

The Future of Ports will Involve Clean Energy

**Clean Energy Institute
University of Washington**

Daniel Schwartz

Director & Boeing-Sutter Professor of Chemical Engineering

December, 2022

Show hands: My Port is considering...

- Electrification of light, medium, & heavy duty ground fleets, ferries, aircraft...
- Improving resiliency & emissions w/ a renewable microgrid

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- Infrastructure & delivery of low carbon fuels
- Infrastructure & delivery of hydrogen



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- Port of Moses Lake: what it means to be a world-class battery materials manufacturing hub?
- How to manage the large number & scale of new opportunities for federal funding.



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CEI's Mission

Accelerate the adoption of a scalable and equitable clean energy future that will improve the health and economy of our state, nation, and world.

Established in
2013



**U.S. Energy
Research
University**

- US News & World Reports
- Shanghai Subject Rankings

32

Member Faculty
in Engineering and Sciences

28

Affiliated Faculty
across the University

70+

Testbed Companies

\$132 MM

New Grant Funding
for research centers led by
CEI Member Faculty in 2021

How do we accelerate clean energy innovations getting to market



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2014-15
West coast
listening tour

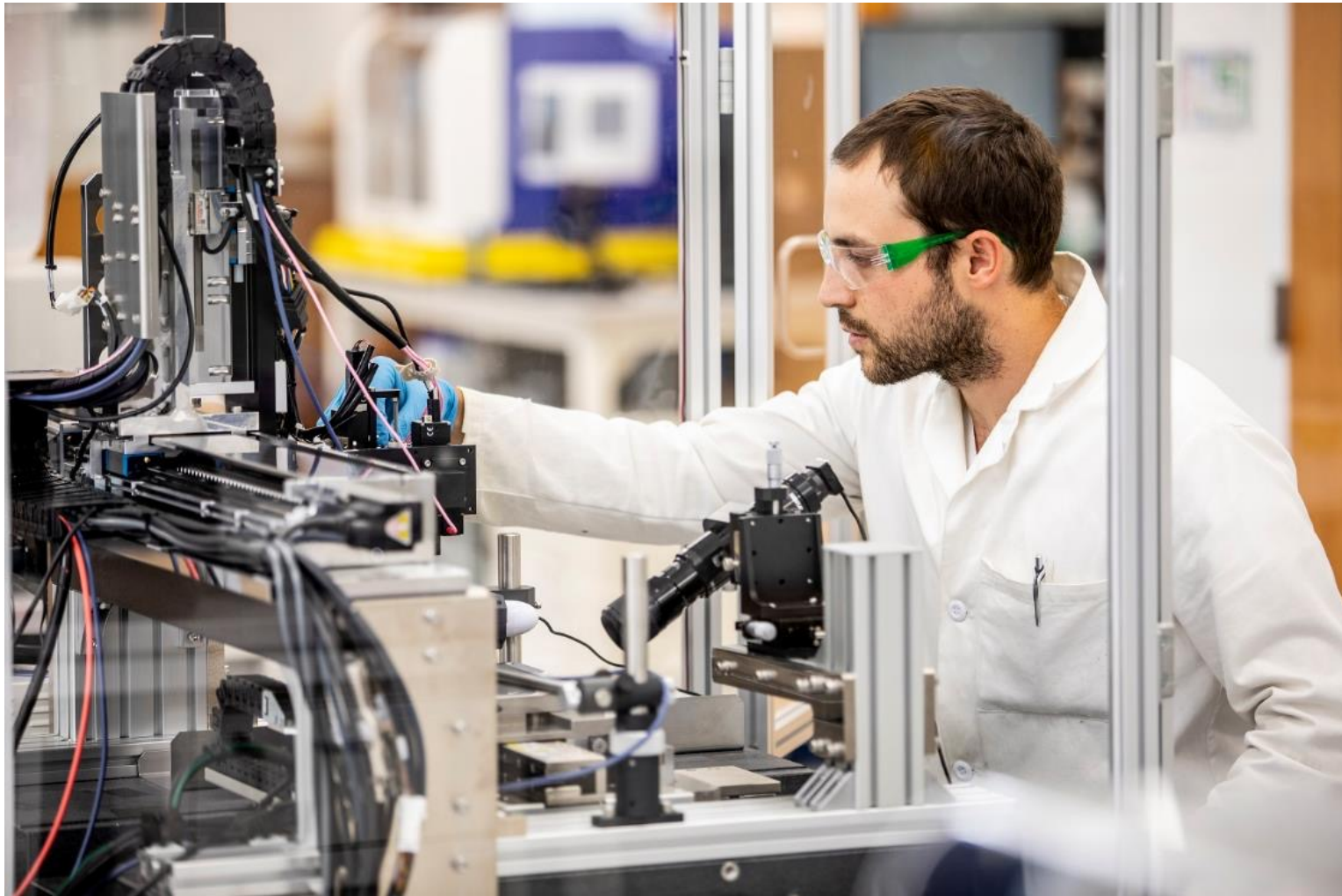


2018-19
DOE issues RFI, reports
findings

Tackle these market barriers:

- Cost and ability to test, validate, and demonstrate new technologies
- Access to industry collaborations
- Access to capital

Washington Clean Energy Testbeds



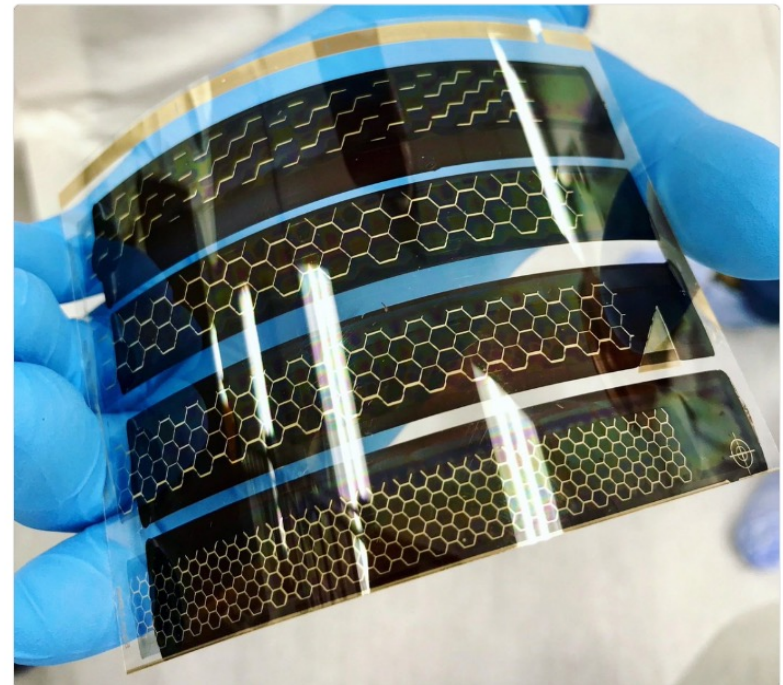
<https://www.scientificamerican.com/article/the-technology-to-reach-net-zero-carbon-emissions-isnt-ready-for-prime-time-but/>

The Testbeds integrate research, tech scale-up and validation

- Open-access facility with staff support and no IP entanglement
- Advanced manufacturing and testing capabilities
- Entrepreneur- and Investor-in-Residence programs
- Advisory Board filled with successful energy entrepreneurs



Printed perovskite solar ☀️ @WCETestbeds
@MIT @mlaitz @ewass14 #GridEdge
#SwartwoutInks #perovskite



Key Performance Indicators:

- 600+ Qualified Testbed Users
- 70+ Companies in our Testbed user ecosystem

The UW Clean Energy Testbeds Accelerate Fabrication, Testing, and System Integration



“The Testbeds saved us a \$1 million and 1.5 years of development time...”

Jerry Schwartz, Founder & CEO, Ecellix



“We accomplished as much in our three-day visit as we would have in a year at home.”

*Chaya Ben Yehuda, Staff Researcher
PO-Celltech, Israel*



“We have been able to pursue things here that we would not, or could not, have done otherwise.”

Tom Madden, CTO, BenAn Energy Technology

EPIC

ENERGY PROGRAM *for* INNOVATION CLUSTERS



U.S. DEPARTMENT OF
ENERGY

Office of
TECHNOLOGY TRANSITIONS

Northwest Cleantech Innovation Network

VertueLab



CleanTech Alliance™



CCA CASCADIA
CLEANTECH
ACCELERATOR



WASHINGTON
Clean Energy Testbeds

University of Washington Clean Energy Institute

CleanTech Hardware
Innovation Prototyping

Entrepreneur & Investor-in-Residence



Dr. Tom Madden
Entrepreneur-in-Residence



Jeff Canin
Investor-in-Residence

Forbes

ENERGY



Fueling a more sustainable future



Baosen Zhang
Associate Professor
Electrical & Computer
Engineering (2015)



Giles Eperon
Postdoctoral Fellow
Chemistry
(2017)



Matt Murbach
Ph.D. & CEI Fellow
Chemical Engineering
(2018)



Daniel Kroupa
WRF Innovation
Postdoctoral Fellow
in Clean Energy
(2019)



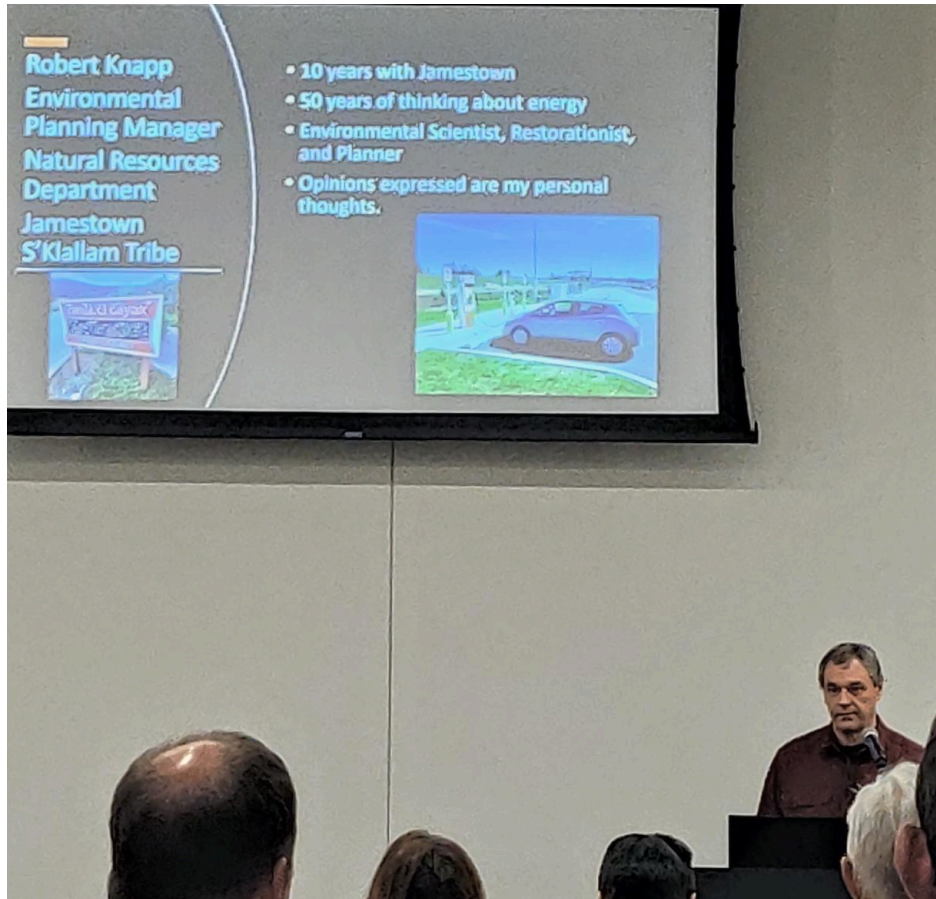
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Supporting Washington's Communities & Businesses thru Workforce Development

*Our impatient faculty, staff, students, and partners want to accelerate
technology for tackling climate change – **TODAY***

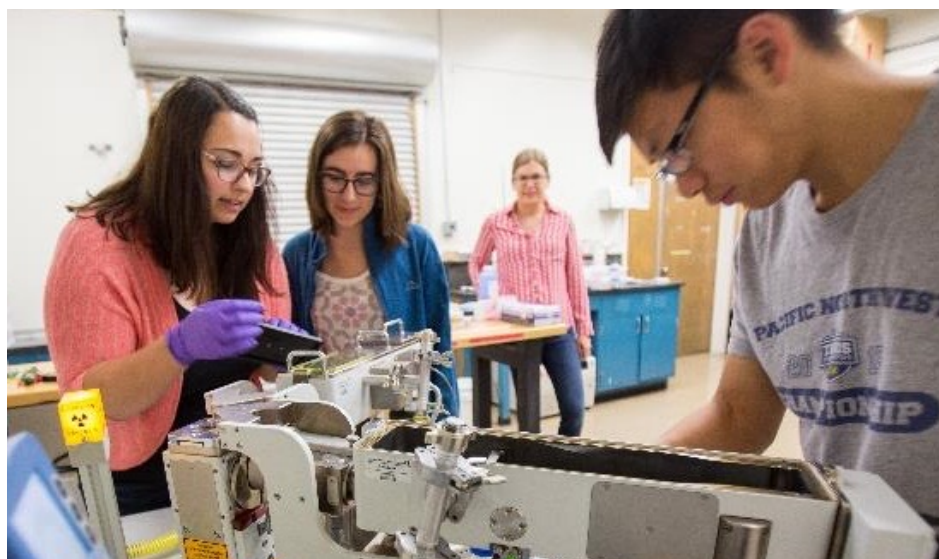
Community Engagement Testbed: Scalable support via Eng. Seniors



Microgrids for community resiliency on the Olympic Peninsula

- Jamestown S'Klallam Tribe
- Clallam County Sheriff (partner: Port of Port Angeles)
- Jefferson County Emergency Management

Attract New Talent: Clean Energy Bridge to Research Summer Program



PI: Schlenker
Chem

Years	CEBR Students	URM Participants	Women Participants	Total # of Applications
2017-21	60	30	32	1521

Attract New Talent: Energy Scholars Mentorship Program

Corporate Internships + UW Community



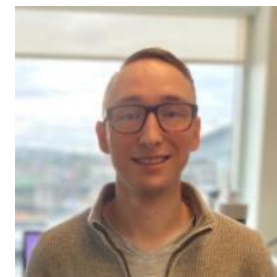
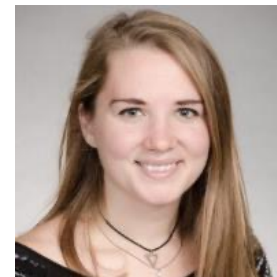
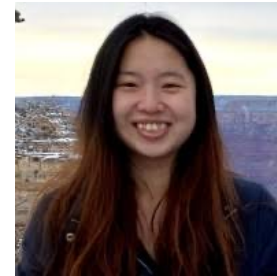
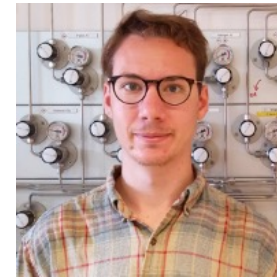
Cohort 1 in 2022: 7 HBCU + 3 UW students

Torrance Science Policy Analysis Track



Tony Usibelli
Policy Analyst in Residence

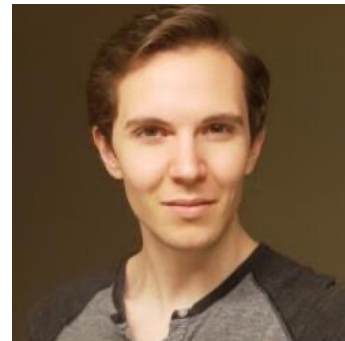
WASHINGTON STATE
Academy of Sciences
Science in the Service of Washington State



Torrance Tech Due Diligence Track



Corie Cobb
Program Director
WRF Innovation Professor
in Clean Energy



K-12 Engagement



Gaby Tosado, Chemical Engineering PhD graduate & CEI Fellow



Email dts@uw.edu with your partnering ideas, here are mine

The Clean Energy Testbeds

- Model feasibility of new clean energy integration concepts with engineering seniors or our professional staff.
- Use entrepreneur- or investor-in-residence office hours
- Use our world-class fabrication and testing capabilities

Meet our outstanding cohorts of summer students

Subscribe to our newsletter

<https://www.cei.washington.edu/news/newsletter/>

Thank you!



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