

ISE Division 2 (BIOELECTROCHEMISTRY) REPORT – 2016



- **Members 669 in good standing**
- **Division officers:**
- Renata Bilewicz – chair
- Fred Lisdat – chair elect
- Alexander Kuhn instead of Woonsup Shin - past chair
- Damien Arrigan – vice chair
- Elisabeth Lojou – vice chair

Summary of Division Activities (2016)

Awards of our Division

George Wilson Distinguished Professor Emeritus at the University of Kansas, USA selected for the Niki Prize 2015 gave the award lecture during 2016 ISE annual meeting Congratulations !!

In 2016 **Jacek Lipkowski**, was selected for **Bioelectrochemistry Award** and his award lecture will be given at the Annual Meeting of ISE in Providence in 2017. The Bioelectrochemistry award is awarded every two years to a scientist who has made an important contribution to the field of bioelectrochemistry. Congratulations!

We are waiting for your candidates for the Niki award in 2017 (<http://www.ise-online.org/awards/index.php>).

Meetings in 2016

2016.07.4-5 - ENFI2016 contact person Fred Lisdat co-sponsored by Division 2

2016.08.16-19 – SMOBE Antwerp contact person Karolien De Wael, co-sponsored by Division 2

2016.09.2016 - Shields Marseille “Redox Films for Energy Conversion – Bioelectrochemical and Molecular Systems” contact person Christophe Léger, co-sponsored by Division 2

2016 - 67th ISE Annual Meeting in The Hague, Netherland

67th Annual Meeting in Den Haag – August 2016 “Electrochemistry: from Sense to Sustainability”

Our division organized two symposia; Symposium 3 was our main symposium and Symposium 4 was a joint symposium with Divisions 1, 2 and 6.

Symposium 3 (main symposium of Div 2): New Approaches for Interfacing Electrochemistry and Biological Systems, Bioelectrochemistry

Symposium Organizers

Elena Ferapontova (Coordinator), Aarhus University, Denmark

(elena.ferapontova@inano.au.dk)

Renata Bilewicz, University of Warsaw, Poland

Karolien de Wael, University of Antwerp, Belgium

Serge Lemay, Twente University, the Netherlands

Fred Lisdat, Technical University of Wildau, Germany

3 poster prizes and 1 short talk prize from Division 2

Short Talk award Michał Kizling, Warsaw, Poland

Posters awards:

SO3-010 **Till Siepenkoetter, Limerick, Ireland** ;

SO3-017 **Tim Bobrowski, Bochum, Germany**;

SO3-031 **Ashley Page, Coventry, United Kingdom.**

Symposium 4: Electrochemical Approaches in Diseases and Human Health

Organized by: Division 1, 2 and 6

Symposium Organizers

Woonsup Shin Div 2 (Coordinator), Sogang University, Korea
(shinws@sogang.ac.kr)

Fethi Bedioui, Chimie ParisTech, France

Marilia O. F. Goulart, Universidade Federal de Alagoas, Brazil

Susan M. Lunte, University of Kansas, USA

Lanqun Mao, Chinese Academy of Sciences, China

1 poster prize from Division 2

s04-026 **Saustin Dongmo**, Oldenburg, Germany

s04-018 **Weseley B. S. Machini**, Coimbra, Portugal

68th Annual Meeting

27 August - 1 September, 2017 Providence, Rhode Island, USA “Electrochemistry without borders”

Symposium 3:

Electrochemical Approaches to Clinical Diagnostics and

Medical Devices Sponsored by: Division 1, Analytical
Electrochemistry and Division 2, Bioelectrochemistry

This symposium covers the broad field of science and technology
where electrochemistry is utilized to develop diagnostic
instruments for diseases and medical devices in the broadest
sense.

Symposium Organizers:

James F. Rusling (Coordinator), University of Connecticut, USA

james.rusling@uconn.edu

Fethi Bedioui, Université Paris Descartes - Chimie ParisTech, France

Woonsup Shin, Sogang University, South Korea

Frédérique T. Deiss, Indiana University Purdue University Indianapolis, USA⁸

Symposium 4 – Main Symposium of Division 2, Bioelectrochemistry „Bioelectrochemistry without Borders”

Experimental as well as theoretical and modeling aspects of biological electron transfer systems and processes are invited.

Imaging of nanostructured interfaces as well as spatio-temporal analysis of biological activity on electrode surfaces will be highlighted.

Applications of electrochemistry in biosensors and bioelectronic devices, biocatalysis for fuel production, energy production via enzymatic or microbial fuel cells, photosynthetic system exploration, waste degradation, and CO₂ reduction, will be emphasized.

Symposium Organizers:

Elisabeth Lojou (Coordinator), CNRS Marseille, France

lojou@imm.cnrs.fr

Shelley Minter, University of Utah, USA

Lars Jeuken, University of Leeds, UK

Scott Calabrese Barton, Michigan State University, USA

Symposium 14:

„Let there be Light in Electrochemistry: From Electrogenenerated Chemiluminescence to Fluorescence”

Organized by: Division 1, Analytical Electrochemistry, Division 2, Bioelectrochemistry, Division 6, Molecular Electrochemistry

This symposium will address fundamental aspects, recent developments, bioanalytical and commercialized applications of ECL and of fluorescence combined with electrochemistry. Electrogenenerated chemiluminescence (ECL) is a powerful technique with extremely broad applications, such as light-emitting devices, immunoassays, biosensors, etc. We wish to cover future development of the field which may include new molecular luminophores, nanoluminophores (metal cluster, nanostructured carbon, Q-dots, nanohybrids), high-throughput assays, bipolar electrochemistry, point-of-care testing, microchips, mechanistic study, light emitting electrochemical cells, etc. The purpose of this symposium is thus to bring together the leading scientists working in all these aspects, in order to stimulate intensive discussions and initiate cooperations

Symposium Organizers:

Gary Blanchard (Coordinator), Michigan State, USA blanchard@chemistry.msu.edu

Zhifeng Ding, University of Western Ontario, Canada

Pawel Kryszinski, University of Warsaw, Poland for Div 2

Neso Sojic, University of Bordeaux, France

Giovanni Valenti, University of Bologna, Italy

Reports on co-sponsored meetings in 2016

OVERVIEW SUMMER MEETING ON BIOELECTROCHEMISTRY - SMOBE2016 - BELGIUM

Antwerp, Belgium, August 17-19, 2016

Concept: Modern electrochemistry is a discipline at the interface between chemistry, physics and biology. The summer meeting covers the breadth and depth of modern interdisciplinary bio-electrochemistry. The invited key-note lecturers focus on the basics of electrochemistry, protein and DNA electrochemistry and, finally, on micro and nanoscale bio-electrochemical applications.

Additionally, PhD students and postdocs are invited to contribute by a poster or oral presentation in one of the above topics.

Objectives of the conference:

- have in-depth discussions on bio-electrochemistry topics between professors, their PhD students and their postdocs.
- provide the participants with the relevant background and emerging topics of the field, through keynote lectures and technical sessions.
- give starting PhD students an opportunity to explain their work and ideas, feedback will be given by the invited lecturers and audience.
- through positive interactions we want to stimulate (young) researchers in what they do and meanwhile initiate/strengthen the collaboration between professors and their research groups.

Participants have the possibility to present the results of their research to a broad public through oral and poster presentations and get into contact with (assistant) professors, people from industry and colleagues from other universities and research centers within their expertise.

Organization: K. De Wael (UAntwerpen, Belgium), L. Rassaei (TUDelft, The Netherlands), T. Doneux (ULB, Belgium)

Ca 60 participants from 17 different countries

Invited lectures:

- Elisabeth Lojou (CNRS, France): enzyme electrical connection in biofuel cells
- Deepak Pant (VITO, Belgium): recent advances in bioelectrochemical conversion of co₂ to chemicals: electrosynthesis via bacteria and enzymes
- Liza Rassaei (Delft University of Technology, The Netherlands): Nanogap sensors
- Renata Bilewicz (University of Warsaw, Poland): electrochemical monitoring of drug release from lipid cubic phases and nanoparticle carriers
- Dirk Heering (University of Leiden, The Netherlands): electro-enzymology: electrochemistry of wired redox enzymes
- Lo Gorton (Lund University, Sweden): direct electron transfer between cellobiose dehydrogenase and electrodes as basis for 3rd generation biosensors/bioanodes
- Ilaria Palchetti (University of Firenze, Italy): electrochemical biosensing platforms for mRNA detection
- Cecilia Cristea ("Iuliu Hațieganu" University of Medicine and Pharmacy, Romania): electrochemical assays for cancer diagnosis and prognosis
- Elena Ferapontova (Aarhus University, Denmark): rationalizing design of genosensors relying on electronic properties of DNA
- Wolfgang Schuhmann (Ruhr-Universität Bochum, Germany): what do molecules encounter at an electrified interface. from DNA to nanosensors

Report on the Workshop

"Engineering of Functional Interfaces - ENFI 2016" at the Technical University Wildau, Germany.

Place: Wildau (South of Berlin)

Time: 3.7.-5.7.2016

website: www.enfi2016.de

Participants: 105

Countries: 6

The meetings contained 5 plenary talks spanning over different aspects of interfacial research and 71 short oral talks from young scientists reporting about detailed concepts, experiments and results. Furthermore 5 hours were devoted to a more detailed discussion of these aspects directly at the poster (overall 83 posters). The discussion was divided into 5 sections. The main topics of the young scientist have been: FET-based sensing structures, photoelectrochemical sensing schemes, microanalytical detection systems, enzyme sensors, DNA detection, thin film technology for the preparation of sensing layers, biofuel cells, implants and surface coatings, functional polymer layers, thermal conduction devices, nanostructures and nanogap sensing a.o. Three posters have been selected for a poster prize.

The 5 plenary talks were the following:

Prof.Dr. R. Haag (FU Berlin), Bioinspired Universal Monolayer Coatings by Combining Concepts from Blood Protein Adsorption and Mussel Adhesion

Prof.Dr. S. Leimkühler (Uni Potsdam), Bacterial molybdenum enzymes, their maturation and future applications

Prof.Dr. V. Mirsky (BTU Cottbus-Senftenberg), Detection, Quantification and Identification of Engineered Nanoparticles

Dr. U. Resch-Genger (Federal Institute for Materials Research and Testing -BAM), Applications and Challenges of Luminescence-based Detection Methods in the Life and Material Sciences

Prof.Dr. G.A. Urban (Uni Freiburg), Microanalytical Systems for Personalized Medicine

The scientific program was accompanied by an evening excursion to "Schloss Köpenick" a small castle in the south of Berlin with an organ concert and a conference dinner.

Fred Lisdat

Report on the ISE sponsored workshop “Redox Films for Energy Conversion – Bioelectrochemical and Molecular Systems”

The 1 st workshop about “Redox films for Energy Conversion” was held at the Institute for Advanced Study (IMéRA), Marseille on September 13, 2016.

The program and the pictures taken during the meeting are online at <https://anrdgshields.wordpress.com/redoxfilmsforenergyconversion/>

The workshop focused on enzymes and molecular catalysts, and their incorporation into protective matrices for the use of these highly active but highly fragile catalysts in Energy conversion. Specific degradation pathways of biological and molecular catalysts need to be understood as well as challenges and limitations in the engineering of tolerant and robust catalysts including enzymes. The workshop was used to discuss the latest advances and results, to gather new ideas about the protection of electrocatalysts and to improve the design as well as assembly of matrices that can shield the catalyst from deactivating molecules such as oxygen.

We invited 14 speakers from five different European countries (Germany, Denmark, Spain, UK, France) to cover the various catalytic systems related to CO₂ reduction, H₂ production and oxidation, O₂ production and oxidation by enzymes, molecular catalysts, and materials (Dr. Vincent Artero, CEA Grenoble, France; Dr. Chris Blanford, University of Manchester, UK; Prof. Kim Daasbjerg, Aarhus University, Denmark; Dr. Antonio Lopez de Lacey, CSIC Madrid, Spain; Prof. Holger Dobbek, HU Berlin, Germany; Prof. Mathias Drieß, TU Berlin, Germany; Dr. Vincent Fourmond, CNRS Marseille, France; Dr. Oliver Lenz, TU Berlin, Germany; Dr. Elisabeth Lojou, CNRS/AMU Marseille, France; Dr. Nicolas Mano, CRPP Bordeaux, France; Prof. Marc Robert, CNRS Paris, France; Dr. Olaf Rüdiger, MPI Mülheim, Germany; Prof. Wolfgang Schuhmann, RUB Bochum, Germany; Dr. Jenny Zhang, University of Cambridge, UK).

The maximal number of 50 possible participants was reached, which illustrates the great interest of young and senior scientists being part of this workshop.

Statistics about participants : Participants: 50 from 12 different countries. France: 28, Germany: 10, UK: 2, Ireland: 2, Austria: 1, USA: 1, Pakistan: 1, South Africa: 1, Belgium: 1, Spain: 1, Algeria: 1, Denmark: 1.

The International Society of Electrochemistry supported this workshop with a generous fund of 800 € from Divisions 2 and 7. These funds have been allocated equally to support the attendance of three young scientists (ISE members) who applied for funding after registration. Two PhD students, Till Siepenkötter and Xinxin Xao, from the University of Limerick (Ireland) and one PostDoc, Pierre Ceccaldi, from the University of Boston (USA).

Elisabeth Lojou (vicechair of division 2) presented ISE during the opening of the meeting.

We also acknowledge all the other sponsors (CNRS, Ville de Marseille, GDR Solar Fuels, IMéRA, FrenchBIC, DFG, ANR, and the German excellence clusters RESOLV and UNICAT) for making it possible to offer free registration and lunch to all participants, and covering all speakers' expenses.

Again, we thank you for the support of ISE,

Yours sincerely,

The Organizing Committee,

Dr. Christophe Léger, Dr. Nicolas Plumeré, Gabriel Kopiec

1. Co-sponsored meetings in 2017

FULL CONFERENCE NAME:	First European Biosensor Symposium/ 10 th German Biosensor Symposium
CONFERENCE ACRONYM:	DBS2017/ EBS2017
CONFERENCE DATES (day-month-year):	20-23-3-2017
CITY:	Potsdam
COUNTRY:	Germany
WEBSITE URL:	EBS2017.com
CONTACT PERSON First Name: Last Name: Institution: E-mail: Function in Conf. Organisation:	Ulla Wollenberger University Potsdam uwollen@uni-potsdam.de Organising committee, co-chair
REGIONAL SECTION (if any) Name of the Regional Representative (RR): Has the RR been contacted? Does the RR sponsor this application? Does the Regional Section provide any financial support?	H. Baltruschat YES XX NO XX but supports application NO XX
ORGANIZERS List of the Organizing Committee and Advisory Board members (specify the ISE members / ISE Division officers among them)	Local Organizing Committee: Frank Bier (chair) Ulla Wollenberger (co-chair) (ISE) Fred Lisdat (ISE) Frieder Scheller (ISE) Carsten Hille
SCOPE OF THE CONFERENCE List of topics	Biosensors, Bioelectrochemistry, Nanotechnology • Technologies for innovative formats

2. 24th International Symposium on Bioelectrochemistry and Bioenergetics of the Bioelectrochemical Society Lyon, France, 3-7 July, 2017

Website: <http://www.bes2017.fr>

Organizing Committee

Chair: Dr. Serge Cosnier, Grenoble Alpes University, France

Pr. Ana Maria Oliveira-Brett, University of Coimbra, Portugal

Dr Carole Chaix, Lyon University, France

Dr. Michael Holzinger, Grenoble Alpes University, France

Dr. Nicole Jaffrezic-Renault, Lyon University, France

Pr. Alexander Kuhn, Bordeaux University, France

Sponsors and advertisers

Important dates :

Opening Abstract submission site : 24-12-2016

Opening Early registration site : 8-02-2017

Plenary speakers

Prof. Christian Amatore Ecole Normale Supérieure, Paris, France

Prof. Evgeny Katz Clarkson University, New York, USA

Prof. Rafael Davalos Wake Forest University, Blacksburg, VA, USA

Prof. Joseph Wang University California San Diego, La Jolla, USA

Division 2 Budget

Unused excess From 2015	1,318.63 €
Allocated for 2016	2,649.82€
Meeting surplus participation	745.33€
Together for 2016	4,713.78€
4 Poster+ 1oral talk prizes	1,545 €
DBS/EBS sponsorship	500 €
SHIELDS sponsorship	500 €
Remaining	2,168.78 €

2018 - 69th Annual Meeting in Bologna „Electrochemistry from Knowledge to Innovation”

Main Symposium of Division 2, „ Bioelectrochemistry returns to the home of Galvani – working title”

Preliminary Symposium Description :

Bologna - home of Galvani and bioelectricity (bioelectrochemistry)

Bioelectricity, biocatalysis, biofuel cells and biobatteries will be highlighted.

Experimental as well as theoretical and modeling studies of biological electron transfer systems and processes are invited.

Protein and DNA electrochemistry with special focus on membrane protein electrochemistry

Electrochemistry of biological and biomimetic membranes

Applications of electrochemistry in biosensors and bioelectronic devices

Electrochemical methods in medical diagnosis

Electrochemical detection of reactive oxygen and nitrogen species

Electrochemistry of oxidative stress based diseases and immune responses

Electrochemistry in cell signaling and communication

Electrochemistry of disease targeted molecules and drug delivery systems

Symposium Organizers:

Wolfgang Schuhmann, University of Bochum

Renata Bilewicz, University of Warsaw

Ilaria Palchetti, Univeristy of Florence

Division: 2

Together with Division 1, 4

Symposium Title: Bipolar electrochemistry, from bioanalysis to materials science

Preferred duration (in half-days): 2

Tentative Keywords (4 to 8):

Bipolar electrochemistry, Bioelectrochemistry, Electroanalysis, Electrodeposition, Electrografting, Corrosion, Spectroelectrochemistry, Electrochemiluminescence

Preliminary Symposium Description (100-300 words):

The concept of bipolar electrochemistry has been known for several decades. However with the advent of micro- and nanotechnology there is considerable renewed interest in this approach as it has become apparent that there are extremely attractive features of bipolar electrochemistry for completely new applications in areas ranging from analytical chemistry to materials science. The renaissance of this topic over the last ten years includes, among others, studies about:

- Electrochemical (bio)sensors and their arrays
- High throughput screening of electrocatalysts
- Controlled generation of surface gradients
- Synthesis of asymmetric particles
- Wireless generation of electrochemiluminescence
- Unconventional motion of small objects
- Corrosion studies

The symposium aims at giving an overview of the potential use of bipolar electrochemistry in very different areas and presenting directions for future evolution.

Symposium Organizers representing the Divisions

Alexander Kuhn (University Bordeaux), Division 2, Richard Crooks (University of Texas, Austin), Division 4
Fredrik Björefors (Uppsala University), Division 1, + 1 local organizer

2018 - 69th Annual Meeting in Bologna „Electrochemistry from Knowledge to Innovation”

Joint Symposium of Division 2, invited Division 6 and 7

„ Photobioelectrochemistry”

Symposium Organizers:

Fred Lisdat, Division 2

Division 6 and 7 invited

Plans for topical meetings in 2018 and 2021 (still under consideration)

**Division 2 topical meeting in Bioelectrochemistry organized together with Bioelectrochemical Society
2021 Romania, Cluj, contact person: prof. Robert Sandulescu**

Division 2 topical meeting for 2018 organized in Vilnius Lithuania, contact person: prof. Rasa Pauliukaite

Candidates for Chair Elect

Following discussion among the Officers and members of the Division 2 we propose two very active members of our Division and Divisional Board as candidates for Chair Elect:

Elena Ferapontova (former Vice Chair)

Damien Arrigan (present Vice Chair)

These are candidates for Chair Elect from the side of Division 2 Board.

We also proposed for the board members of Electrochimica Acta :

Elisabeth Lojou (present Vice Chair)

James Rusling (recipient of the Bioelectrochemistry Niki Prize)

Please visit Division 2 Facebook !

<http://www.facebook.com/pages/ISEDivision-2-Bioelectrochemistry/156450904449193>

Send information to be placed at our facebook page to:

Martin Jönsson-Niedziółka,

Institute of Physical Chemistry, Polish Academy of Sciences