Z43 NEWSQUARTER
No.6 / 2018

Happy New Year!

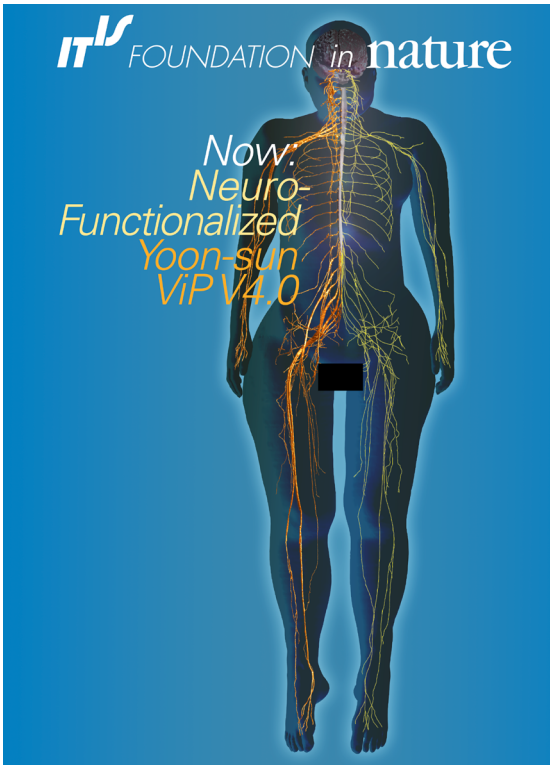
This, our final newsletter of a very successful 2018, brings you – our deeply valued Z43 partners, friends, and followers – up-to-date about our latest developments and results.

*Most importantly, we would like to acknowledge **your** contribution in shaping and accelerating our research activities to create solutions to meet your specific needs and promote sustainable progress.*

Thank you for making it possible to do what we enjoy, and we look forward to moving into 2019 together!

PUBLICATION

Novel Spinal Cord Injury Treatment Published in *Nature*



Esra Neufeld and Niels Kuster are co-authors on a paper published in *Nature* on a study led by neuroscientist Grégoire Courtine of Ecole Polytechnique Fédérale de Lausanne (EPFL) and neurosurgeon Jocelyne Bloch of Lausanne University Hospital (CHUV) in which three paraplegic patients recovered the ability to walk after years of paralysis.

The new treatment is a major breakthrough for spinal-cord-injury patients – the Frankfurter Allgemeine Zeitung (FAZ) called the novel targeted neurotechnology a "biblical moment for medicine". Seven more patients are already enrolled in the study, and we hope that many more will benefit from this technology.

IT'IS contributed by developing and implementing advanced neuro-simulation features in *Sim4Life* for electromagnetic (EM) and electrophysiology modeling, providing patient-specific guidance to identify appropriate electrode positioning and stimulation parameters to restore functionality.

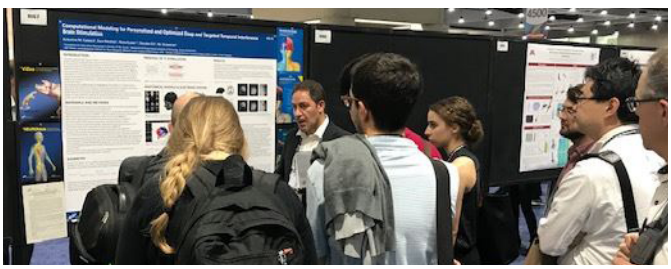
We are proud to have contributed to this successful research, and we look forward to further such rewarding research collaborations!

WORKSHOP

Successful Sim4Life Workshop @ SfN 2018

On November 5, 2018, about 60 neuroscientists and representatives of the medical device industry attended the *Sim4Life* Workshop at Neuroscience 2018 in San Diego CA, USA. Distinguished speakers shared their experiences and vision on how *Sim4Life* can be used to master myriad challenges in bioelectronic medicine, e.g., restoring voluntary motor control after paralysis (Marco Capogrosso, University of Fribourg) and low-intensity focused ultrasound stimulation (Théo Lemaire, EPFL). All presentations generated great interest.

Don't miss the *Sim4Life* Workshop at Neuroscience 2019, to be held in October 2019 in Chicago IL, USA!



MEASUREMENT

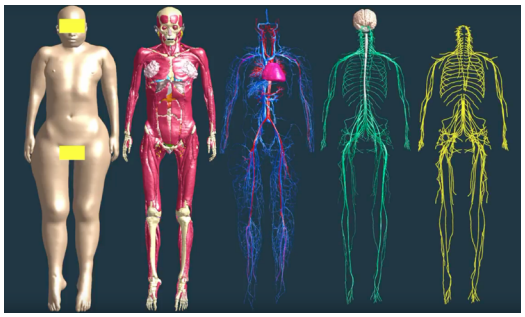
SPEAG Responds to Over-The-Air Certification Priorities Set by CTIA

SPEAG released two new generic CTIA phantoms for over-the-air (OTA) testing, the SHO-GAPC-V1 ANKLE and SHO-GAPC-V1 CHEST. These two phantoms were developed in close collaboration with CTIA's OTA working group in direct response to the needs of the wireless industry and the test plan priorities set by the CTIA. All SPEAG phantoms are fabricated from our standard proven body material, which fully satisfies the CTIA criteria for dielectric parameters for testing at frequencies of 300 MHz – 3 GHz. In addition, SPEAG offers high-frequency versions of all phantoms for testing at frequencies of 3 GHz – >100 GHz.
For more information on our expanding family of EM phantoms, contact us at info@speag.swiss or visit our webpage.

VIRTUAL POPULATION

First Neuro-Functionalize ViP Phantom Yoon-sun V4.0

IT'IS achieved a major milestone with the development of Virtual Population (ViP) model Yoon-sun V4.0 – the result of the ongoing NEUROMAN project in collaboration with Ajou University School of Medicine, Dongguk University College of Medicine, DYMSTEC, and HCTM. Based on the recently released Yoon-sun cV3.1 model, this far more refined next-generation phantom has four times as many tissues segmented, features neuro-functionalized nerve trajectories modeled as splines and assigned default nerve electrophysiology and neuroanatomy parameters according to literature data. The spline trajectories and tissue anatomy are compatible with the *Sim4Life* T-NEURO tissue simulation module. Soon to follow will be the release of the neuro-functionalized male model Jeduk V4.0, also developed as part of NEUROMAN.



RESEARCH

PUBLICATIONS

Computational Animal Phantoms for Electromagnetic Dosimetry
Ilaria Liorni et al., 2018, in: Computational Anatomical Animal Models: Methodological Developments and Research Applications, Edited by Habib Zaidi, Pages 11-1 – 11-18 (online 7 December 2018)

A Numerical Assessment of the Human Body Effect in the Transmission of Wireless Microphones
Eugenia Cabot et al., 2018, Microwave and Optical Technology Letters, doi: 10.1002/mop.31623 (online 05 December 2018)

Functionalized Anatomical Models for Computational Life Sciences
Esra Neufeld et al., 2018, Frontiers in Physiology, section Computational Physiology and Medicine, doi: 10.3389/fphys.2018.01594 (online 16 November 2018)

Theoretical and Numerical Assessment of Maximally Allowable Power-Density Averaging Area for Conservative Electromagnetic Exposure Assessment Above 6 GHz
Esra Neufeld et al., 2018, Bioelectromagnetics 39:617 – 630 (online 01 November 2018)

Targeted Neurotechnology Restores Walking in Humans with Spinal Cord Injury
Fabien B. Wagner et al., 2018, Nature 563: 65 – 71 (online 31 October 2018)

Novel Mechanistic Model and Computational Approximation for Electromagnetic Safety Evaluations of Electrically Short Implants
Ilaria Liorni et al., 2018, Physics in Medicine and Biology (online November 2018)

SOCIAL EVENT

SPARC Hackathon @ NIH

At the NIH SPARC Data Workshop and Hackathon in Rockville MD, USA on December 5 – 7, 2018, IT'IS performed for the first time an extended one-hour live demo of our web-based online o²S²PARC simulation platform. The more than 100 SPARC researchers were particularly excited about the framework's flexible approach and user-friendly intuitive graphical user interface. The Hackathon's expert jury's 1st prize went to a SPARC team led by Bartek Rajwa and Charles Horn for their application "Spat-An-App" for quantifying the spatial organization of cells. The winning team used our o²S²PARC platform in no time to embed their algorithm into a docker image within o²S²PARC, to load their data from the Blackfynn DAT-CORE directly into our tool, and to use Python to process and visualize it in an o²S²PARC Jupyter notebook service.