# Z43 NEWSQUARTER



# Dear Z43 Partners, Friends, and Followers

What a year! This is our final Newsquarter of 2019, summarizing all you need to know about the last three months at Z43 and, most importantly, sharing with you the highlights of our two milestone birthdays: the 20th anniversary of IT'IS and the 25th jubilee of SPEAG. We thank you for all your interest, guidance, and loyalty throughout the years and wish you a happy holiday season and a spectacular New Year!

"Sensationell, humorvoll und teils super schräg" Franz Rhomberg

> "We were really taken back to the roaring 20ies" Ivica Stevanovic

"An unforgettable night" Stephan Bodis

"Das war der Wahnsinn" Isa Schindler

> "Unvergesslich und spektakulär" Adrian Spiegel





#### VIRTUAL POPULATION

# IMAnalytics and MRIxViP Qualified by FDA for MRI Safety Evaluations

Fantastic news for Z43: on December 12, 2019 the U.S. Food and Drug Administration (FDA) announced the qualification of ZMT's IMAnalytics evaluation tool and the IT'IS field exposure libraries MRIxViP1.5T/3.0T as the first FDA-approved computational modeling Medical Device Development Tool (MDDT).

This accreditation certifies that evaluations of health risks posed by active implantable medical devices to patients undergoing magnetic resonance imaging diagnostics are traceable, easy-toconduct, and standardized at the most comprehensive level - and marks a major breakthrough in our endeavors to develop reliable and qualified tools to support medical device development and treatment planning to improve and ensure patient safety!

#### MEASUREMENT

# Release of DASY6 V6.10 – Ready for 5G NR



With the release of DASY6 V6.10, SPEAG has once again pioneered specific absorption rate (SAR) compliance testing! The new version features two worldwide novelties, namely the extension of SAR testing to

10 GHz and the assessment of epithelial power density (IEEE) or transmitted power density (ICNIRP). In addition, DASY6 V6.10 includes everything needed for compliance testing of 5G devices operating with the 5G "New Radio" (NR) standard.

#### SIMULATION

# Release of Sim4Life V5.2 and SEMCAD X V18.2

The next update of ZMT's flagship software package Sim4Life V5.2 is here! The new release strengthens (1) the unstructured finite element method (FEM) low-frequency solver with a new robust octree-based adaptive meshing engine that supports the application of the IT'IS Virtual Population, (2) automated evaluations with the new Python-3 API, (3) compliance testing with new total exposure ratio (TER) features, and (4) IMAnalytics, which supports Tier 2 evaluations according to ISO 10974. We also released SEMCAD X Matterhorn V18.2, which offers the same features as Sim4Life V5.2 suited for electromagnetic simulations. In addition, it allows independent investigators to collaborate more effectively by exchanging models without revealing any confidential information.

Note: SEMCAD X is our well-known and widely applied electromagnetic simulation platform developed by us in the late 1990s. SEMCAD X was the starting point of the multi-physics platform Sim4Life in 2014 and has been jointly developed since then.

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# New Company TI Solutions AG

Z43 welcomes a new company, "TI Solutions AG", under its roof. TI Solutions was cofounded with the inventors of stimulation by temporal interference (TI) – Ed Boyden (MIT, USA), Alvaro Pascual-Leone (Harvard, USA), and Nir Grossman (Imperial College, UK) - to explore medical applications of deep brain neurostimulation by temporally interfering electric fieldsfields<sup>1</sup>. The focus of this new endeavor will be on the development, manufacture, and sale of medical devices and treatment planning tools, as well as the implementation of a support team for researchers worldwide. We are convinced that this work will generate many new breakthroughs in the next few years. More information will follow soon!

<sup>1</sup> Grossman N, Bono D, Dedic N, Kodandaramaiah SB, Rudenko A, Suk H-J, Cassarà AM, Neufeld E, Kuster N, Tsai L-H, Pascual-Leone A, Boyden ES, 2017, Noninvasive Deep Brain Stimulation via Temporally Interfering Electric Fields, Cell, Vol 169, No 6, pp 1029-1041.

#### RESEARCH

# PUBLICATIONS

Current Directions in the Auricular Vagus Nerve Stimulation I A Physiological Perspective

E. Kaniusas et al., 2019, Frontiers in Neuroscience, 13:854: doi.: 10.3389/fnins.2019.00854 (online 09 August 2019)

RF-Induced Temperature Increase in a Stratified Model of the Skin for Plane-Wave Exposure at 6 to 100 GHz

A. Christ et al., accepted for publication in Radiation Protection Dosimetry, 21 November 2019

Discussion on Spatial and Time Averaging Restrictions within the ElectromagneticExposure Safety Framework in the Frequency Range above 6 GHz for Pulsed and Localized Exposures T. Samaras et al., accepted for publication in Bioelectromagnetics, 17 December 2019

Estimated Whole-Brain and Lobe-Specific Radiofrequency Electromagnetic Fields Dose and Brain Morphology in Preadolescents

M. Guxens et al., submitted

Dose in Brain Regions and the Body in European Children and Adolescents

## M. Vrijheid et al., submitted

Organ-Specific Integrative Exposure Assessment: Radio-Frequency Electromagnetic Field Exposure and Contribution of Sources in the General Population

L. Van Wel et al., submitted

Apoptotic Effect of 1800 MHz Electromagnetic Radiation on NIH/3T3 Cells

D.-Y. Li et al., submitted

Bioelectronic Medicine Translational Development – Quantification of Stimulation Parameters for Precision Near-Organ Neuromodulation of Human Splenic Nerves I. Gupta et al., submitted

A Review of 3-D Green's Functions for Integral Equation Modeling of Electromagnetic Scattering from 1/2/3-D Periodic Structures Using Ewald Transformation I. Stevanović et al., 2019 International Conference on Electromagnetics in Advanced Applications (ICEAA), Granada, Spain, 2019, pp. 0701-0706, doi: 10.1109/ICEAA.2019.8879421