

Swimming Biophysics Applied Session @ ISBS 2011

(Biomechanical implications on energy processing)

## Aim

The aim of the Swimming Applied Session is to make an overview of the most updated concepts and methodologies to assess swimming efficiency - and related parameters - that can help researchers and coaches to improve swimming performance. The presenters will introduce some concepts, controversial issues, demonstrations and techniques which will be the focus for discussion among the participants.

## The theoretical foundations

The enhancement of swimming competitive ability should be understood under a biophysical point of view, which means relating both biomechanical and energetic constrains and its influence in performance. This topic introduces an interesting and clear perspective about coaching and sport analysis: the physiologic or the biomechanical knowledge and approaches, once isolated, are not sufficient for fulfilling sports excellence. It is needed an integrated approach, including also other scientific domains that, somehow, influences the energy release and its most appropriate use. This concept implies that the modern coach and scientist need to have full understanding about the maximization of the energetic input to the work-producing system - the swimmer - and about the maximization of the capacity (the total amount of energy available to generate work) and efficiency to use that energy to generate propulsive power in order to compensate and overcome drag and other biomechanical constrains.

Programme

30 June 2011

Room - 15h30 (Chairman Prof. Ricardo Fernandes)



**1st Oral Presentation (20')** 

Prof. Ross Sanders: From technical foundations to increased efficiency in swimming

2nd Oral Presentation (20')

Prof. Paola Zamparo: Assessing gross efficiency and propulsive efficiency in swimming

**3rd Oral Presentation (20')** 

Prof. Raul Arellano: Transferring applied hydrodynamics to technical training

4th Oral Presentation (20')

Prof. Bruce Mason: Evaluation and feedback in swimming: historical overview

Debate (10')

Swimming-pool - 17h30 (Chairman Prof. Francisco Alves)



1st Demonstration (20')

**Prof. Huub Toussaint:** *MAD system for the assessment of active drag and propulsive efficiency* 

2nd Demonstration (20')

**Profs. Carlo Baldari, Laura Guidetti & Marco Meucci:** *Measuring energy expenditure in swimming to assess gross mechanical efficiency* 

**3rd Demonstration (20')** 

**Prof. Raul Arellano & Rocío Domínguez-Castells:** *Assessing muscular and swimming power* 

4th Demonstration (20')

Profs. J. Paulo Vilas-Boas, Leandro Machado, Susana Soares, Ricardo Fernandes, Antônio B. Lima & Miguel Velhote Correia: Swimming biophysical relevant parameters extracted from velocimetry and accelerometry

**Presenters Biographies** 

Ross Sanders is Chair of Spocto Schemie for stinuted of Spoct, to Invisional Enducationate nod adverses in 18 (2008) estimated of the statement of the statemen





is professor of biomechanics at the Faculty of Sport Sciences of the University





Head of Department Aquatics Testing Training and Research Unit of the Austr



is chief scientific officer of the InnoSport.NL Fieldlab swimming in Eindhoven t



arlo Baldari bad his PhD in 'Movement Sciences' U.T.A.D. Portugal. Associate Professor of Methods



J. Paulo Vilas-Boas is a full professor of Biomechanics and Swimming Science at the University of F



dro Machado is Auxiliary Professor at the Biomechanics group of the Faculty of Sports of the Po



Susana Soares is Auxiliary Professor of the Swimming Department of the University of Porto, Faculty of



Formandes is the Head of the Swimming Department of the University of Porto, Faculty of Spo



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# FCT Fundação para a Ciência e a Tecnologia

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