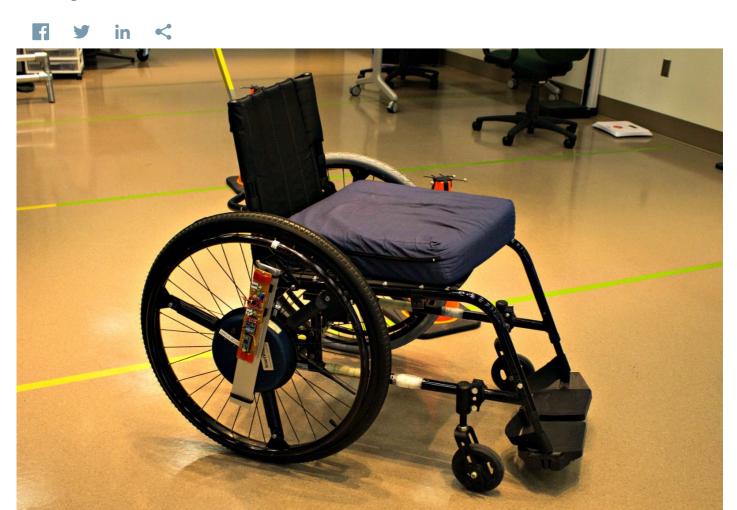# Activity Monitoring For Wheelchair Users

University of Alberta

Researchers from the University of Alberta have applied wearable technology to the wheelchair to help prevent shoulder injuries and generate a trove of accessibility data to users. With help from tech transfer partner TEC Edmonton and the start-up company Redliner Inc., the device is making its way to market.

When Martin Ferguson-Pell, Ph.D., learned that 66 percent of wheelchair users with a spinal cord injury experience shoulder pain and injury, he was inspired to help reduce wear and tear to users' shoulders. He and his team developed a "wearable" device that could be attached to the wheel to collect measurements including the number of strokes or pushes, the length of the stroke, the rolling resistance and the distance covered. The propulsion parameters are then relayed to the user's smartphone or web dashboard.

Feedback from the device also includes the incidence of "redliner" events, or the number of times the wheelchair user exceeds an exertion level that is likely to produce an injury. For users who are consistently overexerting their upper extremities, the data can help make a case for a power-assisted chair or for more accessible work environments.

The technology management team at TEC Edmonton, a joint venture between the University of Alberta and Edmonton Economic Development, connected Ferguson-Pell with Calgary entrepreneur David Evans, who founded Redliner and licensed the exclusive rights to developing, manufacturing and selling the battery-operated Redliner™ device around the world.

The Redliner has the accessibility characteristics of a typical wearable: The company anticipates the cost of the device to be around $100 and have a battery life of about four days.

Evans plans to continue collaborating with Ferguson-Pell's group, which hopes to develop an anonymized repository of data from users to help researchers understand the root causes of shoulder injury and to identify wheelchair-accessible routes.

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