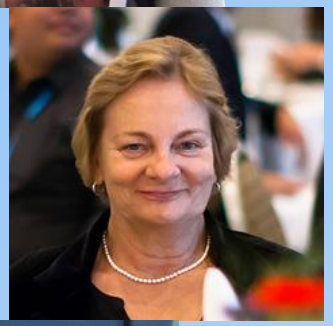
International Society of Electrochemistry

Division 2

Bioelectrochemistry

Report 2017



ISE Division 2 REPORT – 2017

- **Members: 602 in good standing**

- **Division officers:**
- Fred Lisdat – chair
- Elena Ferapontova – chair elect
- Renata Bilewicz – past chair
- Elisabeth Lojou – vice chair
- Taek Dong Chung – vice chair

Summary of Division Activities

Awards of our Division

In 2016

Jacek Lipkowski,

was selected for

Bioelectrochemistry Award

Congratulations!

Award lecture 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.

Awards of our Division

In 2017
Justin Gooding,

was selected for

Katsumi Niki Prize

Congratulations!

Award lecture at the Annual Meeting of ISE in Bologna in 2018.

The Katsumi Niki award is awarded **every two years** to a scientist who has made an important contribution to the field of bioelectrochemistry.

Awards of our Division

In 2018

We are waiting for your proposals for the

Bioelectrochemistry Award

http://www.ise-online.org/awards/bio_div2.php

Previous prize winners:

Frieder Scheller (2008),
Arkady Karyakin (2012),
James Rusling (2014),
Jacek Lipkowski (2016)

Awards of our Division

Poster prizes
at Annual Meetings
+ Banquet ticket

Students Oral Prizes
(for 10min talks)

Sponsored Meetings
2016

3.-5.7. **ENFI2016 Engineering of Functional Interfaces**
Wildau, Germany
contact person: Fred Lisdat

16-19.8. **SMOBE Sommer Meeting on Bio-electrochemistry**
Antwerp, Belgium
contact person: Karolien De Wael,

13.9. **Workshop on Redox Films for energy conversion – bioelectrochemical and molecular systems**
Marseille, France
contact person: Ch. Leger, N. Plumere

Sponsored Meetings 2017

1st EBS/10th DBS

1st European Biosensor Symposium / 10th German Biosensor Symposium

20.3.-23.3.2017 Potsdam, Germany

Chair: F. Bier, U. Wollenberger

Biannual BES Symposium on Bioelectrochemistry

3-7.7.2017 Lyon, France

Chair: S. Cosnier, N. Jaffrezic

Workshop on "Redox Films for Energy Conversion – bioelectrochemical and molecular systems"

28/29.9.2017 Marseille, France

Chair: Ch. Leger, N. Plumere

Division 2 Budget

Unused excess From 2016	918,78 €
Allocated for 2016	**2.923,91€**
Meeting surplus participation	**745,33€**
Together for 2016	**4.588,02€**
4 Poster+ 1oral talk prizes	**1,660,00 €**
Marseille workshop sponsorship	**400,00 €**
Remaining	**2,528.78 €**

68th Annual Meeting
27 August - 1 September, 2017 Providence, Rhode Island, USA "Eletrochemistry 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
Fethi Bedioui, Université Paris Descartes - Chimie ParisTech, France
Woonsup Shin, Sogang University, South Korea
Frédérique T. Deiss, Indiana University Purdue University Indianapolis, USA

<u>Symposium 4</u> – 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
Shelley Minteer, 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 Electrogenerated 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. Electrogenerated 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
Zhifeng Ding, University of Western Ontario, Canada
Pawel Krysinski, University of Warsaw, Poland for Div 2
Neso Sojic, University of Bordeaux, France
Giovanni Valenti, University of Bologna, Italy

2018

69th Annual Meeting of ISE
Electrochemistry from Knowledge to Innovation
Bologna, Italy

2018 - 69th Annual Meeting of ISE, Bologna, Italy

Symposium 3
“Bioelectrochemistry returns to the home of Galvani ”
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

Wolfgang Schuhmann (Germany, wolfgang.schuhmann@rub.de)
Renata Bilewicz (Poland, bilewicz@chem.uw.edu.pl)
Ilaria Palchetti **(**ilaria.palchetti@unifi.it**)**
Fabiana Arduini **(**fabiana.arduini@uniroma2.it**)**

2018 - 69th Annual Meeting of ISE, Bologna, Italy

Symposium 4
Bipolar electrochemistry, from bioanalysis to materials science
Together with division 1,4

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.

Alexander Kuhn (France, Alexander.Kuhn@enscbp.fr)
Richard Crooks (USA, crooks@cm.utexas.edu)
Fredrik Björefors (Sweden, fredrik.bjorefors@kemi.uu.se)
Paolo Ugo (ugo@unive.it)

2018 - 69th Annual Meeting of ISE, Bologna, Italy

Symposium 5
Photobioelectrochemistry - from basic concepts and materials to devices
Together with division 6

The conversion of light into other forms of energy such as electrical or chemical has attracted considerable interest in recent years.
Biological systems can serve as an efficient example for such kind of conversions. Combining principles of photosysnthesis and enzymatic catalysis with basic ideas of engineering and electrochemistry has already been demonstrated to contribute to recent advances. The symposium wants to bring together scientists from different areas who are working on different aspects of such bioinspired, biohybrid or biomimetic systems.

The scope of the symposium will include:
Photobioelectrodes, biohybrid solar cells (including materials and cell design)
Photobiocatalysis, photoelectrochemical fuel production (hydrogen, methanol, formiate....)
combination of microorganisms with electrodes for fuel production
photoelectrochemical sensing

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Danilo Dini (danilo.dini@uniroma1.it)

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Symposium 16

Micro- and Nano-scale platforms to study electron transport in (Bio)molecular systems: from fundamentals to molecular devices. Together with division 6,7

This symposium intends to gather scientists working within the expanding community of (Bio)Molecular Electronics and related fields, who routinely exploits electrochemical-like approaches in nano- and micro-scale platforms.
The symposium will cover all aspects of electron transfer in molecular or biomolecular moieties that profits from an electrified interface and where the electrochemical control has or could find an essential role. In order to put together researchers with very distinct perspectives of molecular electron transfer, the symposium will target studies that range from fundamental approaches, including single-molecule or nanoscale platforms and computational modelling, to micro-scale molecular junctions involving hybrid micro/nano-structured materials for device applications. Such wide vision of this topic will be achieved by attracting researchers interested on different aspects of molecular electron transport, namely, from physical mechanisms and structural aspects of it, to those interested on potential applications such as molecular transistors, (bio)molecular sensors, sequencing platforms, *etc.*

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Angel Cuesta Ciscar (UK, angel.cuestaciscar@abdn.ac.uk)
Nadim Darwish (Australia, nadim.darwish@curtin.edu.au)
Sabrina Antonello (sabrina.antonello@unipd.it)
Giovanni Valenti (g.valenti@unibo.it)

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Symposium 19
Single Entity Electrochemistry Together with division 6,1

Single entity electrochemistry is an important and rapidly growing theme in electrochemistry. It deals with the electrochemical properties of individual molecules, nanoparticles and nanotubes, the use of nanopores and nanopipettes for the detection of biomolecules and single particles, and the study of complex surfaces and single cells at the level of elementary processes and individual surface features. This new area of electrochemistry thus unifies a wide range of important topics, from electrocatalysis at the (sub-)particle level to bioanalysis (e.g., single cell studies and DNA analysis), bringing together underlying concepts, principles and experimental and theoretical challenges that are common. Significant issues for measurements in this area include the detection and analysis of small (pA - fA), and transient, current signals and the treatment of very large data sets. Further, the interpretation of single entity electrochemistry experiments requires theoretical descriptions that go beyond continuum models for mass transport and reactivity, and consideration of interfacial properties (charge density, double layer, structure, composition, defects etc.) at the nanoscale. There are opportunities for significant advances through the use of *in-situ* and *in-operando* spectroscopy and microscopy methods together with electrochemistry. This symposium will provide a vibrant forum to discuss this area of electrochemistry, bringing together experimentalists and theoreticians across several divisions to discuss a topic that is at the forefront of fundamental electrochemistry and underpins many important technical applications.

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Topical Meeting 2018

23rd ISE Topical Meeting
May 8-11 2018, Vilnius, Lithuania

Electrochemistry for the Investigation of Biological Objects: from Functional Nanomaterials to Micro-/Nano-Electrodes

Supported by Division 2

Chair:
Rasa Pauliukaite

Topical Meeting 2018

Scope:

- Bioelectrochemistry (electrochemical methods: CV, amperometry, potentiometry, EIS – for investigation of biologically active materials, proteins and small molecules);
- New functional materials for electrochemical investigation of biological objects (synthesis and characterisation, including combined methods with electrochemistry);
- Formation of micro/nano-structures and micro/nano-electrodes for investigation of biological object;
- Electrochemical investigation of lipid membranes;
- Investigation of an interaction of biological objects and various biologically active compounds;
- Biochelectrochemistry of living or fixed cells.

Topical Meeting 2018

Plenary speakers:

Plamen Atanassov
(USA)

Ana Maria Oliveira-Brett
(Portugal)

Lo Gorton
(Sweden)

Invited speakers:

Christian Amatore
(France)

Orlando Fatibello-Filho
(Brazil)

Fred Lisdat
(Germany)

Jose Manuel Pingarron
(Spain)

Gintaras Valinčius
(Lithuania)

Future Activities

Topical Meeting: (Bio) Electronanalytical Chemistry

Spring 2020, Snowbird, UT, USA
Together with division 1
Organised by: Sh. Minteer, L. Baker, C. Korzeniewski

Division 2 Facebook !

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

Martin Jönsson-Niedziólka,
Institute of Physical Chemistry, Polish Academy of Sciences