NEWSLETTER

PULSE RACING VIII

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From Records to Research: The Next ChapterAwaits

Dear Readers,

Time flies, and here we are – at the end of PULSE Racing VIII! The past months have been filled with inspiring events, and connections and research going on for the following year!

Our mission remains strong: to raise awareness about FES cycling and create opportunities for individuals with spinal cord injuries. We are transitioning to the next team PULSE Racing IX!

In this edition, we share insights from the previous team and the accomplishments. We hope this update inspires you to stay connected and support our journey.

Thank you for being part of the PULSE Racing Community!

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PULSE Racing

RESEARCH UPDATES

At PULSE Racing, training isn't just about working hard—it's about working smart. That's why Peter Jr. follows a structured macrocycle training plan, designed to improve his performance step by step. In the future, Peter Sr. will also start following this approach.

BREATHING TO BOOST PERFORMANCE?

With the Pulse Racing research department we are currently exploring how breathing exercises might improve FES performance by increasing blood circulation at the muscle level.
Our hypothesis is that the blood circulation on the level of the muscle will improve as a result of a hyperventilation breathing exercise. During initial testing we observed a rise in heart rate, and more importantly, an increase in power output from the athlete. To investigate this further, we are currently doing tests with 'Near-Infrared Spectroscopy (NIRS)', which is a technique where light in the 'near-infrared' region is used to measure the circulation of blood on the level on an individual muscle. NIRS shows us how much hemoglobin (a protein inside of red blood cells that transports oxygen) is bound to oxygen or carbon dioxide. We are also able to see if the circulation is increased.
If we find that breathing exercises increase the blood flow in the muscle this could become a viable strategy during FES races, but also during regular training of anyone with a spinal cord injury using FES all around the world!
We are still collecting and analyzing data. Stay tuned for the results!

HOW NUTRITION MIGHT INFLUENCE MOTIVATION

Last cycle, we were kicking off a project that explores how an athlete's diet might influence their confidence and motivation during training. Inspired by research on the gut–brain axis — which shows links between what we eat and how we feel — we are focusing on self-efficacy, or how strongly someone believes in their ability to succeed. Our goal is to see whether better diet quality can boost that belief, and in turn, lead to better performance in FES training.

We are collecting weekly diet reflections, short mood and energy check-ins before training sessions, and combining this with existing training data to explore possible patterns.

It is still early in the process, and the research will continue next cycle, but we are excited to better understand how body and mind work together during spinal cord injury recovery.

For more details, references, or to discuss these findings further, please do not hesitate to reach out to contact us.

ATHLETES SPOTLIGHTS

As both athletes continue with us next year, we look on both of their biggest milestones these past months.

Peter van Burk breaks world record at Wings for Life

On 4 May, Peter van Burk became the first FES-cyclist to take part in the Wings for Life World Run in Breda. Using only FES to activate his paralyzed leg muscles, Peter cycled 19.8 kilometers without motors and without hand-assist.

His goal was to see how far he could go. The result was a performance that exceeded all expectations. He reached 17.7 kilometers when the chaser car caught him, and went on to finish the lap, reaching 19.8 kilometers in total. His average speed was 10.5 kilometers per hour.

This is the longest documented distance covered in an FES cycling event under outdoor conditions, and it shows what is possible when structured training meets determination. The course in Breda included uneven road surfaces and inclines up to 2.8 percent, which makes the result even more impressive.

Peter van Burk entered as an unofficial participant, since FES-cycling does not fit into existing race categories. Thanks to the support of the event organisers, his effort became part of the bigger message: raising awareness for spinal cord injury and showcasing the potential of FES. Events like this help us reach new audiences and bring attention to a technology that is so important.

Peter van Egdom breaks into the outdoors

When Peter van Egdom joined the PULSE Racing team, he had a clear and ambitious goal: to one day cycle outdoors again. It was a powerful vision, that seemed far off in November 2024, when he could manage only 10 seconds of stationary cycling without resistance. Fast forwards to May 27, and Peter was cycling outdoors in Berlin at Tempelhofer Feld. This achievement did not happen overnight. It is the result of structured interval training, customized stimulation programs, and probably the still existing muscle memory of a former triathlete. But the benefits go far beyond time and distance. Improved wound healing, better gut health, and a significant boost in mental wellbeing all signal the broader impact of FES cycling in Peter's life.

EVENT RECAP: FROM THE LAB TO CONGRESSES

From athlete training sessions in our lab and workshops with visitors, to career days and major international conferences – here's a look at what's been happening with us.

On June 3 and 4, PULSE Racing took part in **ISCOMS** Groningen 2025, one of the largest student-led biomedical congresses in the world. We hosted two hands-on workshops, both fully booked, where students and young researchers explored the principles and potential of FES. Participants learned about the science behind FES-cycling, saw how stimulation is applied in training, and had the chance to experience it themselves.

At this year's **NVDG** (Nederlands-Vlaams Dwarslaesie Genootschap) Congress at Sint Maartenskliniek in Nijmegen, we had the opportunity to bring FES directly into the hands and minds of healthcare professionals working in SCI rehabilitation.

We hosted two practical workshops, where we introduced participants to:

- The principles and applications of Functional Electrical Stimulation
- Current scientific evidence on its physiological and psychological effects
- Strategies for integrating FES into clinical rehabilitation programs

Thanks to the presence of our athletes, Peter van Egdom and Peter van Burk, as well as Gerben Mesland, FES moved beyond theory. Healthcare professionals were able to witness muscle activation, strength gains, and the emotional impact that comes from restored movement — all in real time.

We are looking for YOU to join PULSE Racing IX!

PULSE Racing

Why join?

- Work with inspiring athletes with SCI
- Gain hands-on experience in a multidisciplinary Team
- Chance to race with our athletes in Vienna

Whether you study Human Movement Sciences, Mechanical Engineering, Marketing and Communication, or something entirely different; all VU students are welcome to reach out – no matter your study or year!

At **EXO Berlin** 2025, PULSE Racing shared its work at the intersection of rehabilitation, engineering, and human performance. The congress brings together leading voices in assistive robotics and human augmentation — and this year, FES took a central place in the conversation.What set our presence apart was the focus not just on technology, but on the people it's meant to support. With our athletes present, we shared in a big presentation how FES can go beyond data and systems to restore movement, confidence, and independence after spinal cord injury. Many visitors expressed that they hadn't fully understood the depth of challenges following SCI, such as muscle atrophy and cardiovascular issues, until hearing firsthand from our team. These conversations created a valuable dialogue between scientific innovation and lived experience.

One of the most unforgettable moments of the trip happened just outside the congress halls. On a sunny afternoon, we visited Tempelhofer Feld, an old airport area with concrete runways, right in the heart of Berlin. There, both of our athletes took part in outdoor training sessions.

Watching both our athletes training in the open air, surrounded by the openness of Tempelhof, was a moving experience for all of us. Their enthusiasm was contagious. The sense of freedom and energy was visible and a reminder of why we do this work.

Thank You to Our Sponsors and Supporters! We are incredibly grateful to BerkelBike, Vrije Universiteit Amsterdam, and our our sponsors for their unwavering support in helping us drive innovation and promote FES cycling for individuals with spinal cord injuries.