

Chairman's Welcome Message

The exchange of ideas and concepts over different fields of science is an important first step to find innovative solutions for the future and present problems of mankind. It is the aspired aim of the international workshop on impedance spectroscopy (IWIS) to assemble innovative and experienced scientists and different countries to discuss on methods, instrumentation and results of the recent research work in the fields of electro chemistry, material science, biology, medicine, electronics and sensors.

the IWIS celebrates this year a decade of continuous exchange between scientists from different fields of impedance spectroscopy. It is a sign of the high acceptance and underlines its establishment as a forum for specialists, scientists and young scientists.

This year, to the 10th anniversary of IWIS, an advanced school for impedance spectroscopy (ASIS) is launched with the aim to give scientists a better and wider understanding of the method of Impedance Spectroscopy. It offers a wide range of tutorials, held by selected experts, which explain fundamentals of impedance spectroscopy, such as impedance modelling, consistency check, electronic circuits design, embedded system design and instrumentation. Advanced topics on the application of impedance spectroscopy in different fields are presented showing the corresponding challenges and potentials. The ASIS provides a good overview all around the method and make it better accessible for young scientists and reached an outstanding resonance among participants.

The 10th IWIS provides a special networking dinner to encourage the communication between researchers in this field and provides opportunities of exchange about challenges and potentials in science and industry. An exhibition informs about the latest news concerning measurement equipments and devices. These are main components of this annual international workshop taking place at Technische Universität Chemnitz.

In its 10th edition the IWIS workshop is supported by the "Deutsche Forschungsgemeinschaft" (DFG) due to its pronounced international character. It includes more than 43 contributions and participants from 20 countries in 10 sessions, four plenary talks and selected contributions from the workshop will be published as post conference proceedings within a book by Degruyter and special issues in scientific journals.

We thank the IEEE Instrumentation and Measurement Chapter Germany and the Chemnitz School of Metrology (CSM e.V.) for the technical assistance of the event. We thank also our main sponsor Rutronik together with all exhibitors, whose support made the event possible.

The organization of the workshop has requested a considerable effort of the organizing team from the chair for measurement and sensor technology which makes it possible to organize this international event actually within Technische Universität Chemnitz.

We would like to thank you for choosing IWIS 2017 and for coming to Chemnitz.

Prof. Olfa Kanoun & Dr. Norbert Wagner
General Chairs

IWIS 2017 Organizers

General Chairs

O. Kanoun (DE) N. Wagner (DE)

Program committee chair

A. Fendri (TN)

Program Committee

R. Bayford (UK)	E. Barsoukov (US)	P. L. Bonora (IT)
M. Ferreira (PT)	A. Hartov (US)	J. Haueisen (DE)
C. Hübner (DE)	E. Ivers-Tiffée (DE)	N. Jaffrezic-Renault (FR)
S. Leonhardt (DE)	D. Macdonald (US)	O. G. Martinsen (NO)
M. Min (EE)	S. C. Mukhopadhyay (NZ)	N. Pebere (FR)
U. Pliquet (D)	P. Ramos (PT)	A. Robitzki (DE)
B. Roling (DE)	D. U. Sauer (DE)	M. Schneider (DE)
W. Strunz (DE)	B. Tribollet (FR)	U. Tröltzsch (DE)
M. Ulbrich (DE)	J. Vereecken (BE)	W. Vonau (DE)
N. Wagner (DE)	W. Yang (UK)	

Publication chair

A. Fendri (TN)

Organizing Committee Chair

T. Keutel (DE)

Organisation Committee

T. Günther (DE)	C. Weisse (DE)
F. Wendler (DE)	R. Ramalingame (IN)
A. Al-Hamry (YE)	R. Torres (BR)

Contact Information

Chair for Measurement and Sensor Technology

Technische Universität Chemnitz

Reichenhainer Straße 70

09126 Chemnitz

Germany

Tel: +49 (0)371 / 531 - 24480

Fax: +49 (0)371 / 531 - 824480

Email: mst@tu-chemnitz.de

URL: <http://www.tu-chemnitz.de/iwis>

General Information

The City of Chemnitz

Chemnitz, more than 800 years old, is situated in the heart of Saxony. The city is the third-largest in Saxony and is designated as “City of Modernity”. Developed at the time of Classical Modernism, it became the “Manchester on Saxony”, giving impulses to the development of business and science. The influences of the cultural and architectural Modernism are visible so that Chemnitz is today a city with many interesting facets. Fascinating architecture reflects the changing times and spirit of those things which have shaped the city: industrial monuments, redeveloped Gründerzeit residential quarters such as Kassberg, Villa Esche or the city centre, which has been completely renovated since reunification, constructed by Helmut Jahn, Hans Kollhoff and Christoph Ingenhoven, bridge the gap from yesterday to today and to tomorrow.



Rathaus, Neumarkt (©CWE - Chemnitz)

Bars & Restaurants

If you want to spend an evening in the modern city-center of Chemnitz, there are a couple of nice bars and restaurants around. You may want to try the following:

Tillmanns – Brückenstraße 17, www.tillmanns-chemnitz.de

Turmbrauhaus – Neumarkt 2, www.turmbrauhaus.de

Buono – Theaterstraße 7, www.bouno-chemnitz.de

Janssen – Schloßstraße 12, www.janssen-restaurant.de

Brazil – Innere Klosterstraße 10, www.restaurant-brazil.de

Diebels Fasskeller – An der Markthalle 3, www.fasskeller.de

Ratskeller – Markt 1, www.ratskeller-chemnitz.de

City Pub – Brückenstraße 17, www.tower-pub.de

Conference Venue

The International Workshop on Impedance Spectroscopy will take place at the Technische Universität Chemnitz in the site 'Reichenhainerstrasse' in the Building 'Adolf-Ferdinand-Weinhold-Bau'. You can find it at:

Technische Universität Chemnitz
Reichenhainer strasse 70
09126 Chemnitz

Lunch

The lunches will be provided by the Mensa of TU Chemnitz, where a special room is reserved for IWIS participants:



Building of the Mensa on the other side of the street as the conference building

IWIS Networking Dinner – Bar Ausgleich in the Mensa

The networking Dinner will be held in the Bar Ausgleich in the Mensa of Chemnitz University of Technology located in the middle of the Campus. This networking Dinner provides scientists and industrials from battery, bio-impedance, sensors, material and measurement systems fields the opportunity to spend more quality time with each other and discuss actual challenges and possible solutions.



Bar Ausgleich Mensa TU Chemnitz

Travel to Chemnitz

You can reach *Technische Universität Chemnitz* via car or train.

By car from Autobahn A72:

- Take the motorway exit 'Chemnitz Süd'
- Use B173 / Neefestraße direction 'Stadtzentrum'
- After 1 km turn right on the B169 / 'Südring'
- After 5.5 km use exit 'Reichenhainer Straße' direction 'Technische Universität'
- You'll reach campus after 1.5 km. The conference venue is on the left

By car from Autobahn A4:

- Take the motorway exit 'Chemnitz Mitte' in direction to the city centre.
- Follow the road for about 5 km. There are several big crossings.
- Always go straight until there are signs to turn right to the 'Reichenhainer Straße' and to 'Technische Universität'.
- After 1.5 km you'll reach the campus, the conference venue is on the left side. Next to the Mensa is a -car park- where 30 places are reserved.

By train:

- Get off at Chemnitz central station and use tram 6 or 4 in direction 'Zentralhaltestelle'
- Get off the tram at Station 'Zentralhaltestelle'
- Use Bus 51 direction 'Altchemnitz' or 'Reichenhain'
- Get off at 'TU Campus Reichenhainer Straße'

Airport:

- The next nearby Airports are Dresden and Leipzig
- From airport Dresden go A4 direction Chemnitz/Erfurt.
- From airport Leipzig-Halle go into A14 direction Dresden, at 'Dreieck Nossen'
go on A4 direction Chemnitz/Erfurt. Proceed as described above.

Taxi: If you need a taxi in Chemnitz please call: +49 371 369 000

Getting Around Chemnitz

All buses and trams in Chemnitz meet at the Central Bus Station ('Zentralhaltestelle').

Information about public transport and timetables you can find here:

www.cvag.de

www.opnvkarte.de

Getting from the Hotel Mercure to the university:

Take 5 to 10 minutes walk to the bus station 'Zentralhaltestelle', closely located to the hotel Mercure and take the bus line 51 or E51 into direction 'Chemnitz, Altchemnitz' or 'Chemnitz, Reichenhain'. The station at the university is named 'TU Campus' and is 5 minutes by walk from the workshop venue.



Map of Chemnitz city center

Internet Access

During the event, a wireless network is available at the campus site. Please use the following registration information to log in:

Network name – “special-rh”

WPA2 key – “IWIS2017”

If you have problems connecting to the network, please ask organizers for help.

Sponsors

The workshop is supported by:

- Deutsche Forschungsgemeinschaft (DFG)



- School of Metrology CSM e.V.



From industry side the workshop is supported by:

- The main sponsor: Rutronik



- Tunisair



Together with all the exhibitors listed in the next page

Exhibition

During the workshop the following exhibitors will be present:



Program

Monday, September 25th, 2017

- 14:00 – 18:00 **Registration (Registration Desk)**
19:00 – 23:00 **Get together**
 Miramar Chemnitz

Tuesday, September 26th, 2017

- 08:00 – 12:00 **Advanced School on Impedance Spectroscopy**
12:00 – 13:00 **Lunch, Exhibition**
13:00 – 18:00 **Advanced School on Impedance Spectroscopy**

Wednesday, September 27th, 2017

- 08:00 – 12:00 **Advanced School on Impedance Spectroscopy**
12:00 – 13:00 **Lunch, Exhibition**
13:00 – 18:00 **IWIS 10 Year Anniversary**

Thursday, September 28th, 2017

8:00 – 8:30 **Registration (Registration Desk)**

8:30 – 8:45 **Opening Chair: Olfa Kanoun**

8:45 – 9:30 **Plenary Talk**

BioLab-on-chip based on Impedance Spectroscopy for Heart failure application; Prof. Errachid Abdelhamid.

Chair: Olfa Kanoun

Session 1 - Battery I

Chair: Norbert Wagner

09:30 – 10:10 **Robust and Universal Modeling Algorithm for Impedance Spectroscopy in Embedded Systems; *Andreas Mangler***

Electrochemical Impedance in Aviation Applications; *Wolfgang Scheuerpflug*

10:10 – 10:40 **Coffee Break**

Session 2 - Battery II

Chair: Jörg Himmel

10:40 – 12:00 **Study of the Electrolyte Penetration Depth of Cathodes in Zn-Air Batteries by Electrochemical Impedance Spectroscopy; *Norbert Wagner***

Analysis and modelling of inductive-resistive behavior of commercial Li-Ion-Cells; *Markus Hahn*

Distribution of Relaxation Times and Peak Fitting as Basis for diagnostic and predictive Degradation Analysis of commercial Lithium-Ion Cells; *Stefan Schindler*

Impedance Spectroscopy Upgrade to a Student Battery Cell Test System; *Fabian Steger*

12:00 – 13:00 **Lunch,Exhibition**

13:00 – 13:45 **Plenary Talk**

The influence of battery cell design on the cell impedance; Prof. Dr.-Ing. Andreas Jossen

Chair: Michael Danzer

13:45 – 14:15 **Exhibitors Presentations**

Rutronik, Zahner Messsysteme, PalmSens, ScioSpec, DE Gruyter, Keysight Technologies;

Session 3 - Battery III

Chair: Michael Danzer

14:15 – 15:35 Using an equivalent circuit model to fit the impedance spectra of a variety of lithium ion cells; *Samuel Buteau*

Battery Impedance Spectroscopy obtained from Electrochemical Model; *Angel Cuadras*

Battery Aging Impedance Spectroscopy and Incremental Capacity Analysis; *Angel Cuadras*

Single- and Multi Sine Excitation on Batteries and Fuel Cells - Influence of Noise and Drift to Impedance Spectra; *Werner Strunz*

Session 4 - Bi-impedance Spectroscopy

Chair: Uwe Pliquet

14:15 – 15:15 Electrical impedance tomography of single cells in rolled-up microtubes; *Sonja Weiz*

Impedance Spectroscopy in HF surgery; *Tino Morgenstern*

Highly Sensitive Impedimetric Ion Selective Micro Electrode for Amphetamine Detection; *Juan Gallardo-Gonzalez*

15:35 – 16:35 **Poster session & Student Award Embedded systems**

Circle of Experts Impedance Spectroscopy (CEIS)

16:35 – 17:35 **Emerging Technologies for Smart Systems**

Chair: Uwe Pliquet

18:30 – 23:00 **IWIS Networking Dinner**

Bar Ausgleich in the Mensa

Friday, September 29th, 2017

8:00 – 8:30 **Registration (Registration Desk)**

08:30 – 09:15 **Plenary Talk**
On the Clinical Impact of Bioimpedance from bench to bedside;
Prof. Steffen Leonhardt
Chair: Olfa Kanoun

Session 5 - Sensors

Chair: Jörg Himmel

9:15 – 10:15 Considerations in Frontend Design for Broadband Inductive Sensors; *Frank Wendler*
Verification of the Impedance Spectroscopy Method Used in Olive Oil Water Content Assessment ; *Lukasz Macioszek*
Capacitance sensor for degradation assessment of cooking oil; *Ahmed Fendri*

Session 6 - Materials

Chair: Norbert Wagner

9:15 – 10:15 Process Monitoring in Steel-Mills using Impedance Analysis; *Mario Radschun*
Impedance Spectroscopy Investigation of Electrowetting on Multilayer Dielectrics; *Brian Cahill*
Investigation of Metal Hardness Using Impedance Spectroscopy; *Rohan Munjal*

10:15 – 11:00 **Poster Session & Coffee Break**

11:00 – 12:00 **Plenary Talk**
A New Method for the Development of Manufacturing Processes for Injectable Drug Products; Prof. Geoff Smith
Chair: Mart Min

12:00 – 13:00 **Lunch, Exhibition**

Session 7 - Measurement Systems

Chair: Mart Min

13:00 – 14:40 Emulation of a Low Impedance Energy Storage System based on a Hybrid Topology with Digital Power Management; *Andreas Mangler*

Impedance measurement with minimalistic hardware and low energy consumption; *Yahor Zaikou*

System Design for Portable Devices powered by Li-Ion Cells; *Martin Götz*

Wide range simple Interface Circuit for the Measurement of Complex Impedance in Capacitive Sensor; *Ahmed Fendri*

Dual Mode Direct-Digital Converter for measurement of sensors represented by Parallel R and C; *Ammar Al-Hamry*

14:40–15:00 **Closure Chair: Olfa Kanoun**

Publications series

O. Kanoun (Ed.)

Progress Reports on Impedance Spectroscopy

Vol. 1, ISBN 978-3-11-044756-9, 2016

Lecture Notes on Impedance Spectroscopy: Measurement, Modeling and Applications

Vol. 5, ISBN 978-1-138-02754-1 (Hbk), 2015

Vol. 4, ISBN 978-1-138-00140-4 (Hbk), 2014

Vol. 3, ISBN 978-0-415-64430-3 (Hbk), 2012

Vol. 2, ISBN 978-0-415-69838-2 (Hbk), 2012

Vol. 1, ISBN 978-0-415-68405-7 (Hbk), 2011

Selected contributions from the IWIS 2017 will be published in a new volume of *Progress Reports on Impedance Spectroscopy*.