Grant Trails: We need to enhance and clarify our value for the State

- Grant Trails ([https://granttrails.uconn.edu/CT](https://granttrails.uconn.edu/CT)) interactively shows you where research grants that are awarded to UConn faculty are spent throughout our state.

**Key takeaways:**

- Research is crucial if UConn wants to improve its reputation and support its many stakeholders
- Grant dollars are used to pay for equipment, reagents, consumables, salaries, etc. that are required for actually carrying out the research.
UConn: TIP Highlights

Fiscal Year 2021

- 5 New UConn faculty startup
- $8.6M Raised by UConn TIP startups
- 6 UConn companies that received SBIR funding
- 18 Entrepreneurs-in-Residence
- 62 TIP companies
- 284 Full and part-time employees in TIP Companies
- $71M Funds raised by TIP companies

New Faculty Startups

- Nevive Therapeutics
- MembraneX LLC
- FlexHealthinfo LLC
- Aerocyonics Imaging
- VERINTÄS

Stamford Updates

- Opened January 2021
- 17 Startups at TIP Digital
- NEW EIRs and FTEs
Where We Are
Largest Award in UConn History

- $40M Major Research Instrumentation Award
- Network for Advanced Nuclear Magnetic Resonance
- Prof. Jeffrey Hoch, UConn Health, PI
- Partners: University of Wisconsin, University of Georgia
Recruiting the Best Students

Four-star forward Alex Karaban commits to UConn men’s basketball

He is coming to UConn because of UConn’s academic and research strengths

He toured IPB with his parents before committing to UConn
New Awards
100% increase over five years

$375M

184.5M

FY 2017 FY 2021

Sources of FY2021 Federal Awards

- Health & Human Services* 52%
- National Science Foundation 21%
- Energy 9%
- Defense 8%
- Commerce 1%
- Other 9%
- NASA 1%
- USDA 4%
- Education 3%

* National Institutes of Health accounts for 88% of HHS funding.
New Awards by Campus

UConn Health
$170M

$155M
Medicine

$13M
Dental Medicine

$2M
Other

UConn Storrs + Regionals
$205M

$72M
Engineering

$55M
CLAS

$31M
CAHN

$47M
Other
Research Expenditures by Source*

- 56% Federal
- 30% UConn Institutional Funding
- 4% Business
- 2% State and Local Government
- 8% All other

*2019 HERD Survey
Subsequent to receiving seed funding, PIs have been awarded > $273M in extramural awards.
Where Do We Need to Be?
Growth Forecasts
AAU Indicators

- Competitively funded federal research support
- Membership in the National Academies
- Faculty awards, fellowships, and memberships
- Citations
How Do We Get There?
UConn Areas of Strength

- Neuroscience
- Energy
- Genomics
- Manufacturing
- Cybersecurity
- Health Behavior
- Materials
UConn and the National Science Foundation

- NSF roundtable at Yale with NSF Director Panchanathan and Connecticut Senators Blumenthal and Murphy
- NSF Director Panchanathan invited to visit UConn in November
- Visit will introduce NSF to New England University Collaboration on Renewable and Sustainable Energy (NEUCORSE) Initiative
Key Takeaways

- Research is crucial if UConn wants to improve its reputation—a key to attracting top student and faculty talent.

- Donations and greater visibility will enhance our reputation and the impact of our research, which are increasingly important in obtaining extramural funding.
How the Trustees Can Help

• Make inroads to companies
• Support efforts to develop resources and expertise that will make companies want to work with us
• Support investments in areas of collaborative research strengths - Interdisciplinary Centers/Institutes
• Support targeted cluster hires
• Champion fundraising for research
Thank You!
THE WERTH INSTITUTE
FOR ENTREPRENEURSHIP & INNOVATION
STANDARD ENTREPRENEURIAL STARTUP PROGRAM

- ACCELERATE UCONN
- INNOVATION QUEST
- CCEI SUMMER FELLOWSHIP
- UCONN SCHOOL OF BUSINESS
THE PETER J. WERTH INSTITUTE FOR ENTREPRENEURSHIP AND INNOVATION LINKS THE ECOSYSTEM OF RESOURCES, PROGRAMS, ACADEMIC COURSES, FUNDING, MENTORSHIP, EDUCATION, AND ACTIVITIES RELATING TO ENTREPRENEURSHIP AND INNOVATION THROUGHOUT THE UNIVERSITY.
NetWerox programs include:
- One-on-one Conversations
- Group mentorship activities, including Werth Coffee Chats and Dinner with Alum
- Individualized entrepreneurial coaching
- Skill-based workshops
- Networking nights
Werth Innovators are student ambassadors for entrepreneurship and innovation at UConn who:
• play a central role in building interest and participation in UConn's entrepreneurial ecosystem
• are selected annually from a pool of rising sophomore and junior applicants
• receive a $3,000 scholarship and access to unique, transformative experiences during their remaining years at UConn
• become leaders through mentorship, networking, community and skill building
The Stamford Startup Studio (S3) is a program that brings industry into education. Students work collaboratively with studio leadership, consultants, corporate partners, an advisory board, and an investment board to create early-stage solutions and prototypes to real-world problems.
Part of the Month of Discovery, UConn students discover the wide range of programs, resources, and activities facilitating entrepreneurship, innovation, and creativity through a Storrs-campus based Expo.

BADM/MGMT 2234: THE ENTREPRENEURIAL JOURNEY

This introductory, interdisciplinary course nurtures interest and enthusiasm for entrepreneurship, facilitating continued engagement with related programming.
1. The Center for Neurodiversity & Employment Innovation
2. Entrepreneurship Pop-Up Course
3. Content and Brand Development (Name/Image/Likeness)
Department of Biomedical Engineering
The University of Connecticut
Overview & BME Dept. History

- Graduate Program in Biological Engineering (1966)
- Undergrad BME program (2000)
- BS degrees in BME accredited since 2005
- BS, MS, and PhD degrees in Biomedical Engineering
- BME Department approved by the UConn Board of Trustees (September 2012)
UConn BME Department
Two Campuses – One Department

Undergraduate and Graduate

Graduate
**BME Enrollment 2020**

<table>
<thead>
<tr>
<th></th>
<th>Headcount</th>
<th>Male</th>
<th>Female</th>
<th>U.S. Minority</th>
<th>Int.</th>
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<tbody>
<tr>
<td><strong>Undergraduate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-time Freshmen</td>
<td>131</td>
<td>65</td>
<td>66</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>Other First Year</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
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<tr>
<td>Sophomores</td>
<td>59</td>
<td>28</td>
<td>31</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>Juniors</td>
<td>73</td>
<td>32</td>
<td>41</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>Seniors</td>
<td>129</td>
<td>68</td>
<td>61</td>
<td>41</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>393</td>
<td>194</td>
<td>199</td>
<td>147</td>
<td>16</td>
</tr>
<tr>
<td><strong>Graduate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.S.</td>
<td>49</td>
<td>22</td>
<td>27</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>87</td>
<td>52</td>
<td>35</td>
<td>11</td>
<td>57</td>
</tr>
</tbody>
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- BME is the 2nd-largest Undergrad department for 2016, 2014, 2015, 2019, 2020
- BME is the largest Graduate department for 2019, 2020
- 2018: ~150 freshmen
- 2019: ~90 freshmen
UConn BME Department
Department structure

CORE Faculty (52)
- BME Faculty (19 T/TT & 4 NTT)
- Non BME dept. Faculty (26)

Affiliated Faculty (37)
- Span various departments and schools
BME Hires (2020-21)

Prof. Yi Zhang
PhD Georgia Tech

Prof. Hugo Posada-Quintero
PhD UConn

Research Prof. Minghu Song
PhD RPI

Prof. in Residence Stephanie Santos
PhD UConn

Prof. in Residence Faye Assanah
PhD UConn
CORE BME FACULTY (20T/TT (6@ UCH)), 5 APIR)

6 NSF CAREER INVESTIGATOR Awardees (SINCE 2017)
2 NIH K Awardees
15 NIH R01 Grants
$40M + Major Funding 2015-2021

BME Research Awards

- NIH 57%
- NSF 21%
- DOD 13%
- Industry 2%
- Other 7%


Millions
## Research Productivity AY21

<table>
<thead>
<tr>
<th>Expenditures</th>
<th>Proposals Submitted</th>
<th>New Awards</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Value $</td>
</tr>
<tr>
<td>Industry</td>
<td>6</td>
<td>600,000</td>
</tr>
<tr>
<td>Federal</td>
<td>45</td>
<td>47,467,211</td>
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<tr>
<td>State</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>51</td>
<td>48,067,211</td>
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<thead>
<tr>
<th></th>
<th>Number</th>
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<tbody>
<tr>
<td># Patents Awarded</td>
<td>6 &amp; 1 provisional</td>
</tr>
<tr>
<td># Journal Papers</td>
<td>95</td>
</tr>
<tr>
<td># Conference Papers</td>
<td>32</td>
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AY 2019-2020 Senior Design (SD) Information

- BME Faculty heavily involved in mentoring SD teams:

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</thead>
<tbody>
<tr>
<td># Projects/ Teams</td>
<td>26</td>
</tr>
<tr>
<td># Students Participating</td>
<td>85</td>
</tr>
<tr>
<td># Company Sponsors</td>
<td>4</td>
</tr>
<tr>
<td>$ Revenue from Sponsors</td>
<td>$25K</td>
</tr>
</tbody>
</table>

UConn Engineering Senior Design Demonstration Day @ Gampel
BME Faculty Research Highlights
1) CRISPR-based Molecular Detection

- Xiong Ding et al., *Nature Communications*, 2020, 11, 4711
- Xiong Ding et al., *Biosensors and Bioelectronics*, 2021, 113218
- Patent application No.: PCT/US2021/022760 (Licensed)

2) Point of Care Diagnostic Devices

- Kun Yin et al., *Lab on a Chip*, 2021, 21, 2730–2737
- Zhiheng Xu et al., *Biosensors and Bioelectronics*, 2021, 113306
- Patent application No.: 63/146,124

3) Biosensors and Bioinstrumentation

- Ziyue Li et al., *Biosensors and Bioelectronics*, 2021, 192, 113498
- Kun Yin et al., *Sensors and Actuators B: Chemical*, 2021, 130242
- Patent application No.: 63/222,989

4) Synthetic Biology and DNA Computing

- Jiongyu Zhang and Changchun Liu, *ACS Synthetic Biology*, 2021, DOI: 10.1021/acssynbio.1c00431

Acknowledgments

- NIH R01 EB023607 (NIBIB)
- NIH R01 CA214072 (NCI)
- NIH R61 AI154642 (NIAID)
- NIH U01 AI148306 (NIAID)
- NIH R21 OH012194 (NIOSH)
Yupeng Chen’s Nanomedicine Lab

**Molecular Engineering**
Design and synthesis of DNA-mimicking nanotubes.

**Nano-Matrices for Tissue Engineering**
Injectable fibrous scaffolds for tissue engineering and tissue regeneration.

**Nanopiece Technology**
Intracellular delivery of drugs and genes.

**From Earth to Space**
Developing tissue-on-a-chip for the International Space Station.
Neurostimulators to manage chronic pain

Novel protocol of dorsal root ganglia (DRG) stimulation to attenuate pain

Chen et al., *Pain*. 2021 [Link](#)

U.S. provisional patent, #63210671

UConn Daily news report ([link](#))

Funded by the NSF CAREER and NIH U01 awards

Novel nerve-electrode interface for single-fiber recordings

Optical single-neuron DRG recordings [Link](#)

Mechanical neuromodulation of peripheral nerves

[Link](#)

[Link](#)

Journal cover
Advanced Neural Probes to Understand Brain Function

- Neurochemicals (more than 100 in the brain; rewarding, learning, and motor control functions; the treatments of neurological disorders).

- Developed advanced neural probes for real-time monitoring of dopamine and serotonin with cellular-scale spatial dimension and sub-second temporal resolution.

- Applications for understanding molecular mechanisms underlying various neurological disorders (Alzheimer’s and Parkinson’s disease).

Yi Zhang group in BME at UConn, supported by NIH BRAIN Initiative (RF1NS118287).
Thank you!

Questions?