Chairman's Welcome Message

The exchange of ideas and concepts across different scientific fields is an important first step to find innovative solutions for the future and the current problems of mankind. It is the aspired aim of the international workshop on impedance spectroscopy (IWIS) to bring together 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 and medicine, electronics and sensors. The Advanced School on Impedance Spectroscopy (ASIS), which takes place for the third time this year, provides a good overview of the basics all around the method and makes it more accessible for young scientists. An exhibition informs about the latest news on the measurement equipment and devices. These are main components of this annual international workshop taking place at Technische Universität Chemnitz.

In its 12^{th} edition, the IWIS workshop includes more than 50 contributions from 15 countries in 6 sessions, 7 plenary talks, 9 tutorials and 1 workshop. Selected contributions from the workshop will be published as post-conference proceedings in international journals. The peer reviewed contributions aim to highlight new advances and present different approaches to impedance spectroscopy including modeling, measurement and applications.

This year's IWIS is a special one, as the Inaugural meeting of the IEEE Technical committee IM-TC 2 on Impedance Spectroscopy will take place. The TC-2 has been formed this year to promote Impedance Spectroscopy and standards within the IEEE community world wide.

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 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 2019 and for coming to Chemnitz.

Prof. Olfa Kanoun & Prof. Abdelhamid Errachid
General Chairs

IWIS 2019 Organizers

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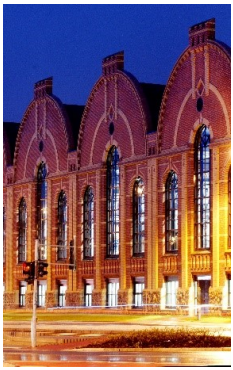
General Information

The City of Chemnitz

Chemnitz has its unique story - of groundbreaking inventions in automotive engineering, mechanical engineering or the textile industry as well as of courageous companies like Richard Hartmann, Carl Gottlieb Haubold or Louis Schönherr. 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 with a focus 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 with 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, Chemnitz as an important link in the global manufacturing chain, produces excellent machines and production facilities for the whole world.

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

Buildings in Jugendstyle in the famous Chemnitz-Kaßberg (4.5 km^2 protected area as a historic monument), (©www.chemnitz.de)

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 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 at the Campus of Chemnitz University of Technology. You can find it at:

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 a couple of nice bars and restaurants around. 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

Ratskeller – Markt 1, www.ratskeller-chemnitz.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 Gasttromeile – chemnitzcity.de/gastromeile/

IWIS Special Dinner – Café Moskau

The Special Dinner will be held in Café Moskau in Straße der Nationen, nearby the campus of the University in the Street of Nations. It has a side-view on the Opera house "Opernhaus Chemnitz", the Municipal Theater "Städische Theater Chemnitz" and the Church of Petrikirche.

Café Moskau Chemnitz

The restaurant is looking forward for our visit:
We combine traditional values with fresh ideas, because not only visually, classic and contemporary elements merge in our house to the unique flair of Café Moscow. Whether happy

bachelor parties, the first date, the tenth wedding anniversary, a fun evening with colleagues, Grandma's 80th birthday, Champions League final with the boys or the relaxed end of an evening in the opera - in Café Moscow you feel comfortable for every occasion. We are not only a modern meeting place for young people who enjoy delicious cocktails from all over the world in a convivial round, but also the place where you can meet the family for coffee and cake on Sundays.
What probably connects every inhabitant of chemnitz with the Cafe Moscow is the billiards game. We also remain true to this tradition and offer you the opportunity to practice and measure at 30 tables in the art of handling queues and balls. Whether you want to sit back with a glass of good wine and relax or rather have an excited fever, you decide.

Getting from the Hotel Seaside Residenz or the Venue to the Restaurant:

By car:

Please see the map in pg. 12 / 13
Straße der Nationen 56, 09111 Chemnitz

By tram / local train:

- From the front of the hotel / Venue, take one of the following transport:
  - Tram 3 'Hauptbahnhof – Technopark' in the direction of 'Hauptbahnhof'
  - Train C13 'Chemnitz – Burgstädt' in the direction of 'Burgstädt'
  - Train C14 'Chemnitz – Mittweida' in the direction of 'Mittweida'
  - Train C15 'Chemnitz – Hainichen' in the direction of 'Hainichen'
- Get off at 'Theaterplatz' (Theaterplatz / Kunstsammlungen Chemnitz)

IWIS Social Program – Visit to Räucherkerzenland Crottendorf
Are you interested in making your own original Crottendorfer incense candles and getting your head free after a long workshop day?
Then take part in our Social Program on the 25th of September 2019.

Räucherkerzenland Crottendorf

We invite you to an original Ore Mountains (Erzgebirge) handwork! Knead the dough, pick and mix your own scent and form your own incense candle.
Start is around **02:30 p.m**. in front of the lecture hall building. After your arrival in Crottendorf, you have the opportunity to make your own incense candles in the "Räucherkerzenland" around **4:00 pm**.
Afterwards we will have dinner in the "Kaiserhof Neudorf", where you have the possibility to taste original dishes from the "Erzgebirge" .
Paid by yourselves. Just one drink is paid by us.
Departure is about **09:00 p.m.**
Arrival will be about **10:00 p.m.** at the lecture hall building.

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' 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 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.öpnvkarte.de
www.bahn.de

The ticket 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 the public transport mean does not require a further stamping. For trams and trains, the distribution machines are found in the middle of the mean of transport. 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 4,40€ and is valid until 4:00 AM of the following day in reference to the date stated in the ticket.

A one-drive ticket "Einzelfahrtkarte" is valid for 1 hour from the stamp time. It costs 2,20€.

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.

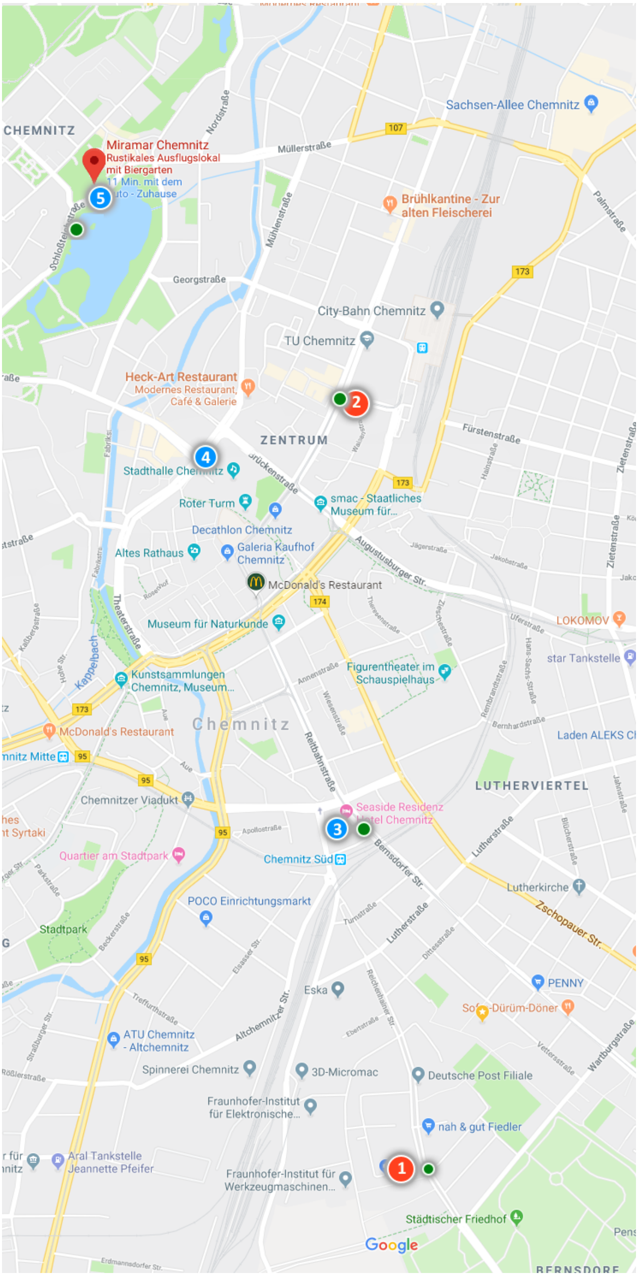
Getting from the Hotel Dorint Kongresshotel to the workshop venue:

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. Restaurant/Café Moskau Chemnitz
3. Hotel Seaside Reisdenz Chemnitz
4. Hotel Dorint Kongresshotel Chemnitz
5. Miramar Chemnitz

[x]Green dots in the map represent the tram/bus stations.


CHEMNITZ
Miramar Chemnitz
Rustikales Ausflugslokal
mit Biergarten
Nordstraße
Müllerstraße
Sachsen-Allee Chemnitz
Brühlkantine - Zur
alten Fleischerei
Palmstraße
Mühlenstraße
Georgstraße
City-Bahn Chemnitz
TU Chemnitz
Heck-Art Restaurant
Modernes Restaurant,
Café & Galerie
ZENTRUM
Fürstenstraße
Stadthalle Chemnitz
Roter Turm
smac - Staatliches
Museum für...
Decathlon Chemnitz
Altes Rathaus
Galeria Kaufhof
Chemnitz
Augustusburger Str.
McDonald's Restaurant
Museum für Naturkunde
LOKOMOV
star Tankstelle
Theaterstraße
Kappelbach
Kunstsammlungen
Chemnitz, Museum...
Figurentheater im
Schauspielhaus
McDonald's Restaurant
Chemnitz
Reitbahnstraße
Laden ALEKS
LUTHERVIERTEL
Chemnitzer Viadukt
Seaside Residenz
Hotel Chemnitz
Quartier am Stadtpark
Chemnitz Süd
Bernsdorfer Str.
Lutherstraße
Lutherkirche
Zschopauer Str.
POCO Einrichtungsmarkt
Stadtpark
PENNY
Eska
Sofra-Dürüm-Döner
ATU Chemnitz
- Altchemnitz
Altchemnitzer Str.
Spinnerei Chemnitz
3D-Micromac
Deutsche Post Filiale
Fraunhofer-Institut
für Elektronische...
nah & gut Fiedler
Aral Tankstelle
Jeannette Pfeifer
Fraunhofer-Institut für
Werkzeugmaschinen...
Städtischer Friedhof
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City Plan

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

Network name	`tuc-special`
WPA2 key	`iwis2019`

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

Sponsors

The workshop is supported by:

- School of Metrology CSM e.V.
  

- IEEE Instrumentation & Measurement Society
  

- IEEE IM Chapter Germany Section
  

- The main sponsor from industry:
  

Together with all the exhibitors listed in the next page

Exhibition

During the workshop, the following exhibitors will be present:

ASIS Program

Tuesday, September 24th, 2019

08:30 - 09:00	**Registration**
09:00 - 10:00	**Tutorial 1** Basics on Electrochemistry, Phase Boundaries and Cell Potentials Prof. R. Gruden, DHBW Stuttgart
10:00 - 10:15	**Discussion**
10:15 - 10:45	**Coffee Break & Poster Exhibition**
10:45 - 11:45	**Tutorial 2** Modeling of the Impedance Data Prof. A. Lasia, Retired Professor at the Chemistry Department of the Université de Sherbrooke, Québec, Canada
11:45 - 12:00	**Discussion**
12:00 - 13:00	**Lunch**
13:00 - 14:00	**Tutorial 3** Electroanalytical chemistry? Basics and Chemical Sensor Applications Prof. L. G. Paterno, Laboratory of Research on Polymers and Nanomaterials, Institute of Chemistry, University of Brasilia, Brazil
14:00 - 14:15	**Discussion**
14:15 - 15:15	**Tutorial 4** Dynamic Impedance-Spectroscopy: the Combination of Fast Impedance Measurement with Controlled Voltage Offset Prof. U. Pliquett , Institut für Bioprozess- und Analysenmesstechnik e.V. Heilbad Heiligenstadt
15:15 - 15:30	**Discussion**

15:30 - 16:00	**Coffee Break & Poster Exhibition**
16:00 - 17:00	**Tutorial 5** "Debugging" of Impedance Spectra Dr. W. Strunz, Zahner elektrik, Kronach, Germany
17:00 - 17:15	**Discussion**
17:15 - 18:30	**Workshop** Arduino Basics - Hands on R. Ramalingame, R. Torres, Technische Universität Chemnitz

Wednesday, September 25th, 2019

09:00 - 10:00	**Tutorial 6** Signal Processing for Impedance Spectroscopy Prof. O. Kanoun, Chair for Measurement and Sensor Technology, TU Chemnitz, Germany
10:00 - 10:15	**Discussion**
10:15 - 10:45	**Coffee Break & Poster Exhibition**
10:45 - 11:45	**Tutorial 7** Impedance Spectroscopy as a Tool for the Characterization of Bio & Chemical Sensors Prof. A. Errachid, CNRS, ENS Lyon, Institut des Sciences Analytiques, France
11:45 - 12:00	**Discussion**
12:00 - 13:00	**Lunch**
13:00 - 14:00	**Tutorial 8** Electrochemistry-based Approaches for Cancer Biomarkers Detection Dr. N. Fourati , Laboratoire SATIE, Conservatoire National des Arts et Métiers, Paris
14:00 - 14:15	**Discussion**
14:15 - 15:15	**Tutorial 9** High-Resolution Impedance Sensing: Circuits, Instrumentation and Applications Prof. M. Carminati, Politecnico di Milano, Milano, Italy
15:15 - 15:30	**Discussion**
14:30 – 19:00	**Social Program** Räucherkerzenland Crottendorf

IWIS Program

Thursday, September 26th, 2019

08:00 – 08:30 **Registration (Registration Desk)**

08:30 – 08:55 **Opening**
Chair: Prof. Olfa Kanoun

08:55 – 09:35 **Plenary Talk 1**
Chair: Prof. Olfa Kanoun
Kinetics of hydrogen evolution reaction; *Prof. Andrzej Lasia*

09:35 – 10:15 **Plenary Talk 2**
Chair: Prof. Abdelhamid Errachid
EIS-based Health Micro-instrumentation for Measurement of Drug Transdermal Delivery; *Prof. Pasquale Arpaia*

10:15 – 10:45 **Coffee Break & Poster Exhibition**

Session 1 - Fundamentals
Chair: Prof. Andrzej Lasia

10:45 – 12:30 Electrical Mott-Schottky for Analysis of pH Capacitive Sensor based on Hafnium Oxide Deposited by Atomic Layer Deposition; *Abdelhamid Errachid et al*

Transport Studies on Model-Type Interphases Grown on Glassy Carbon Electrodes; *Bernhard Roling et al*

Determination of Gas Diffusion Coefficients in Porous Materials by Impedance Spectroscopy; *Quang Nguyen et al*

Detection and Measurement of Uniaxial Anisotropy in Steel Sheets with Eddy Current Sensors; *Frank Wendler et al*

Series RQ Circuit Identification using Alpha-Distribution of Relaxation Times; *Ahmed Yahia Kallel et al*

12:30 – 13:30 **Lunch, Exhibition**

13:30 – 14:10 **Plenary Talk 3**
Chair: Prof. Pasquale Arpaia
Surface Acoustic Wave Sensors Functionalized with Ionic and Molecular Imprinted Polymers for The Detection of Chemical and Biological Species; *Dr. Najla Fourati*

14:10 – 14:50 **Plenary Talk 4**
Chair: Prof. Pasquale Arpaia
Field-induced orientation and impedance in suspensions of ellipsoids: Are the electrostatic orientation approach and the principle of maximum entropy production compatible?; *Prof. Jan Gimsa*

14:50 – 16:15 **Poster Session**

14:50 – 16:15 **Science Fair**

14:50 – 16:15 **Tour**
Rutronik
Sciospec
Zahner Messsysteme
Keysight Technologies
rhd Instruments
RelaxIS 3

15:15 – 16:45 **Meeting of the IEEE Technical Committee**

Session 2a - Measurement Systems
Chair: Prof. Jan Gimsa

16:15 – 18:00 Evaluation of Electrical Impedance Spectroscopy for In-Line Monitoring of Crystallization Processes; *Santiago Hidalgo et al*

A Compact Vector Impedance Analyser based on Delta-Sigma D/A and A/D Coversion; *Roberta Ramilli et al*

Low Cost Portable Faradic Impedance Analayzer based on ARM Cortex-M4; *Ammar Al-Hamry et al*

Coin sorting using Multifrequency inductive sensor systems; *Rohan Munjal et al*

Development of a Fast Impedance Spectroscopy Instrument suitable for Quality Assurance for the Mass Production of Supercapacitors.; *Farhan Farooq et al*

Session 2b - Materials & Corrosion

Chair: Prof. Leonardo Giordano Paterno

16:15 – 18:00 Measuring the Dielectric Spectra of Layered Soils; *Felix Schmidt et al*

Galvanostatic Impedance Measurements for The Efficient Adsorption Isotherm Construction in Corrosion Inhibitor Studies; *Jacek Ryl et al*

Understanding of Lithium Ion Migration in Modulated Thin Films Revealed by Electrochemical Impedance Spectroscopy; *Andy Fiedler et al*

Measurement Technology in Geotechnics for The Detection of Material Transport; *Christoph Clemens et al*

19:30 – 23:00 **Special Dinner**
Café Moskau
https://www.moskau-chemnitz.de/

Real-time updated program can be found here:
https://www.tu-chemnitz.de/etit/messtech/iwis/program_iwis.php

Friday, September 27th, 2019

08:30 – 09:10 **Plenary Talk 5**
Chair: Prof. Abdelhamid Errachid
Electronic Tongue; *Prof. Leonardo G. Paterno*

09:10 – 09:50 **Plenary Talk 6**
Chair: Prof. Leonardo G. Paterno
Microstructural Electrical Networks and a Breakdown in the Case for Giant Permittivity; *Prof. Chris Bowen*

09:50 – 10:10 **Coffee Break & Poster Exhibition**

Session 3 - Batteries
Chair: Prof. Abdelhamid Errachid

10:10 – 11:10 Evaluation of Electrchemical Impedance Spectra of Metal-Air Batteries (Li-Air/Zn-Air) for Aqueous, Organic and Solid Electrolytes; *Norbert Wagner et al*

Graphical Analysis of New and Aged Cell Impedance Data; *Wolfgang Scheuerpflug et al*

Investigation of Microstructural Properties of Porous Battery Electrodes with Impedance Spectroscopy Calculating a Novel Admittance based Distribution of Relaxation Times (ADRT); *Peter Marcinkowski et al*

Session 4 - Bioimpedance & Medical
Chair: Prof. Leonardo G. Paterno

11:10 – 12:30 Sensor-in-a-Tube for Label-Free Immune Cell Analysis; *Aleksandr Egunov et al*

Dielectric and Electrical Properties of Porcine Femur Fitted with CPE Element and Cole Model; *Wenzuo Wei et al*

Sensing The Interaction between Beta Tubulin and Epothilone B by Electrochemical Capacitance Spectroscopy; *Sandra Patricia Corzo Mantilla et al*

Evaluation of Electrical Properties of Bio-Tissues Using Electrodes Fabricated near The Sharp Tip of a Hypodermic Needle; *Jinhwan Kim et al*

12:30 – 13:30 **Lunch, Exhibition**

13:30 – 14:10 **Plenary Talk 7**
Chair: Prof. Olfa Kanoun
Impedance Analyzers Tailored on Micro-Nano Devices to Reach Zeptofarad Resolution; *Prof. Giorgio Ferrari*

Session 5 - Sensors
Chair: Prof. Giorgio Ferrari

14:10 – 15:30 Non-contact Magnetic Induction Bioimpedance Spectroscopy of Hass Avocado during Ripening; *Michael O'Toole et al*

Development of an Impedimetric Label-Free Biosensor for Detection of P53 in Salivary; *Abdelhamid Errachid et al*

Impedemetric Sensitivity of Graphene Based Material to Volatile Organic Compound; *Ammar Al-Hamry et al*

Carbon Screen Printed Electrodes Functionnalized with AuNPs for Environmental Application; *Malak Talbi et al*

15:30 – 15:45 **Closure**

Posters

An Algebraic Approach for Identification of Electrochemical Hydrogen Compressors; *Gjorgji Nusev et al*

Non-Invasive Investigation of Ageing Processes with Impedance Spectra of High Power Lithium Iron Phosphate Batteries; *Gereon Stahl et al*

Screening of Cervical Cancer by Electrical Impedance Spectroscopy' Radar Graph of Cells in Suspension; *Sandra Milena Pinto et al*

A Comparaison of Semiconducting Properties of Tin Sulfide Obtained by Chemical and Electrochemical Methods; *Yamina Louafi et al*

A Novel Alpha-Distribution of Relaxation Times Approach for Series RQ Circuit Identification; *Ahmed Yahia Kallel et al*

A Novel Sensitive Immunosensor Array for TNF-Alpha Detection in Artificial Saliva (AS) Using Polymer-Coated Magnetic Nanoparticles onto Screen-Printed Gold Electrode (SPEAu): Heart Failure.; *Lassaad Barhoumi et al*

An Electrochemical Sensor Based on Carbon Black Modified Paper-based Electrode (μPAD) for Detection of Bisphenol A in Water Samples; *Dhouha Jemmeli et al*

Comparative Analysis of Key Metrics Effect on Howland Current Source Output Impedance for Portable Biomedical Device; *Emna Ben Ayed et al*

Comparative Study of Excitation Signals Efficiency for Portable Medical Devices; *Yesmine Ben Elhaj et al*

Conduction Mechanism of Different Cationic Centre in PVA- RTIL Solid Electrolyte for Supercapacitor Application; *Shabeeba P. et al*

Conformal Electrodeposition of Layered Manganese Oxide Intercalated with Potassium as a Pseudocapacitive Functionalisation of Carbon Electrodes in Supercapacitors; *Akash A.W. Ratnayaka et al*

Design of New Circuit for Temperature Cancelation for ISFET Sensor; *Ahmed Gaddour et al*

Development of Low-Cost Supercapacitor for Energy Storage Devices with Sustainable Approach ; *Ilyes ben Hadj Jrad et al*

Early Stage Detection of Cancer Biomarkers Using Nano-Materials Based Sensors; *Zina Fredj et al*

Effect of Electrode Processing and Cell Assembly on The Performance of Supercapacitor in Prototype Pouch Cell Format; *Dhrubajyoti Bhattacharjya et al*

Electrochemical Impedance Sepectroscopy Analysis of Graphene Fiber; *Jin-Young LEE et al*

Electrochemical Impedance Spectroscopy and Its Use in Corrosion; *AMBRISH SINGH et al*

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