

The workshop-tutorial during the exhibition at **the Conference on physics, chemistry and biology of water 2017**, Sofia, Bulgaria, October 28, 14.00-18.00, 2017

## **High-resolution electrochemical measurements for detecting effects of non-chemical treatment of water**

Research of last 30 years identified electrochemical measurements of water and aqueous solutions (pH, DC/AC conductivity, impedance spectroscopy) as a useful tool for detecting and characterizing various effects of ‘weak emissions’ and non-chemical treatment of water. The measuring equipment should satisfy specific requirements such as differential measurements, thermostabilization of samples and electronic components, high resolution of the system (up to  $10^{-5}$ - $10^{-6}$  pH and  $10^{-8}$ - $10^{-11}$   $\mu$ S/cm resolution). However, many aspects of measurement metrology and methodology remain open, for instance, types of non-chemical treatment (hydrodynamic cavitation, E/M fields, ultra-/infra-sound, light/LED/laser), phenomenology of ‘weak emissions’, conditions for control measurements, performing experiments with passive objects (stickers, info-cards, wristlet etc), the ‘after-effect’, impact of an operator, measurement units, repeatability and other issues. Specific conditions are required for performing experiments on long-range distant interactions and for using organic materials as bio-detectors. This workshop is devoted to practical aspects of such measurements, it includes a few short presentations and then demonstration of specific aspects of real measurements with conductivity and impedance spectroscopy (EIS) devices. About 5 EIS devices will be distributed among participants for performing independent experiments on different user-defined technologies (stickers, info-cards, “biofield” applications, harmonizers, water treating/imprinting devices). Finally, the discussion part with questions and answers will close this event.

**We ask everybody who is interested to test own technology to contact the workshop organizer (at least one day before the workshop) to install the EIS software on the laptop of this person.**

Additional material to the workshop:

- [S.Kernbach, I.Kuksin, O.Kernbach, A.Kernbach, The Vernadsky scale -- on metrology of EIS in time-frequency domain, IJUS, 15-16\(5\), pp.143-150, 2017](#)
- [S.Kernbach, V.Zamsha, Y.Kravchenko, Experimental Approach Towards Long-Range Interactions from 1.6 to 13798 km Distances in Bio-Hybrid Systems, NeuroQuantology, 14\(3\), pp.456 -476, 2016](#)
- [S.Kernbach, O.Kernbach, Reliable detection of weak emissions by the EIS approach, IJUS, E1, pp.90-103, 2017](#)
- [S. Kernbach, O. Kernbach. On precise pH and dpH measurement, IJUS, 5\(2\), 83-103, 2014](#)
- [S.Kernbach, Replication Attempt: Measuring Water Conductivity with Polarized Electrodes, J. of Scientific Exploration, Vol. 27, No. 1, pp. 69–105, 2013](#)

**Workshop organizer:** Serge Kernbach, Dr.rer.nat., is a director of the Research Center of Advanced Robotics and Environmental Science “Cybertronica Research”. He graduated in electronic engineering and computer science in 1994. In 1996 he was awarded Presidential Fellowship as a young researcher, in 1997–the DAAD fellowship, he was a guest scientist in the center of Synergetics led by Prof. H. Haken, who also co-supervised his PhD work. In 2007 his doctoral thesis won the faculty-award as the best dissertation of the year at the University of Stuttgart, where he worked as a head of group until 2013. Since 2004 he has been a coordinator of several European research projects on the field of bio-hybrid systems and collective robotics, and acquired over 6.0M Euro. In 2016 he was elected as a Foreign Member of the Russian Academy of Natural Sciences. He is an author and co-author of 4 books and over 150 articles in international journals and conferences with best paper awards.