



ReWIRE Newsletter

Welcome to the seventh edition of the ReWIRE Newsletter!

The ReWIRE Workshops and Network Meeting took place in early February 2026 in Grenoble, France, hosted by CEA and co-organized with UZH. The event brought together all ReWIRE Doctoral Candidates (DCs), supervisors, and collaborators for several days of intensive scientific exchange, interdisciplinary training, and community building.

It began with a two-day workshop organized by CEA, focused on pre-clinical and clinical studies in neurotechnology. Participants explored key aspects of translational research, from neuroprotective surgical strategies and nerve regeneration after SCI to clinical investigations and regulatory frameworks for medical devices. Leading experts delivered lectures on electrical neuromodulation, the development of implantable technologies, and emerging concepts such as digital patient modelling, providing a comprehensive overview of the pathway from fundamental science to clinical application.

The second day continued with a strong emphasis on clinical translation, including discussions on EU regulatory pathways, technical development of medical devices, and functional electrical stimulation approaches to restore sensory-motor functions. A highlight of the workshop was the visit to Clinatex and the CEA showroom, offering DCs direct insight into cutting-edge neurotechnology platforms and ongoing clinical studies. In parallel, a one-day workshop organized by ETH/UZH focused on data mining and machine learning, further complementing the technical training programme and emphasizing the importance of computational approaches in modern neuroengineering.

The event continued with the ReWIRE Network Meeting, where DCs presented updates on their individual projects and shared recent scientific progress. The presentations were structured in interactive sessions, fostering discussion and feedback across disciplines and institutions. Afterwards, the Network Dinner, held in the city center of Grenoble, provided a relaxed setting to strengthen collaborations and reinforce the sense of community within ReWIRE.



What's new?

Below you can find updates on recent research progress, secondments, conferences, open days, and ambassador activities across the network. The contributions of all DCs have been invaluable to the network, and we thank them for their dedication and achievements. Let's wish all DCs the very best for the months ahead!

Scott Erickson recently traveled to Japan to progress his project in the lab of Yoshiho Ikeuchi at the University of Tokyo. He learned some data analysis techniques and generated different organoid types for use on his MEAs. Back at EPFL, he worked at the Open Days event to discuss his project and demonstrate the work of his lab with the general public. Recently, **Carlo Carraro** started supervising two students working on motion detection algorithms for gait phase detection and clonus events in the spinal cord injury population, as well as on the mechanical design and improvement of wearable devices for controlling epidural electrical stimulation. This marks an exciting step in his PhD, as these efforts contribute to developing more precise and subject-specific strategies for closed-loop control of epidural electrical stimulation. The project of **Firman Isma Serdana** continues to advance a clinical trial on Peripheral Nerve Stimulation (PNS) using TMS to restore hand function in tetraplegic patients, with initial results showing single-finger movement currently under review and presented at GRC 2025. In parallel, work on decoding hand kinematics from intracortical signals is ongoing, alongside the development of EMG-controlled soft robotic hand exoskeletons. Pilot studies in SCI patients have shown improved function, with manuscripts in preparation and recent findings submitted for presentation at NCM 2026. During this

ReWIRE Newsletter

period, **Rui Chen** developed a bidirectional soft robotic glove capable of assisting both finger flexion and extension for hand rehabilitation, alongside a soft shoulder exosuit supporting shoulder flexion and abduction, both validated in preliminary studies on healthy subjects. He presented this work at the IEEE International Conference on Robotics and Biomimetics (ROBIO 2025) in Chengdu, China. In parallel, he was actively involved in outreach and ambassador activities. As part of the FuoriClasse initiative at the Scuola Superiore Sant'Anna, Rui Chen, together with Prof. Daniele Leonardis, organized an interactive workshop on robotics and human-robot interaction for high school students in Livorno, combining live demonstrations with open discussion. Additionally, during an ambassador visit to his former school in Guilin, he introduced students to the Marie Skłodowska-Curie Actions, the ReWIRE project, and his research on soft upper-limb exoskeletons, offering insights into international research pathways and careers.

Catarina Tavares' work focused on optimizing thermoresponsive poly(N-acryloyl glycinamide) (PNAGA) microgels (50–70 μm) by tuning monomer and crosslinker concentrations to enable size-selective encapsulation. Swelling behavior and the diffusion of FITC-dextran model molecules were evaluated at 4 °C and 37 °C, establishing conditions for encapsulation at 4°C and release under physiological conditions. In parallel, PEGDA hollow microgels are being developed as a controlled release system by tuning shell porosity and incorporating RNA sequences to enable encapsulation of FGF and its subsequent release following RNA degradation. During a secondment at the University of British Columbia in Professor Karen Cheung's laboratory, Catarina gained an understanding of the spinal cord injury model used in the group and acquired practical experience in cell culture techniques relevant to drug delivery research. In addition, she supervised two students during her PhD, including a master's internship and a bachelor's thesis. **Elif Onsoz** is exploring how a mechanical microconnector system (mMS+) performs in vitro, looking at the degradation rate over time and how well it interacts with individual DRG neurons. As part of this work, she is using BMSC-derived exosomes loaded with miR-21, which are known to promote regeneration by inhibiting PTEN. At the same time, she is investigating injectable microgels as an alternative approach for spinal cord repair. These microgels are modified with bioactive peptides such as IKVAV, RGD, and laminin and tested on DRG cultures to assess their effects on neuron attachment, survival, and growth. By also incorporating miR-21-loaded exosomes into these systems, she aims to understand better how they work together to support neuronal regeneration. Using phage display, **Navami Koyande** identified IL-6 mimetic peptides targeting the IL-6 receptor, with initial binding confirmed by ELISA and Grating-Coupled Interferometry (GCI). The strongest candidates were synthesized, stabilized via CLIPS™ cyclization, and further validated, followed by an extensive lead optimization campaign generating multiple variants assessed by ELISA and GCI. Ongoing studies include competition ELISAs, as well as toxicity and functional assays. In parallel, she applied phage display to identify laminin mimetic peptides targeting integrin receptors, with samples currently under NGS analysis to determine enriched sequences. **Vi Anh Nguyen** confirmed the functional role of this neuronal population using chemogenetic inhibition in Vsx2::Cre mice, demonstrating that epidural electrical stimulation (EES) fails to restore micturition when these neurons are inhibited. Recent efforts have focused on replicating these findings in fully transected mice and in models with ablation of the pontine micturition center (PMC), further confirming that EES is ineffective at eliciting micturition in these conditions. On March 11th, 2026, Vi Anh Nguyen also served as an ambassador during a one-day visit by high school students from Basel to EPFL, introducing them to neuroscience research and ongoing work in the field as part of an educational outreach initiative. **Bianca Yu** has continued working on two clinical studies at the CHUV. The first trial is for brain-controlled epidural electrical stimulation (EES) for the restoration of arm and hand movement in participants with tetraplegia. The other study focuses on transcutaneous spinal cord stimulation (TSCS) in neurologically-intact subjects to better understand the relationship between stimulation parameters and muscle recruitment, in order to optimize TSCS therapy for people with tetraplegia. **Simay Geniscan** has successfully completed the drug screening phase and has initiated her final in vivo experiment exploring combinatorial treatments with ChABC gene therapy, marking a key step forward in her research. In parallel, she is preparing to introduce visiting Master's students to the ReWIRE project, providing an overview of its objectives, activities, and opportunities, and fostering engagement among early-stage researchers. **Paula Holban** demonstrated that her UPy-based supramolecular tactoid platform promotes neurite extension in chicken dorsal root ganglia, highlighting its potential for guiding neural growth. In parallel, she is expanding her work across multiple supramolecular biomaterial platforms, including coatings, hydrogels, and biomembranes, aimed at advancing neural tissue engineering strategies. During this period, she also supervised three Master's students, contributing to both research progress and the training of early-stage scientists.

Looking ahead: The first ReWIRE International Neuromodulation Conference will take place from August 24 to 26, 2026, in Bergisch Gladbach, Germany. The conference will bring together leading scientists in neuroscience, biomedical engineering, and neurotechnology to address challenges in spinal cord injury and explore emerging therapeutic strategies.

The programme will span topics from the biological mechanisms of spinal cord repair to advanced neurotechnologies and clinical applications. It will feature keynote lectures, thematic sessions on neurotechnology and clinical translation, as well as poster presentations and networking opportunities, creating a platform for knowledge exchange across disciplines.

Written and coordinated by Paula Holban



ReWIRE is a project within the Marie Skłodowska-Curie Doctoral Networks.
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