ISE - Division 2 - BIOELECTROCHEMISTRY

Report August 2012

by Alexander Kuhn (Chair)

• **Members**: 623 in good standing (604 and 607 in September 2010 and 2011 respectively)

• **Division officers**

  **Chair**: Alexander Kuhn, **Past Chair**: Lo Gorton, **Chair Elect**: Woonsup Shin,

  **Vice-Chairs**: Evgeny Katz and Elena Ferapontova

• **Divisional Meeting**

  The division will have its traditional divisional lunch meeting at the occasion of the annual ISE meeting in Prague on Thursday 23 August 2012. Several topics will be discussed, including the budget, the format of the bioelectrochemistry symposia and the sponsoring of other meetings. A special issue this year will be the upcoming joint ISE/BES topical meeting in Bochum in spring 2013

• **Activities at the Annual Meeting in Prague in 2012**

  At this annual meeting the division organizes two symposia:

  **Symposium 2**  
  **Electrochemistry meets biology: fundamental aspects of electrochemistry with biological systems**

  This symposium focuses on fundamentals of electron transfer pathways and mechanisms within and between biological systems and electrodes. Electron transfer reactions play a key role in biology and for a deeper understanding of such reactions and the successful applications of biological systems in analysis, medicin, energy conversion, and other areas.

  This symposium of the Bioelectrochemistry Division also covers all general aspects of bioelectrochemistry.

  **Topics include but are not limited to:**
  - Electron transfer reactions and mechanisms within and between proteins/redox proteins/enzymes and electrodes
  - Modification of surfaces and interfaces with enzymes, organelles, cells, and biomimics
  - Switchable and tunable electrochemical interfaces and information processing in bioelectrochemical systems
  - Electrochemical transport through membranes and their mimics
  - Enzyme, biomembrane, organelle, and whole cell bioelectrochemistry and bioenergetics
  - Photosynthesis and electrochemistry
  - Electrochemistry of nucleic acids and electrochemical nucleic acid sensors
Symposium Organizers

Elena Ferapontova (Coordinator), Interdisciplinary Nanoscience Centre, Aarhus University, Aarhus C, Denmark, (elena.ferapontova@inano.au.dk)
Taek Dong Chung, Seoul National University, Korea
Lo Gorton, Lund University, Lund, Sweden
Miroslav Fojta, Academy of Sciences, Brno, Czech Republic

Symposium 3

“Advanced materials design for bioelectrochemical applications: from biosensors to biofuel cells”

Nanostructured electrode materials and sophisticated electrode architectures integrating biological elements are key factors for the successful development of state-of-the-art devices with optimized performance for applications ranging from biosensors to biofuel cells. Therefore this symposium focuses primarily on the rational design of electrode materials and surfaces for the study of fundamental and applied aspects in the broad field of bioelectrochemistry.

Topics include but are not limited to:

- Nanostructured electrode materials with bioelectrochemical activities
- Organized surfaces and interfaces modified with biological systems
- Bioelectrocatalysis and electrochemically driven or assisted biological conversions
- Engineering the bioelectrochemistry of cells and tissues
- Nucleic acid, enzyme and whole cell biosensors based on advanced materials
- Optimised design of enzymatic and microbial fuel cells

Alexander Kuhn (Coordinator), Université de Bordeaux, Bordeaux, France, kuhn@ensebp.fr
Evgeny Katz, Clarkson University, Potsdam, NY, USA
Woonsup Shin, Sogang University, Seoul, Korea
Wolfgang Schuhmann, Ruhr University Bochum, Bochum, Germany
Jiri Barek, Charles University, Prague, Czech Republic

We were able to attract a wide range of high quality keynote and invited lecturers for both symposia:

Symposium 2

Michael Hill, Chunhai Fan, Frieder Scheller, Julea Butt, Alan Bond, Emil Palecek, Lars Jeuken

Symposium 3

Scott Calabrese Barton, Taek Dong Chung, Alexander Bittner, Frank Crespilho, Claire Marie Pradier, Edmond Magner, Jacek Lipkowski, Sergey Shleev, Jan Labuda, Xing Hua Xia, Jay Wadhawan
Furthermore there will be, as in former meetings special slots for oral presentations from PhD students on Wednesday from 11:10 to 12:20 and we organize in both symposia a poster award competition with a total of four poster prizes (300 euros each).

A special joint event shared by the two symposia is the minisymposium in the honor of Frieder Scheller who is celebrating his 70th birthday this year.

• **Activities at the Topical Meeting in Bochum in 2013**

Division 2 is in regular contact with the organizers of the meeting and the officers of the Bioelectrochemical Society to prepare this joint meeting.

The symposium features all aspects of the highly interdisciplinary areas of bioelectrochemistry and bioenergetics on the following themes:
i) electrochemistry at cells and tissues;
ii) enzymatic and microbial biofuel cells;
iii) design of the interface between biological recognition elements and electrodes, including new tools and measuring techniques;
iv) bioassays, biochips, biosensors: new developments and applications;
v) interdisciplinary bioelectrochemistry: hyphenated techniques and impact from other fields on bioelectrochemistry;
vi) membrane electroporation and biomedical applications;
vii) biocorrosion: new developments and applications;
viii) protein electrochemistry;
ix) bioelectroanalysis.

• **Activities at the Annual Meeting in Querétaro/Mexico in 2013**

Our division will be involved in the organization of two symposia at this annual meeting, one is a joint symposium with division 1 and the other one is our main symposium.

**Symposium 2**
**Sensing in Living Systems**
Sponsored by: Division 1 and 2, Analytical Electrochemistry and Bioelectrochemistry

Symposium organizers

Fethi Bedioui, ENSCP, Paris, France
Elena Ferapontova, Aarhus University, Denmark
Susana I. Córdova, Universidad de Sao Paulo, Sao Paulo, Brazil
Xóchitl Domínguez, VITO, Belgium.

**Symposium 3**
**New Concepts for Designing Bioelectrochemical Interfaces**
Sponsored by: Division 2, Bioelectrochemistry

Symposium organizers
• Activities at the Topical Meeting in Nanjing/China in 2014

Our division is co-organising with division 1 this topical meeting around the theme “Electrochemical Methods for Life Science and Bioanalysis”. Further details will be discussed in the near future, especially during the Prague meeting.

• Awards

The Bioelectrochemistry Award of division 2 is awarded every two years to a scientist who has made an important contribution to the field of bioelectrochemistry. For the 2012 edition of the award the selection committee has chosen Prof. Arkady Karyakin as the winner of the award. He has made very important contributions to several areas of electrochemistry and especially to the field of bioelectrochemistry over the last decades. He has produced many key publications and has been pioneering biosensors and bioelectrochemistry right from the beginning of this field, and has since then consistently produced work of the highest quality. In many examples the work of Professor Karyakin coupled successfully electrochemistry and life sciences with significant achievements, for example concerning the oriented immobilization of antibodies on gold electrodes, the amperometric observation of protein transfer across liquid|liquid interfaces, reagentless DNA sensors or immobilized hydrogenase enzymes as a basis of biofuel cells.

• Other activities

Division Facebook page

Thanks to the help of Martin Jönsson-Niedziółka from the Institute of Physical Chemistry, Polish Academy of Sciences our division has since October 2011 its own FACEBOOK page (http://www.facebook.com/pages/ISE-Division-2-Bioelectrochemistry/156450904449193). It is regularly used by our members to post advertisements for meetings, open positions etc.

• Budget

The division has at the time of this report a remaining budget of 1563 euros. During the year the budget has been spent to support young scientists through a waiver of the registration fees for students that present an oral in the special student slots of the annual meeting (1250 euros) and also the Bioelectrochemistry award has been paid from this budget (750 euros). We still need to subtract the poster prizes, that will be awarded at the Prague meeting (4x300 euros), meaning that by the end of the year the division will have a remaining budget of 363 euros.