Innovation Community Super Connectors Help Accelerate the Path to Commercialization for New Defense-Critical Technology

401 TECH BRIDGE

EXECUTIVE SUMMARY

When Dr. Eliza Van Reen, Ph.D., founder of Circadian Positioning Systems (CPS), sought to expand the commercialization of her groundbreaking fatigue-mitigating technology that was being deployed by the Navy into additional military applications, she turned to RI Hub's Venture Mentoring Service. She was paired with leaders from 401 Tech Bridge and other crucial mentors to help navigate the complex requirements within the Department of Defense. By leveraging the extensive contacts and knowledge base within the Tech Bridge network to connect her to the procurement and acquisition community for military programs associated with CPS' technology, the company is making strides along the path from research and development into commercialization.

Dr. Eliza Van Reen, Ph.D.
Founder of Circadian Positioning Systems

CIRCADIAN POSITIONING SYSTEMS

UNLOCKING THE SECRETS OF SLEEP

Within the human body, the timing of events such as sleep, alertness, and hormone release are controlled by circadian rhythms. These 24-hour cycles are essentially part of the body's "master clock" and help to predict what will happen at certain times to prepare a person for the aspects of daily life.

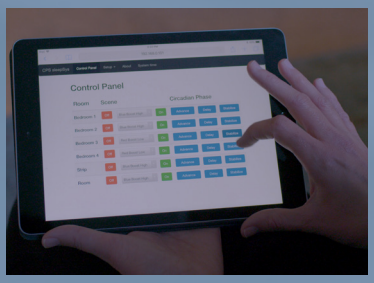
However, when circadian rhythms are not in alignment, alertness, performance, physical health, mood, emotional health, and more are negatively impacted. For example, there is a circadian rhythm to the sleep/wake cycle. When the body's internal timing system thinks its nighttime, but external environmental cues indicate that its daytime, a person is unable to perform at their peak because internal biology has not caught up with the external environment.

One of the most recognizable environmental signals that helps coordinate these internal timing systems is light. Recognizing this, Dr. Eliza Van Reen, Ph.D., founded Newport, RI-based Circadian Positioning Systems (CPS) to offer a software solution using data-backed circadian light recipes that help align internal biology to match external demands.

Dr. Van Reen has more than 20 years of experience in the field of sleep and circadian rhythms. She received her Ph.D. from Brown University, where the primary focus of her research was sleep and circadian rhythms. She then completed her postdoctoral training in sleep and circadian rhythms at the Division of Sleep Medicine at Harvard Medical School and the Brigham and Women's Hospital.

The technology being developed by Dr. Van Reen and the CPS team has the potential to save lives in mission-critical industries such as defense, where service members are often required to keep difficult schedules. CPS' technology was specifically designed to address fatigue and circadian misalignment in humans that have irregular sleep patterns and must work during times when performance is typically degraded. The CPS system uses tailored light recipes that helps circadian rhythms better align with scheduled sleep opportunities and work shifts. Facilitating a better match between an individual's circadian biology and their work schedule can help the person stay more alert and perform better.

CPS' lighting system includes a lighting source integrated with proprietary software and an interactive wearable patch. The patch is worn by the user 24/7 and measures circadian and sleep/wake patterns via an application that feeds that data to a software platform to control the lighting with personalized "recipes." Essentially, it helps biology work with the body instead of against it. CPS' lighting system is extremely flexible and can be installed in many environments (e.g., U.S. Naval warships, rapid deployment shelters, military aircraft, large boats, houses, and many more) and works with most smart lighting systems.



EARLY SUCCESS: HELPING MITIGATE FATIGUE FOR NAVAL WARFIGHTERS

After collisions involving the USS Fitzgerald and USS John S. McCain in 2017, the Navy conducted multiple in-depth investigations to determine what factors may have contributed to these incidents. Fatigue and circadian rhythm misalignment were found to be among the contributing factors.

Fatigue issues have plagued Navy warfighters and those serving in critical positions in the Department of Defense (DoD) for decades because these individuals have grueling and highly irregular schedules. These issues have been explored in-depth by the Crew Endurance Team at the Naval Postgraduate School (NPS) led by the Navy's sleep expert, Dr. Nita Shattuck.

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Dr. Shattuck learned of CPS' technology and began using the technology in testing and experimentation performed at the Naval Postgraduate School. The technology has been tested in military environments including aboard ships and the Aviator Circadian Entrainment laboratory study as well as additional crew endurance studies. The testing and experimentation performed at NPS has showed positive results, affirming the effectiveness of the technology.

THE ROAD TO COMMERCIALIZATION

The sleep deprivation topic is an urgent issue across all branches of the DoD; there have been numerous performance issues caused by sleep irregularities in the Marines, Navy, Army, Air Force, Special Forces and more. In fact, according to a report published in 2017, sleep may be the most important biological factor that determines service member health and combat readiness. The DoD has been actively trying to solve the issue of how to get service members to perform better when they are being asked to keep difficult schedules and have different sleep opportunities.

As testing has continued to find additional implementation scenarios, Dr. Shattuck notes that Circadian Positioning Systems' technology has tremendous potential to help additional military communities. Given the applicability within the DoD, Dr. Van Reen and her team have prioritized commercializing their technology for additional DoD environments and broader applications. However, this can be an arduous process within the DoD and often involves securing non-R&D funding associated with commercialization and specific programs of record to achieve validation in operationally relevant environments.

Dr. Van Reen initially consulted with RIHub Venture Mentoring Services (VMS), a non-profit providing business guidance to Rhode Island entrepreneurs, to assist with this crucial phase and was assigned four mentors: Christian Cowan, 401 Tech Bridge executive director, Kirk Jordan, Bert Lederer, and Matt Lukens. The mentor team also brought in Lee Silvestre, Naval X Northeast Tech Bridge/401 Tech Bridge coordinator. The team began working with Van Reen on design for commercialization initiatives and making connections with points of contact in the Navy to help get her closer to the procurement and acquisition community for programs that might be associated with CPS' technology.

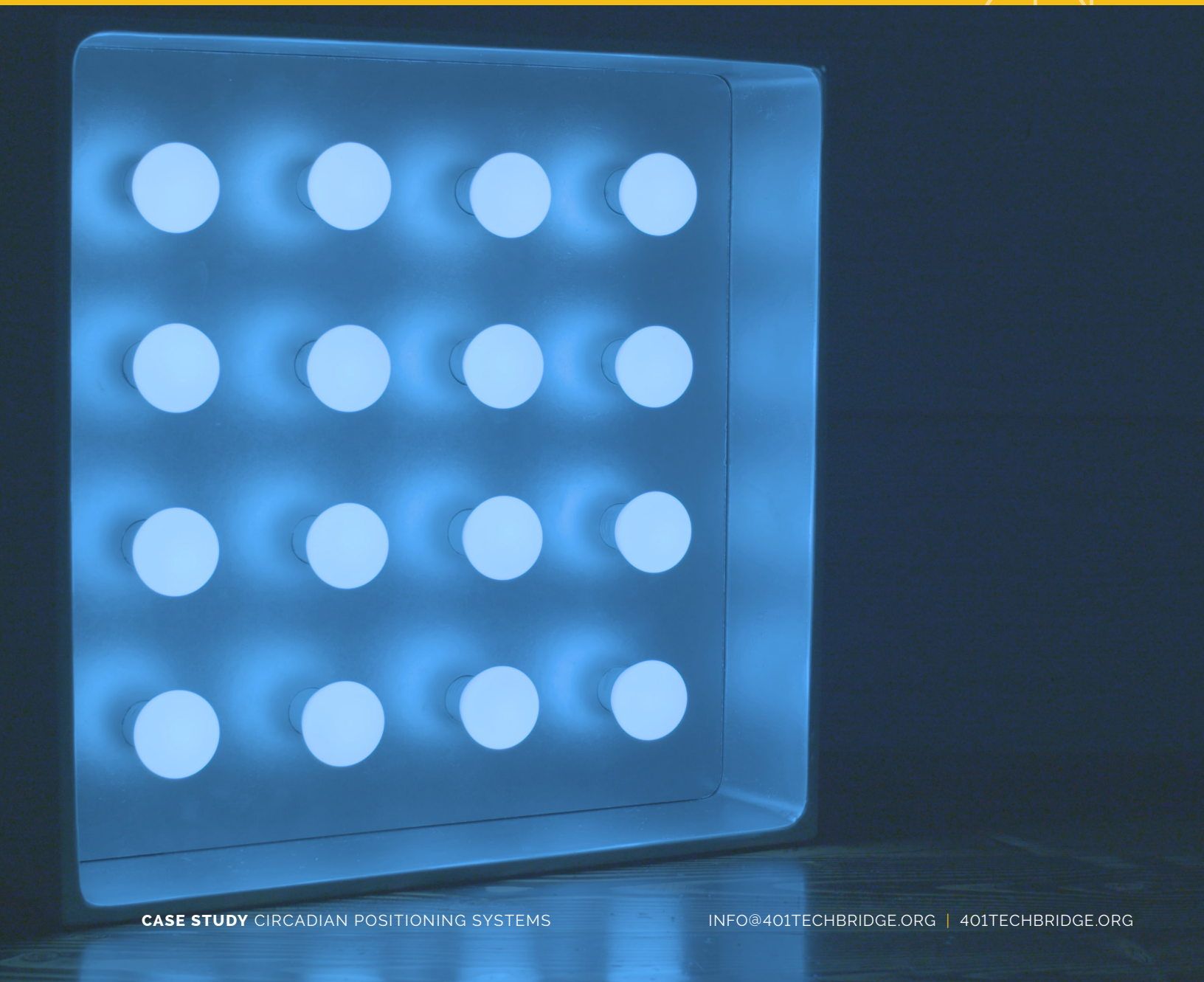
TECH BRIDGES: MAKING THE RIGHT CONNECTIONS

The Naval X Tech Bridge initiative was created by the Department of the Navy to increase collaboration, knowledge sharing, and innovation with leading-edge tech companies and innovation partners to accelerate solutions to the warfighter. The Northeast Tech Bridge is part of NavalX Tech Bridge initiative. 401 Tech Bridge, a Rhode Island-based nonprofit economic development organization that creates growth in the state and regional economy by supporting the acceleration and development of technology, serves as the hub for NavalX North East Tech Bridge activities, helping the Navy build relationships with small businesses, entrepreneurs, and startups that have potential to address mission critical needs with novel technologies. The close and seamless collaboration between the Northeast Tech Bridge and the 401 Tech Bridge, which is a business unit of the University of Rhode Island Research Foundation and not a Navy entity, is a national model for collaboration among the sixteen Naval X Tech Bridge sites across the country.

"At this phase of commercialization, there's a lot of emphasis on return on investment, so it takes a different strategy than R&D," noted Dr. Van Reen. "Navigating this 'middle' is a big challenge and I have been incredibly fortunate to partner with this talented team of individuals who have been working to introduce me to those who have successfully done this before, especially on the procurement side. I have found this network to be absolutely essential, especially in navigating the complex requirements within the Department of Defense."

The team established crucial contacts for Dr. Van Reen and her team with the NPS Office of Research, NUWC Division Newport, and other resources within the Tech Bridge community. They also connected Dr. Van Reen to Dr. Joe Rosen at Dartmouth Hitchcock Medical Center and Dartmouth University, who helped to find additional opportunities to help push this proven technology further outside of the lab. Dr. Rosen has since connected CPS with the Medical Technology Enterprise Consortium (MTEC), and helped the team submit an entry to MTEC entitled "Wearable device and technology for accurate real-time assessment of sleep and circadian parameters," that could lead to further opportunities.

"Technical founders often feel pressure to do everything themselves, and don't realize that there are networks of people out there that can help if they just reach out and ask," said Christian Cowan, 401 Tech Bridge Executive Director. "In this case, VMS, 401 Tech Bridge, Northeast Tech Bridge and others saw the incredible potential of Circadian Positioning Systems' technology and came together to support Dr. Van Reen, leveraging our contacts and the knowledge we have gained about the process of moving from research and development into acquisition. We are incredibly excited to see this technology in action to help address a critical issue faced by so many service members."



ABOUT 401 TECH BRIDGE

401 Tech Bridge accelerates the journey from concept to prototype to commercial scale while creating business opportunities. It facilitates collaboration across industry, government, and academia and leverages the resources and expertise of its vibrant advanced materials and technology ecosystem, which spans industries and activities ranging from infrastructure development and naval research to oceanographic and offshore wind enterprises. 401 Tech Bridge offers meeting, training, lab, and equipment space for industry, government, and academic partners to collaboratively problem-solve, develop concepts, build, and test prototypes, and present solutions. It also connects companies into research divisions at the University of Rhode Island and other universities and institutions across the region, offering facilities for research, prototyping, testing and validation of concepts alongside faculty researchers and students.

The 401 Tech Bridge is a business unit of The University of Rhode Island Research Foundation and serves as a partner intermediary organization for the Naval Undersea Warfare Center Division Newport, supporting the Naval X Northeast Tech Bridge. It receives support from the U.S. Economic Development Administration, the National Institute of Standards and Technology's Manufacturing Extension Partnership (NIST MEP), the Rhode Island Commerce Corporation, The Rhode Island Foundation, and the Van Beuren Charitable Foundation.