

Unfolding Innovation: Scaling Space Power with Beyond Reach



Growing power demands are exposing the limits of conventional space structures. **Beyond Reach Labs** is engineering deployable solar array architectures that stow compactly for lift-off and unfold in orbit to deliver dramatically more energy capacity. Built to withstand launch and perform reliably in harsh environments, these large-scale deployables unlock power levels that enable new classes of missions in space.

As satellites take on heavier workloads and new infrastructure moves into orbit, energy demand is increasing exponentially. Boosting power usually requires larger solar panels, which are more prone to bending, vibrating, breaking, and escalating costs. Beyond Reach Labs takes a different approach. Instead of forcing rigid structures to scale beyond their limits, their patented deployable architecture changes shape once in space, extending smoothly while staying stiff and controllable. The result is a system that delivers dramatically more usable power without demanding more from the launch vehicle — a reminder that sometimes the most effective way to grow isn't to add more mass, but to let the structure unfold.

Founded in 2023 by University of Pennsylvania roommates and longtime collaborators **Mitchell Fogelson** and **Pele Collins**, Beyond Reach Labs combines deep space expertise with practical engineering experience. Fogelson earned his PhD at Carnegie Mellon University (CMU) working with NASA on kilometer-scale deployable structures, while Collins spent seven years at SpaceX leading Dragon parachute engineering, the critical safety mechanism designed to stabilize a spacecraft during reentry. Their shared technical knowledge and vision are driving a new class of deployable solar panels designed to deliver up to ten times more usable power for satellites—without adding mass or volume.

Challenge

Beyond Reach Labs had developed a novel deployable architecture, but demonstrating its value required more than strictly technical knowledge. As the company prepared for key industry events and startup competitions, the team needed a working physical prototype to showcase the system's deployable mechanics, scale, and reliability, giving potential partners and investors a tangible way to understand the technology and its impact.

The deployable demo needed to unfold smoothly, pack down efficiently, and survive repeated transport and hands-on use, all while faithfully showcasing the collapsible mechanism at the heart of Beyond Reach Lab's technology. This was not a conceptual model, but a functional system that had to look polished, perform reliably, and clearly translate advanced engineering into real-world applications.

Project Details

Company: **Beyond Reach Labs** Year Founded: **2023**

Founders: **Mitchell Fogelson, Ph.D.** and **Pele Collins**

Programs Participated In (Year):
Robotics Factory Scale Program (2024)
Robotics Factory Accelerate Program (2025)
Robotics Factory Manufacturing Assistance (2025)



Solution

Utilizing the Scale and Accelerate programs, Beyond Reach Labs relied on the Robotics Factory to transform their deployable demo from an abstract design concept into a polished, fully operational prototype. On the electrical side, the Robotics Factory team designed and built a custom control circuit with a DC motor and pendant switch for smooth, push-button deployment. On the mechanical side, the team engineered and fabricated key components, mounts, and an aluminum base with upgraded rail slides allowing for stable, repeatable motion. Hands-on manufacturing assistance from **Andrew Katon** also ensured that future prototypes could be sourced and produced locally in southwest Pennsylvania.

A critical collision between the extender and its base mounting joints threatened the demo as the Pittsburgh Robotics & AI Discovery Day neared. Led by **Brian Dougherty**, the Robotics Factory team stepped in to troubleshoot and resolve the problem, making corrections to the system that deployed smoothly and reliably in front of a live audience. The success of the demo and the collaboration with Robotics Factory helped Beyond Reach Labs move critical prototyping work out of the university setting and into a production-oriented environment. The deployable prototype was critical for demonstrating technical capabilities, securing early funding, and taking meaningful steps toward turning research prototypes into viable products for ground and space applications.

Beyond Reach Labs is building for space, but its foundation is firmly rooted in Pittsburgh. For Mitchell Fogelson, the region offers a rare combination of deep materials and manufacturing expertise alongside a world-class robotics and innovation ecosystem. Support from Innovation Works and the Robotics Factory, Project Olympus, the University of Pittsburgh's (Pitt) entrepreneurial network, and CMU's



"We learned so much from our Robotics Factory mentors and fellow founders, in just a few short months."

--Mitchell Fogelson
Co-Founder and Co-CEO,
Beyond Reach Labs

Swartz Center for Entrepreneurship, where Fogelson also served as an Innovation Commercialization Fellow, has been both practical and personal. The density of talent and willingness to collaborate helped Beyond Reach Labs transition from university research to a venture-backed startup, culminating in a major win at the 2025 Keystone Space Collaborative Innovation Challenge.

That regional strength has also shaped how the company approaches customer discovery. By engaging with partners across defense, infrastructure, and space, Beyond Reach Labs has sharpened its focus on building deployable systems that perform reliably in remote and demanding environments. Looking ahead, the company plans to grow its team by drawing on talent from CMU, Pitt, Duquesne University, and the region's manufacturing base, starting with space deployables and expanding into terrestrial infrastructure. Fogelson's advice to fellow founders reflects the ecosystem that helped launch Beyond Reach Labs: stay focused on the problem, remain curious, and support one another. In Pittsburgh, that approach turns ideas into innovations.

Innovation Works and the Robotics Factory

Innovation Works is one of the most active early-stage investors in the country and the most active in Pennsylvania. Since its inception of the seed fund in 1999, Innovation Works has invested in over 780 companies that have gone on to raise \$3.4 billion in follow-on funding. Innovation Works is part of the Ben Franklin Technology Partners network, which has catalyzed economic growth over the last 30 years by providing access to capital and networks that help foster innovation and technology-based economic development in Pennsylvania. The Robotics Factory is an array of robotics programs led by Innovation Works and the Pittsburgh Robotics Network. Learn more at innovationworks.org and roboticsfactory.org.