

Adaptive Technology Gives Those With Complex Disabilities Skiing Independence

University of Utah



Utah is known for having the “greatest snow on Earth,” and locals love hitting the slopes to ski or snowboard. But what happens when a life-changing accident leaves you unable to participate in the sport you love? Enter TetraSki.

TetraSki, developed at the [University of Utah](#), is a high-tech, adaptive, alpine ski that allows individuals with severe spinal cord injuries and other complex physical disabilities to return to the slopes with a degree of independence that can be life changing. Prior to the TetraSki, these individuals would ski dependently in sit-down devices with instructors providing the majority of the turning and speed control input.

In the TetraSki system, sit-skiers use a joystick or their breath to control their turns and their speed with the help of battery-powered components that are built into the equipment. These electric actuators allow a skier with limited strength and dexterity to operate the TetraSki with a high degree of performance and independence. A trained instructor will ski behind the TetraSki user, with a safety tether connecting the two, but experienced TetraSkiers will only be assisted by the instructor in an emergency.

For individuals who were avid skiers before suffering a traumatic injury, that level of independence brings the experience closer to what they remember and an important part of the rehabilitation process, according to Dr. Jeffrey

Rosenbluth, a spinal cord injury rehabilitation specialist at the University of Utah's Craig H. Neilsen Rehabilitation Hospital. Rosenbluth created the TetraSki with mechanical engineering support from the University of Utah. The technology is now distributed worldwide through a nonprofit business called Tetradapt.

"I've always felt if you want to follow rehabilitation to its furthest reaches, you have to help people get back – all the way – to those things that were important to them," Rosenbluth said. Those things often include sports and hobbies, like skiing.

In 2005, Rosenbluth teamed up with Tanja Kari, a Finnish Paralympic skier, to run Technology Recreation Access Independence Lifestyle Sports (TRAILS), an adaptive recreation program at the university. TRAILS, initially a small handcycling group for the spinal cord injury community, quickly developed into an extensive community program focused on the recreation, socialization and education needs of individuals with complex physical disabilities.

The involvement of University of Utah students and faculty, including lead engineer Ross Imburgia, led to the development of TetraSki. Rosenbluth and his team knew they had a great product, but they realized they didn't have the business knowledge to get it to the right people.

"I needed help at every step: understanding intellectual property, understanding patents and protections and trademarks, understanding the potential of the device, even figuring out leadership," Rosenbluth said.

Rosenbluth sought help from the university's Partners for Innovation, Ventures, Outreach & Technology (PIVOT) Center, which serves as a catalyst for the regional innovation economy, integrating technology commercialization, corporate engagement and economic development.

After bringing in mentors and attorneys, the PIVOT Center helped Rosenbluth establish a business called Tetradapt Community, which leases skis globally and provides specialized training, support and repairs. PIVOT also trademarked Tetradapt and licensed several technologies to the non-profit.

With PIVOT's help, TetraSkis have been distributed to adaptive ski programs across the U.S. as well as in Canada and Europe, along with a comprehensive training package for instructors and participants. TetraSki achieved a significant milestone in 2019 when it was introduced internationally at the 2019 World Para Alpine Skiing Championships in Slovenia. The first National TetraSki race was held in 2022, and this annual event will expand to become a global competition in 2024. Tetradapt is working on a pathway toward inclusion in Paralympic-level competition.

This story was originally published in 2023.

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