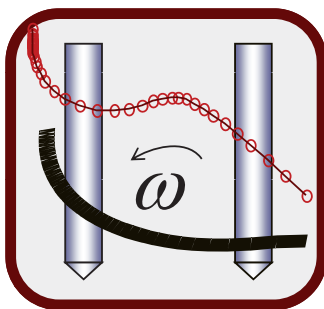


Program Book
16th International Workshop
on Impedance Spectroscopy

IVIS 2023



September 26-29, 2023
Technische Universität Chemnitz
Germany

Chairman's Welcome Message

The exchange of ideas and concepts between different scientific fields is an essential first step to find innovative solutions for future and current problems of mankind. The goal of the International Workshop on Impedance Spectroscopy (IWIS) is to bring together innovative and experienced scientists from different countries to discuss methods, instrumentation, and results of recent research in electrochemistry, materials science, biology and medicine, electronics and sensors. The Advanced School on Impedance Spectroscopy (ASIS), now in its fourth year, provides a good overview of the basics of the method and makes it more accessible to young scientists. An exhibition will provide information on the latest developments in instrumentation and equipment. These are the main components of this annual international workshop at the Chemnitz University of Technology.

In its 16th edition, the IWIS includes 35 contributions from 17 countries in 8 sessions, 4 plenary talks, 2 Hands-on tutorials and 6 tutorials. The peer-reviewed contributions highlight new advances and present different approaches to impedance spectroscopy, including modeling, measurement, and applications.

This year's IWIS is a continuation of the brilliance of the IEEE Technical Committee IM-TC 2 on Impedance Spectroscopy. In its fourth year, TC2 promotes Impedance Spectroscopy and standards within the IEEE community worldwide.

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

We thank the IEEE Instrumentation and Measurement Society for supporting the Advanced School on Impedance Spectroscopy and the IEEE Instrumentation and Measurement Chapter Germany for the assistance of the event. The workshop is co-organized by the Chemnitz School of Metrology (CSM e.V.), whose support for the event is highly acknowledged.

We would like to thank you for choosing IWIS 2023.

Prof. Olfa Kanoun & Prof. Pasquale Arpaia
General Chairs

IWIS 2024 Organizers

General Chairs

O. Kanoun (DE)

P. Arpaia (IT)

Honorary Chair

H.-R. Tränkler (DE)

Program Committee

P. Arpaia (IT)

R. Bayford (UK)

R. Bragos (ES)

M. Ferreira (PT)

A. Hartov (US)

E. Ivers-Tiffée (DE)

D. Klotz (USA)

Ø. G. Martinsen (NO)

S. C. Mukhopadhyay (NZ)

A. Robitzki (DE)

M. Schneider (DE)

B. Tribollet (FR)

W. Vonau (DE)

M. Ates (TR)

P. Bertemes-Filho (BR)

M. Danzer (DE)

J. Fleig (AT)

J. Hauelsen (DE)

N. Jaff.-Renault (FR)

S. Leonhardt (DE)

M. Min (EE)

U. F. Pliquett (DE)

B. Roling (DE)

G. Smith (UK)

M. Ulbrich (DE)

W. Yang (UK)

E. Barsoukov (US)

P. L. Bonora (IT)

A. Errachid (FR)

R. A. Gerhardt (USA)

Ch. Hübner (DE)

A. Jossen (DE)

D. Macdonald (US)

K. Möller (DE)

P. Ramos (ES)

D. U. Sauer (DE)

W. Strunz (DE)

J. Vereecken (BE)

ASIS Chair

T. Keutel

Publication Chair

N. Ammar (DE)

Organization Committee Chair

A. Y. Kallel (DE)

Organization Committee

T. Almustafa

A. Attaoui

B. Ben Atitallah

A. Fischer

K. Hamza

F. Keil

S. Missaoui

K. Schütze

A. Alnaimi

I. Ayedi

H. Boughanmi

D. Haddad

H. Hellara

T. Keutel

H. Nouri

F. Wendler

N. Ammar

O. Bader

A. Djemal

M. Hafsa

A.Y. Kallel

F. Mancino

C. Ouni

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 has its unique story - of ground-breaking inventions in automotive engineering, mechanical engineering or the textile industry as well as of courageous companies like Richard Hartmann, Carl Gottlieb Haubold or Louis Schickelnherr. As a modern industrial city, Chemnitz has continued to write its history and is today one of the fastest-growing cities in Germany. The city is a center of technology focusing on the automotive and supplier industries, information technology and mechanical and plant engineering.



Industry Museum,
(©www.chemnitz2025.de)



Rathaus, Neumarkt (©CWE - Chemnitz)

Going down their own path, experiencing new adventures and inventions - this recipe makes the city Chemnitz and its people successful: thousands of patented ideas like the thermos flask or the first mild detergent were conceived

here. Today, as an essential link in the global manufacturing chain, Chemnitz produces excellent machines and production facilities for the whole world.

A European selection jury has named the German city of Chemnitz the European Capital of Culture for 2025. The Saxonian city beat four other German cities on the shortlist: Hannover, Hildesheim, Magdeburg and Nuremberg.



Logo of Chemnitz as European capital of culture (©www.chemnitz2025.de)



Residents of Chemnitz celebrate the nomination of Chemnitz as the European Capital of Culture 2025. (©Jan Woitas/dpa)

Tradition and modernity are also reflected in exciting urban contrasts. Unique evidence like “das Bauhaus” and “die neue Sachlichkeit” or the Kaßberg, some of the largest intact areas of Wilhelminian style architecture in Europe, are deeply loved by the architecture fans. Just like Chemnitz city center, which has been redesigned over the past 20 years by internationally renowned architects such as Helmut Jahn, Hans Kollhoff and Christoph Ingenhoven.

For lovers of the fine arts there is a lot to discover in Chemnitz: For example, the Chemnitz Art Collections or the Gunzenhauser Museum, which houses one of the most impressive collections of classical modern art. Meanwhile, the Saxon



Buildings in Jugendstyle in the famous Chemnitz-Kaßberg (4.5 km² protected area as a historic monument), (©www.chemnitz.de)

Industrial Museum traces its history and present. The Municipal Theatres with the Robert-Schumann-Philharmonie attract visitors from all over Germany.

A side trip to the more than 100-year-old town hall is also worthwhile: the monumental Klinger-mural “Arbeit - Wohlstand - Schönheit” can be admired in the town council hall. The council hall is adorned with the work “Die Abwäng” by Neo Rauch, one of the most important contemporary artists.

Those who simply want to relax will also find a place in Chemnitz: recreation islands such as the castle pond with the adjoining kitchen forest invite you to stroll and linger as well as the historic city park along Chemnitz.

Let Chemnitz surprise you, go to discover the city by yourself - it's worth it!

Conference Venue

The International Workshop on Impedance Spectroscopy will take place in a **hybrid** form: **online** using the Zoom platform and **On-site** at TU Chemnitz:

Technische Universität Chemnitz
Neues Hörsaal und Seminargebäude (Orangerie)
Reichenhainer Straße 90
09126 Chemnitz



TU Chemnitz, Zentrales Hörsaal- und Seminargebäude (©www.chemnitz.de)

Bars & Restaurants

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

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

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

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

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

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

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

Turmbrauhaus – Neumarkt 2, www.turmbrauhaus.de

Gastromeile

New in the city of Chemnitz is Gastromeile, where there is something for everyone. Have a look at the website:

Chemnitzer Gastromeile – chemnitzcity.de/gastromeile/

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 Special Dinner – Max Louis

We invite you to a special dinner at **maxlouis** on **September 28th 2023 at 19:00**

Max Louis is a restaurant located in Chemnitz, Germany. It offers a unique dining experience for scientific conference participants. Here are some details about Max Louis:

Address: Schönherrstraße 8, 09113 Chemnitz, Germany

Getting there by bus: Take the “82B TU Campus” from the front of the university, and get off at the “Chemnitz, Schloßviertel” stop (36 mins ride).

Phone: +49 371 46402433

Cuisine: The restaurant specializes in serving authentic Saxony and German dishes.

Menu: The restaurant offers a diverse menu with various options for conference participants.

Hours: Max Louis closes at 10 PM.

Reviews: Max Louis has received positive reviews on platforms like TripAdvisor, where it is ranked #6 out of 251 restaurants in Chemnitz.



IWIS Social Program – Visit to Meissen

On September 27 at 3:00 PM, a shuttle bus will transport interested participants to the museum.

We welcome you this year to the **Porcelain manufacturer museum "Meissen"**, leading the business since 1710.



The dinner will be at Café & Restaurant MEISSEN.

Travel to Chemnitz

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

By car from Autobahn A72:

- Take the motorway exit '15-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' toward 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 3 in direction 'Technopark Chemnitz', alternatively local trains C13, C14 or C15 in direction 'Technopark Chemnitz'
- Get off at 'TU Campus (Reichenhainer Straße)'

Airport:

- The next nearby Airports are Dresden and Leipzig
- From airport Dresden go into 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 in Chemnitz

Most of the 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
www.bahn.de

The tickets for the local train (C13, C14 and C15), Trams (1, 2, 3, 4, and 5), and Buses could be obtained either from the ticket distribution machines in the stations or directly from inside the mean of transport.

The tickets obtained from the distribution machines in the stations should be stamped after boarding the bus/tram/train. The stamp machine is typically orange.

Meanwhile, the tickets obtained from public transport do not require further stamping. The distribution machines are found in the middle of the means of transport for trams and trains. The bus, however, must always be boarded from the front door. The ticket could be obtained from the driver.

A 1-day ticket "Tageskarte" could get you around Chemnitz. It costs 5,40€ and is valid until 4:00 AM the following day with reference to the date stated on the ticket.

A one-drive ticket, "Einzelfahrkarte," is valid for 1 hour from the stamp time. It costs 2,40€.

Please note that, in case you have booked a Sachsen-Ticket, the ticket would also be valid for all the means of transport indicated above.

It is possible to use Android/iPhone app DB Navigator from the app store. (<https://www.bahn.com/en/view/booking-information/booking/db-navigator-app.shtml>)



Getting from the Hotel Seaside Residenz to the workshop venue:

By feet:

15 minutes of walk.

By Tram/Train:

In front of the hotel, you will find 'Bernsbachplatz' train/tram station. Take Tram 3, alternatively Train C13, C14 or C15 to the direction 'Technopark Chemnitz'. The station at university is named 'TU Campus' and is just in front of the workshop venue.

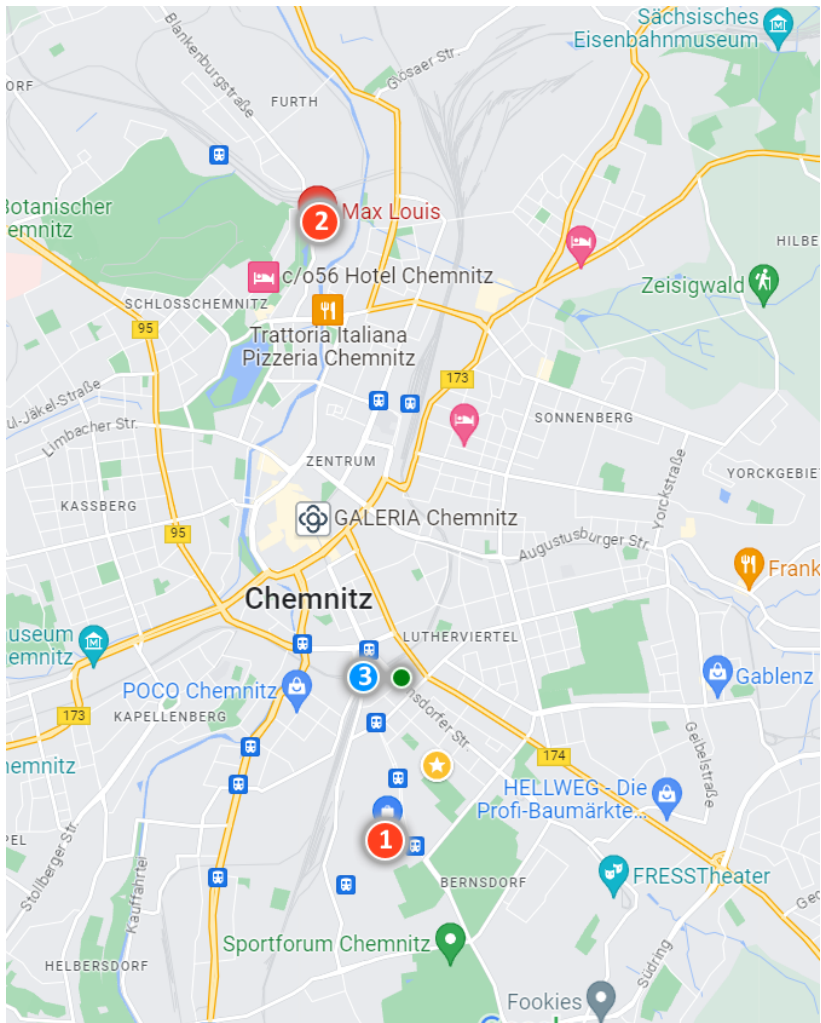
Getting from the Hotel Dorint Kongresshotel to the workshop venue:

By Tram/Train:

Nearby the hotel, you will find 'Roter Turm' train/tram station. Take Tram 3, alternatively Train C13, C14 or C15 to the direction 'Technopark Chemnitz'. The station at university is named 'TU Campus' and is just in front of the workshop venue.

City Plan

1. Venue (Zentrales Hörsaal- und Seminargebäude, nicknamed Orangerie)
2. Max Louis Restaurant
3. Hotel Seaside Residenz Chemnitz



City Plan

Internet Access

During the event, Wi-Fi access is available at the campus site. Please use the following registration information to log in:

Network name tu-chemnitz.de
WPA2 key IWIS2023

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

Sponsors

The workshop is supported mainly by:

- Rutronik



- Sciospec



and by:

- School of Metrology CSM e.V.



- IEEE Instrumentation & Measurement Society



- IEEE IM Chapter Germany Section



- IEEE EMB Chapter Germany Section



- IEEE Technical committee IM-TC 2 on Impedance Spectroscopy



- Bio-Logic Science Instruments GmbH



- Safion GmbH



- ZAHNER-elektrik GmbH & Co. KG



First Aid

Your safety is our priority; if you or anyone else is injured, contact Mr. Frank Wendler or Ms. Franziska Keil immediately.

ASIS Program

Tuesday, September 26th, 2023 : ASIS Day 1

- 09:00 - 10:15 **Tutorial 1**
Validation and Reconstruction of Impedance Data - Comparison Between the Measurement Model and the ZHIT Algorithm
Dr. Werner Strunz, Zahner elektrik, Kronach, Germany
- 10:15 - 10:30 **Short break**
- 10:30 - 11:45 **Tutorial 2**
EIS Quality Indicators
Dr. Bogdan Petrescu, Senior Scientist, BioLogic, France
- 11:45 - 12:45 **Lunch break**
- 12:45 - 14:00 **Tutorial 3**
Impedance Measurements - Instruments, Sensors & Beyond: An introduction on how to choose, design and successfully use setups for electrical impedance spectroscopy
Dipl. phys. Martin Bulst, Sciospec Scientific Instruments GmbH, Bennewitz, Germany
- 14:00 - 15:15 **Tutorial 4**
Basics on Equilibrium Electrochemistry
Prof. Leonardo Giordano Paterno, Laboratory of Research on Polymers and Nanomaterials - LABPOLN, Institute of Chemistry, University of Brasilia, Brazil
- 15:15 - 15:30 **Short break**
- 15:30 - 18:00 **Tutorial (Hands-on) 1**
Impedance measurements - instruments, sensors & beyond - shown on selected experiments
Martin Bulst, Sciospec Scientific Instruments GmbH
- 15:30 - 18:00 **Tutorial (Hands-on) 2**
Arduino basics - hands-on
Amin Fischer, Measurement and Sensor Technology, TU Chemnitz

Wednesday, September 27st, 2023 : ASIS Day 2

- 09:00 - 10:15 **Tutorial 5**
Single Chip Solution for electrical characterization
Prof. Uwe Pliquet, Institut für Bioprozess- und Analysen-
messtechnik e.V., Heilbad Heiligenstadt, Germany
- 10:15 - 10:30 **Short break**
- 10:30 - 11:45 **Tutorial 6**
Application of Electrical Impedance Spectroscopy in Food
Science
Dr. Vozáry Eszter Emília, Hungarian University of Agricul-
ture and Life Sciences, Budapest, Hungary
- 11:45 - 12:45 **Lunch break**
- 12:45 - 14:45 **Tutorial (Hands-on) 3**
Impedance measurements - instruments, sensors & beyond
- shown on selected experiments
Martin Bulst, Sciospec Scientific Instruments GmbH
- 12:45 - 14:45 **Tutorial (Hands-on) 4**
Development of conductivity measurement device
Jordan Rose, RUTRONIK Elektronische Bauelemente
GmbH
- 14:45 - 15:00 **Short Break**
- 15:00 - 20:00 **Social event**

IWIS Program

Thursday, September 28th, 2023 : IWIS day 1

- 08:30 - 09:00 **Opening**
- 09:00 - 10:00 **Plenary Talk 1**
Chair: Prof. Richard Bayford
Challenges of the applications of electrical impedance spectroscopy in medical application; *Prof. Pasquale Arpaia*
- 10:00 - 10:15 **Short break**
- Session 1 - Bioimpedance**
Chair: Prof. Pasquale Arpaia
- 10:15 - 11:15 - On using electrical impedance measurements for fish detection in sea- and freshwater; *Lukasz Nowak et al.*
- Bioimpedance spectroscopy improves insulin absorption measurement method: A feasibility in-vivo study based on saline; *Pasquale Arpaia et al.*
- A Low-Complexity Method for Processing EIS Data of R-RC Circuit and Parameter Identification; *Mitar Simic et al.*
- Study for the Minimization of the Number of Frequencies for Cole-Cole Model for Bioimpedance Spectroscopy; *Cherif Ouni et al.*
- Session 2 - Signal Processing**
Chair: Prof. Francesco Ciucci
- 11:15 - 12:00 - Cole-Cole Bio-Impedance Parameters Estimation From Sinewave Excitation Signal with a Minimum Number of Frequencies; *Nour Ammar et al.*
- Dynamic Impedance Spectroscopy: Fitting Multivariate Impedance Spectra using B-Spline Basis; *Richard Chukwu et al.*
- Feasibility Study of Detecting the Impact of Caffeine, and Diet on Hand Gestures Classification by sEMG Signals; *Hiba Hellara et al.*

Session 3 - Materials(I)

Chair: Dr. Julia Linnemann

- 11:15 - 12:00 - Application of impedance spectroscopy for in-situ corrosion tests in supercritical water; *Jan Macák et al.*
- Assessment of the physicochemical meaning of the ohmic series resistance observed for high frequencies in electrochemical impedance spectra; *Sebastian Reinke et al.*
- Quantitative investigation of CeO₂ surface proton conduction in H₂ atmosphere; *Taku Matsuda et al.*

12:00 - 13:00 Lunch break & Exhibition & Hackathon Presentations

13:00 - 14:00 Plenary Talk 2

Chair: Prof. Francesco Ciucci

Distribution of Relaxation Times for the Analysis of Large EIS Datasets; *Prof. Pasquale Arpaia*

Session 4 - Materials(II)

Chair: Prof. Roman Gruden

- 14:00 - 14:45 - Effect of Impedance on electrochromic properties of W-doped V₂O₅ films; *Hua Li et al.*
- In-situ polymerization measurement during zeolite formation employing a differential impedance approach; *Nikolaus Doppelhammer et al.*
- Investigation of complex electrical properties of concrete during decommissioning of nuclear power plants (II): an experimental analysis; *Tanzila Nurjahan et al.*

14:45 - 15:00 Short break

Session 5 - Materials for Energy Devices

Chair: Dr. Nikolaus Doppelhammer

- 15:15 - 16:00 - Ion Correlations and Transport in Concentrated Electrolyte Solutions for Battery Applications; *Bernhard Roling et al.*
- Humidity dependence of the dielectric constant of a thermosetting polyurethane; *Hans Liebscher et al.*
- Electrochemical properties of ternary metal oxides for supercapacitor; *Jyoti Raghav et al.*
- Room temperature ionic liquids encapsulated in PVDF-HFP as an electrolyte for flexible supercapacitors; *Dr. Shabeeba Pilathottathil et al.*

16:00 - 17:00 **CEIS: TC-2 Meeting**

16:00 - 17:00 **Poster Session**

- Impedance Spectroscopy of Hydrogel, Rubber and Textile Electrodes for Bioelectrical Stimulation; *Irene Lange et al.*

- Exploring the Behavior of Electrodeposited Iodonium Salts: Insights from Electrochemical Impedance Spectroscopy on Coating Performance; *Taral Patel et al.*

- Structural and Dielectric Properties of Laser Crystallized BST thin films for Microwave Device Applications; *Akhil Raman T S et al.*

- Application of printed paper sensors in characterizing curing behavior of thermosetting resin systems using dielectric spectroscopy; *Nitin Gupta et al.*

- State-of-charge Estimation of Li-ion Battery Cells based on Distribution of Relaxation Times and Gaussian Mixture Model; *Dhia Neifar et al.*

- Electronic Tongue based on Composites of Metal Phthalocyanine and Carbon Nanotubes and Electrochemically Deposited Metal Nanoparticles for Metal Ions Detection Enhanced by Machine Learning; *Tianqi Lu et al.*

- Integration of Carbon nanotubes (CNT) in Oxide Ceramic Composites for Temperature Sensing Applications; *Sarra Missaoui et al.*

- Design of experiments based study to optimize laser induced graphene surfaces for electrochemical sensor applications; *Anurag Adiraju et al.*

19:00 **Dinner**

Friday, September 29st, 2023 : IWIS Day 2

- 09:00 - 10:00 **Plenary Talk 3**
Chair: Prof. Olfa Kanoun
Impedance Sensing and Microsensors; *Prof. Marco Carminati*
- 10:00 - 10:15 **Short break**
- 10:15 - 11:15 **Plenary Talk 4**
Chair: Dr. Thomas Keutel
Nonlinearity and frequency dependence: material behavior or artefact ?; *Prof. Uwe Pliquett*

Session 6 - Systems

- Chair: Prof. Uwe Pliquett
- 11:00 - 12:00 - Portable Impedance Meter for Focused Impedance Applications; *Graziella Scandurra et al.*
- An upgraded version of a bioimpedance transducer for non-invasive monitoring artificial insulin bioavailability after subcutaneous administration; *Pasquale Arpaia et al.*
- A Novel Wearable Device for Continuous Bioimpedance Monitoring in Congestive Heart Failure Patients; *Santiago F. Scagliusi et al.*
- 12:00 - 13:00 **Lunch break & Poster Session**

Session 7 - Energy

- Chair: Dr. Werner Strunz
- 11:00 - 12:00 - Drift Correction in Operando Electrochemical Impedance Spectroscopy for Batteries Research; *Rebeca Fortes-Martín et al.*
- Exploring degradation of Li-ion batteries aged with a driving profile using EIS and DRT; *Brian Ospina Agudelo et al.*
- How can we gain Trust in EIS Measurements on High Impedance Systems?; *Mirdash Bakalli et al.*
- Dynamic impedance modeling of an alkaline electrolyzer - A practical approach; *Oleksandr Sologubenko et al.*

Session 8 - Sensors

Chair: Prof. Jörg Himmel

- 14:00 - 15:30
- Usability Tests on the Temperature-Induced Changes in Magnetic Hysteresis During Steel Production; *Marc Simoneit et al.*
 - Impedance spectroscopy for monitoring the condition of wooden components; *Maja Vasiljevic et al.*
 - Inductive Sensor for Magnetic Property Evaluation in Hot Rolling Mill Wire Production; *Jonas Rafael Brodmann et al.*
 - Design of a Self-Calibrating Wide-Band Radiometer; *Fabian Ströder et al.*
 - Catechol-Sensitive Nanosensors Based on Novel Silver Nanoparticles Modified Glassy Carbon Electrodes: Application for Water Monitoring; *Siwar Jebril et al.*
 - 3D Printed Thermoplastic Polyurethane Filaments with Carbon Nanotubes for Sensing Applications; *Qi Xue et al.*

15:30 - 15:45 **Closure**

Publications series

O. Kanoun (Ed.)

Impedance Spectroscopy: Advanced Applications: Battery Research, Bioimpedance, System Design

Vol. 1, ISBN 978-3-11-055892-0, 2018

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

TIME	Tuesday	Wednesday	Thursday	Friday
	26 September	27 September	28 September	29 September
	ASIS Day 1	ASIS Day 2	IWIS Day 1	IWIS Day 2
8:00				
8:15				
8:30			Opening	
8:45				
9:00				
9:15	Tutorial 1 (Room N010)	Tutorial 5 (Room N012)	Plenary 1 (Room N012)	Plenary 3 (Room N012)
9:30				
9:45				
10:00	Discussion	Discussion	Short Break	Short Break
10:15	Short Break	Short Break		
10:30			Session 1 Bioimpedance (Room N012)	Plenary 4 (Room N012)
10:45	Tutorial 2 (Room N010)	Tutorial 6 (Room N012)		
11:00			Session 2 Signal Processing (Room N012)	Session 6 Systems (Room N012)
11:15			Session 3 Material (I) (Room N010)	
11:30	Discussion	Discussion		
11:45				
12:00	Lunch Break	Lunch Break	Lunch Break & Exhibition	Lunch Break & Exhibition
12:15			Hackathon Session	
12:30				
12:45				
13:00	Tutorial 3 (Room N010)	Hands-on Tutorial 3 Sciospec (Room N005)	Plenary 2 (Room N012)	Session 7 Energy (Room N012)
13:15		Hands-on Tutorial 4 Rutronik (Room N006)		
13:30				
13:45	Discussion		Session 4 Material (II) (Room N012)	Session 8 Sensors (Room N012)
14:00	Tutorial 4 (Room N010)			
14:15			Short Break	
14:30				
14:45				
15:00	Discussion		Session 5 Material for Energy (Room N012)	Closure
15:15	Short Break			
15:30				
15:45				
16:00			TC-2 meeting	Women in Engineering
16:15	Hands-on Tutorial 1 Sciospec (Room N005)	Hands-on Tutorial 2 MST (Room N006)	Poster Session	
16:30				
16:45				
17:00		Social Event		
17:15				
17:30				
17:45				
18:00				
18:15			Dinner	
18:30				
18:45				
19:00				