

mind-set was totally different: she wanted to show what she can manage despite her paralysis. For her, the most important thing was to get out to the arena, even if it was in a noncompetitive way. The three pilots have one common motivation factor: to inspire other people. All of us had great fun (see Figure 2).

**RAM:** Could the Cybathlon become a benchmark for assistive technologies?

**Auberger:** It could, but I am not sure if it should. Benchmarking always comes with standards that limit creativity. It is very hard to benchmark

rehabilitative technology because users are individuals. At the Cybathlon, we saw that the pilots have a great influence on the result. Therefore, it could be misleading to define such an event as a benchmark. It is hard for an academic team with a pilot recruited for a clinical trial to compete against big industrial players who send top athletes. In the future, Cybathlon results can be used for marketing reasons but hopefully not for technology benchmarking.

**RAM:** What do you expect from a future Cybathlon? Will you join again?

**Auberger:** I like the competitive aspect of Cybathlon, in particular, the fun part of it. Cybathlon should be a festival about inclusion and pushing technological limits. People with disabilities, scientists, engineers, and spectators meet in the surrounding conditions of this sportive environment and show what they are able to do, exchange ideas, and have fun. The event also creates a great opportunity in project organization because it sets a motivating deadline for the research and development team. I would definitely like to join again.

## Team ReWalk Ranked First in the Cybathlon 2016 Exoskeleton Final

By Erwin Prasser and Arturo Baroncelli

The following is an interview conducted by Peter Wolf, a guest editor of this issue of *IEEE Robotics and Automation Magazine* (RAM), who interviewed Mela Ikanovic, team ReWalk, ranked first in the Cybathlon 2016 Exoskeleton contest.

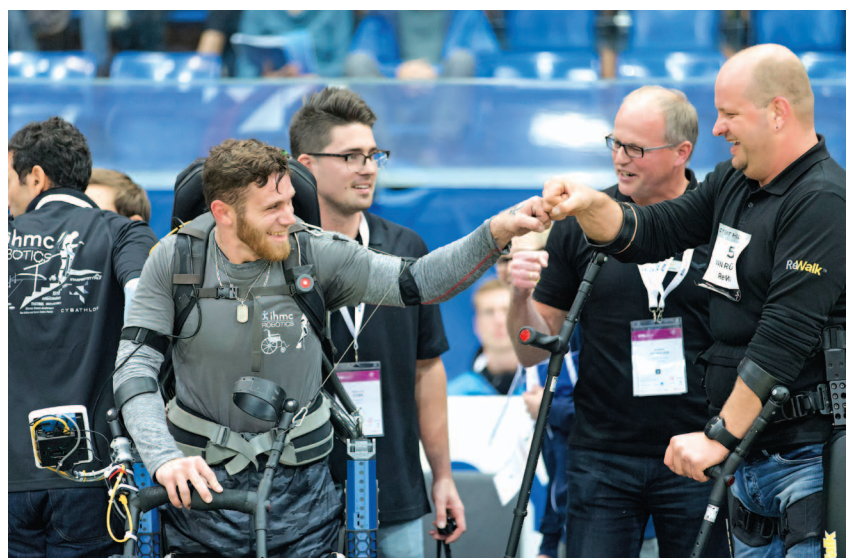
**RAM:** Why did you decide to participate?

**Mela Ikanovic:** We became aware of the Cybathlon project in December 2013. This was still one year prior to our official product launch of the ReWalk Personal System, and our market focus was within the clinical and rehabilitation segment. Yet, the importance of a platform created with Cybathlon was immediately visible for us. Well aware of the influence and impact that Paralympics had for disabled people worldwide, we expected that Cybathlon would create the same impulse toward robotic-assisted technology development and its implementation. Our expectations have been fully met. The echo of Cybathlon even reached Nepal; one of our key opinion leaders

was part of the international Alpinist group and some members of the group were watching Cybathlon's live broadcast online. Our key opinion leader did not know about Cybathlon, but he knew about exoskeleton technology, and, after Cybathlon, he sent us a message congratulating us and our pilot.

**RAM:** Did the decision to participate affect your research and development activities?

**Ikanovic:** ReWalk Exoskeleton is developed to allow the persons with lower limb disabilities to stand upright, walk, turn, and climb and descend stairs, allowing the user independent, controlled



**Figure 1.** A few participants after the exoskeleton race. Mark Daniel (left) (Team IHMC of the Institute of Human and Machine Cognition, Florida, United States) and Andre van Rüşen (right) (Team ReWalk) congratulate each other. (Photo courtesy of the ETH Zürich, Switzerland.)

walking while mimicking the natural gait pattern of the legs. The majority of the tasks within the Cybathlon exoskeleton race included those regular daily operations that each ReWalker learns to execute in the system. We have not applied any changes to software or hardware to make our participation more successful. Ultimately, ReWalk Exoskeleton is not designed as a sports device but as a technology to enable the paralyzed person upright mobility. The limits we have seen—i.e., the stone path within the exoskeleton race track—have been clearly defined and accepted as such. But taking a seat and standing up completely independently, managing the obstacles along the walking path (the normal pedestrian traffic), walking up and down the ramp, opening the door and closing it, ascending and descending the stairs—all those race tasks are also the daily tasks to be completed when walking in ReWalk and utilizing it in everyday life. Our pilot managed those at the best of his skills and ReWalk's technology.

**RAM:** What was the most challenging issue in which to participate? What was the impact on your pilot?

**Ikanovic:** The most challenging issue was to decide which ReWalker would take part in Cybathlon! Indeed, as the most used exoskeleton technology worldwide, we are proud to see numerous skilled ReWalker users worldwide, who are using the system daily and in their everyday lives. So, it was certainly a difficult decision to make, as it was also a way to pay tribute to the commitment and passion that each ReWalker user performs when learning to walk again. Finally, we decided to take on the Cybathlon challenge with Andre van Ruischen, the ReWalker user who has always pushed himself to the limits, as someone whose sportsmanship is paired with the goal to inspire and motivate all others whose lives are affected by spinal cord injury (see Figure 1). His victory was also a victory for his peers and other pilots, those who took part at the first Cybathlon, and those who will join in the upcoming competitions.

# Assistant Professor in Mechanical Engineering, Tenure-Track

The Department of Mechanical & Industrial Engineering in the Faculty of Engineering & Architectural Science at Ryerson University in Toronto, Canada, invites applications for the tenure-track position of Assistant Professor in Mechanical Engineering. The expected starting date is July 1, 2018, subject to final budgetary approval. Candidates should hold a PhD degree (or be near completion) in Mechanical Engineering, Mechatronics Engineering, or Electrical Engineering. Postdoctoral experience is an advantage. The selected candidate must be eligible to register as a professional engineer (PEng) in the province of Ontario. **Candidates must have a demonstrated commitment to upholding the values of equity, diversity, and inclusion as it pertains to service and teaching, as well as scholarly, research or creative activities.**

Candidates must have outstanding research and teaching abilities in Mechatronics Engineering, preferably with expertise in robotics and control engineering, MEMS, and their applications. However, consideration will be given to all exceptional candidates. The successful candidate will have the ability to contribute to our undergraduate and graduate programs. **Candidates should hold a strong research profile (e.g., evidence of an emerging scholarly record, and the ability to establish and maintain an independent, externally funded research program), evidence of high-quality teaching and student training, and a capacity for collegial service.**

The Department of Mechanical & Industrial Engineering has a complement of 37 faculty members and offers four-year accredited programs leading to Bachelor of Engineering (BEng) degrees in Mechanical Engineering and Industrial Engineering. The department also offers graduate programs leading to a Doctor of Philosophy (PhD) degree, Master of Applied Science (MASc) degree, and Master of Engineering (MEng) degree. The Department of Mechanical & Industrial Engineering is home to approximately 850 undergraduate and 150 graduate students, and is one of the top engineering departments contributing to research activities at Ryerson University.

**Interested candidates can view the full posting details, including instructions on how to apply, by searching under "Faculty Opportunities" at [www.ryerson.ca/jobs](http://www.ryerson.ca/jobs).**



**Figure 2.** The exoskeleton race gold medalist Andre van Rüschen (center), who was supported not only by ReWalk Robotics trainers and by service team members, but above all by his wife, Gerlinde, and his son, Tim (back row, left). (Photo courtesy of ETH Zürich, Switzerland.)



## Worcester Polytechnic Institute

### Assistant Professor, Biomedical Engineering

The Department of Biomedical Engineering (BME) and the Robotics Engineering Program (RBE) invite applications for a tenure-track joint position at the Assistant Professor Level.

Candidates should have a Ph.D. in BME, RBE, or a closely related field. We especially encourage applicants with an expertise in medical robotics, bio robotics, or biomechanics that synergize with our existing research areas.

Applicants must show potential for an innovative and sustainable research and teaching career. We expect faculty to be involved in a balance of research, teaching, and service.

The Department of Biomedical Engineering delivers a vibrant ABET-accredited undergraduate program with approximately 400 undergraduate and 50 graduate students pursuing MS, MEng, and Ph.D. degrees. BME faculty are leaders in several interdisciplinary programs including an NSF IGERT with the mission of training leaders in Biofabrication and an NSF REU program focused on training female and underrepresented minority students.

The RBE Program, with approximately 370 undergraduate and 170 graduate students offers robotics engineering BS, MS, and Ph.D. degrees. In 2016 this ABET accredited program was awarded the inaugural ABET Innovation Award for its truly interdisciplinary, project based, curriculum which integrates Computer Science, Electrical & Computer Engineering and Mechanical Engineering content.

Applications should include curriculum vitae, statements of teaching and research interests, and a list of five professional references submitted to <http://apptrkr.com/1071809>

WPI's reputation as a rigorous and innovative university rests on the shoulders of its faculty. A highly selective, private technological university and one of the nation's first, WPI believes that when great minds work together, great advances follow. At WPI, the boundaries to multidisciplinary collaboration are low—faculty members, students, and other partners work together on the real-world projects and purposeful research that are hallmarks of the WPI experience. We are most proud of a recent No. 1 ranking for "faculty who best combine research and teaching." (Wall Street Journal/Times Higher Ed, 2016) The university's campus is located (one hour west of Boston) in Worcester, Massachusetts, a thriving 21st century college city recognized as a growing hub of scientific and technological innovation.

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# GREAT MINDS at WORK

**RAM:** Could the Cybathlon become a benchmark for assistive technologies?

**Ikanovic:** Cybathlon has already accomplished a very important benchmark: the first Cybathlon presented and made visible the robotic-assistive technology as the future, which is already here and among us, increasing the acceptance of the robotics, inspiring and encouraging the upcoming generations of the developers, raising the awareness for the needs of disabled persons to the next level.

**RAM:** What do you expect from future Cybathlons? Will you join again?

**Ikanovic:** Cybathlon has the great potential to become a unique platform for robotic industries and the adopters and users of the assistive robotics devices to show off the latest technology and newly gained skills. Will we join again? Seeing our proud gold-medal winner Andre (see Figure 2), there are certainly many ReWalkers striving to experience the incredible enthusiasm and sportsmanship spirit of the next Cybathlon and defend the title of the champion.