

# XIth International Symposium for Biomechanics and Medicine in Swimming

Oslo, 16th – 19th June 2010  
Program & Book of Abstracts

Per-Ludvik Kjendlie, Robert Keig Stallman and Jan Cabri (eds)



## Scientific Program



**Wednesday, 16 June 2010**

**16:00 - 16:30 Opening Session (Chair: R. Stallman) Room: Aud A**

**16:30 - 17:15 Keynote Lecture 1: The Leon Lewillie Memorial Lecture  
(Chair: P.L. Kjendlie)  
Room: Aud A**

16:30 Biomechanics and Medicine in Swimming, Past, Present and Future KL-001  
*João Paulo Vilas-Boas* (PORTUGAL)

**18:00 Departure for City Hall**

**19:00 The Mayor of Oslo's welcoming reception**

**Thursday, 17 June 2010**

**08:30 - 10:00 DRAG & PROPULSION (Chair: R. Sanders) Room: Aud A**

08:30 Wave Formation as a Possible Mechanism of Propulsion in the Freestyle Stroke O-001  
*M. Keys; A. Lyttle; L. Cheng; B.A. Blanksby* (AUSTRALIA)

08:45 Direct Measurement of Stroke Propulsion in Real Swimming by Means of a Non-Invasive Gauge O-002  
*AS. Bottoni; N Lanotte; S Bifaretti; G Gatta; M Bonifazi; P Boatto* (ITALY)

09:00 The Effect of Angle of Attack and Depth on Passive Drag O-003  
*David Pease<sup>1</sup>; R. Vennell<sup>P</sup>*  
<sup>1</sup>(AUSTRALIA); <sup>2</sup>(NEW ZEALAND)

09:15 Measuring Active Drag within the Different Phases of Front Crawl Swimming O-004  
*D.P. Formosa; BR Mason; BJ Burkett* (AUSTRALIA)

09:30 Prediction of Propulsive Force Exerted by the Hand in Swimming O-005  
*S Kudo; M. K. Lee* (SINGAPORE)

09:45 A Method to Estimate Active Drag over a Range of Swimming Velocities which may be used to evaluate the Stroke Mechanics of the Swimmer O-006  
*B.R. Mason<sup>1</sup>; D.P Formosa<sup>1</sup>; H.M. Toussaint<sup>2</sup>*  
<sup>1</sup>(AUSTRALIA); <sup>2</sup>(NETHERLANDS)

**Thursday, 17 June 2010**

**08:30 - 10:00 BLOOD LACTATE (Chair: R. Fernandes) Room: Aud D**

08:30 Critical Velocity And The Velocity At Maximal Lactate Steady State In Swimming O-007  
*M.A. Espada; F.B. Alves* (PORTUGAL)

08:45 Factors Affecting Blood Lactate Accumulation and Clearance in Elite Competitive Swimmers during Competition O-008  
*GD Wells; O Falenchuk; G Gannon; JD Vescovi* (CANADA)

09:00 Maximum Blood Lactate Concentration after Two Different Specific Tests in Freestyle Swimming O-009  
*G Rozi<sup>1</sup>; V Thanopoulos<sup>1</sup>; M Dopsai<sup>2</sup>*  
<sup>1</sup>(GREECE); <sup>2</sup>(SERBIA)

- 09:15 Does the y-intercept of a Regression Line in the Critical Velocity Concept Represent the Index for Evaluating Anaerobic Capacity ? O-010  
*Y Shimoyama; K Okita; Y Baba; D Sato* (JAPAN)
- 09:30 Critical Swimming Speed Obtained by the 200-400 Meters Model in Young Swimmers O-011  
*R. Zacca; F. Castro* (BRAZIL)
- 09:45 Extending the Critical Force Model to Approach Critical Power in Tethered Swimming, and it Relationship to the Indices at Maximal Lactate Steady-State O-012  
*Dalton Müller Pessoa Filho; B. S. Denadai* (BRAZIL)

**Thursday, 17 June 2010****08:30 - 10:00 ADAPTED ACTIVITIES (Chair: J. Prins) Room: 106**

- 08:30 Swimming, Cycling, Running and Cardiovascular Health O-013  
*A. Bagheri; Hamid Mohebbi; Masoumeh Azizi; Abdolamir Saiiari* (ISLAMIC REP. of IRAN.)
- 08:45 Comparison of Respiratory Function to Swim Training in Paraplegic vs Amputee Swimmers O-014  
*M.M. Abouzeid* (EGYPT)
- 09:00 The Comparison of the Effects of Corrective Exercise on Land and in Water on the some Selected Parameters Related to Kyphosis in Kyphotic girls O-015  
*K Asadi; Y Sokhngouei; M Azizi; M Eslami; M Hematinejad* (ISLAMIC REP.of IRAN)
- 09:15 Analysis Of The Aerobic/Anaerobic Performance In Functional Disabled Swimmers: Low Classes Vs High Classes O-016  
*J. De Aymerich; J De Aymerich; J Benavent; V Tella; JC Colado; LM Gonzalez; X García Massó; J Madera* (SPAIN)
- 09:30 The Effect of Tethered Swimming Speed on External Power Output of Well-Trained Disabled Swimmers O-017  
*C.J Lee; C.J Payton* (UNITED KINGDOM)
- 09:45 Can Aquatic Exercise Improve Function in Elderly Persons with and without Chronic Disability? : A Systematic Review O-018  
*D Daly; G Vanlanthen; T Vanhullebusch; J Lambeck* (BELGIUM)

**Thursday, 17 June 2010****08:30 - 10:00 MEDICINE I (Chair: E. Kristiansen) Room: 107**

- 08:30 Prevalence of Airway Hyperresponsiveness in International Level Synchronised Swimmers O-019  
*V. Bougault<sup>1</sup>; J Turmel<sup>2</sup>; LP Boulet<sup>2</sup>*  
<sup>1</sup>(FRANCE); <sup>2</sup>(CANADA)
- 08:45 Differences in Body Composition Between Swimmers and Synchronised Swimmers O-020  
*MA Martínez; S Hernández; P Esteban; G Díaz; S Labrado; V Muñoz; F Jimenez; JM González-Ravé* (SPAIN)

- 09:00 An *Agaricus Blazei* Murill-based Mushroom Extract may be Beneficial for Athletes because it Protects Against Inflammation, Infection and Allergy  
*G Hetland* (NORWAY) O-021
- 09:15 Effect of two Aquatic Training Programs on Risk Factors of Hip Fracture. Osteoaqua Project  
*G. Diaz; M. Carrasco; F. Jiménez; A. Barriga; M.A. Martinez; F. Navarro* (SPAIN) O-022
- 09:30 Elite Child Athletes are our Future. Cardiac Adaptation to Monofin Training in Prepubescent Athletes  
*M.M. Abouzeid; Magdy Abouzeid* (EGYPT) O-023
- 09:45 Estimation Method for Energy Expenditure by Acceleration of Human Head during Water Walking  
*K. Kaneda; Y. Ohgi; C. Tanaka* (JAPAN) O-024

**Thursday, 17 June 2010**

**10:30 - 11:15 Keynote Lecture 2 (Chair: J. Cabri) Room: Aud A**

- 10:30 Inter-Limb Coordination in Swimming  
*Ludovic Seifert* (FRANCE) KL-002

**11:15 - 12:00 Keynote Lecture 3 (Chair: J. Cabri) Room: Aud A**

- 11:15 Muscle Fatigue in Swimming  
*Annie Rouard* (FRANCE) KL-003

**Thursday, 17 June 2010**

**12:00 - 13:00 Poster session Biomechanics 1 (Chair: J.P. Vilas-Boas) Room: Poster and Exhibition Hall**

- 12:00 Comparison of Manikin Carry Performance by Lifeguards and Lifesavers When Using Barefoot, Flexible and Fiber Fins  
*J.A. Abraldes<sup>1</sup>; S. Soares<sup>2</sup>; A.B. Lima<sup>3</sup>; R.J. Fernandes<sup>2</sup>; J.P. Vilas-Boas<sup>2</sup>* <sup>1</sup>(SPAIN); <sup>2</sup>(PORTUGAL); <sup>3</sup>(BRAZIL) P-001
- 12:00 Swimming Forces: A Review  
*S. Avramidis* (GREECE) P-002
- 12:00 Kinematical Characterisation of a Basic Head-out Aquatic Exercise During an Incremental Protocol  
*T.M. Barbosa; C. Oliveira; G. Teixeira; M.J. Costa; D.A. Marinho; A.J. Silva* (PORTUGAL) P-003
- 12:00 Kinematic Analysis of Take-off Performance in Elite Swimmers: New OSB11 versus Traditional Starting Block  
*K. Biel; S. Fischer; A. Kibele* (GERMANY) P-004
- 12:00 Application of CAST Technique to 3D Motion Analysis of Front crawl Swimming  
*E. Ceseracciu; S. Cecon; Z. Sawacha; S. Fantozzi; M. Cortesi; C. Cobelli; G. Gatta* (ITALY) P-005
- 12:00 Which is the Recommend Duration for the Tethered Swimming Test?  
*M. Cortesi; E. Cesaracciu; Z. Sawacha; G. Gatta* (ITALY) P-006
- 12:00 The Effect of Wearing a Synthetic Rubber Suit on Hydrostatic Lift and Lung Volume  
*M. Cortesi; P. Zamparo; E. Tam; M. Da Boit; G. Gatta* (ITALY) P-007

- 12:00 Kinematical Analysis of Butterfly Stroke: Comparison of Three Velocity Variants P-008  
*K. de Jesus; K. de Jesus; P.A. Figueiredo; P. Gonçalves; J.P. Vilas-Boas; R.J. Fernandes* (PORTUGAL)
- 12:00 Biomechanical Characterization of the Backstroke Start in Immersed and Emerged Foot Conditions P-009  
*K. de Jesus<sup>1</sup>; K. de Jesus<sup>1</sup>; P.A. Figueiredo<sup>1</sup>; P. Gonçalves<sup>1</sup>; S.M. Pereira<sup>2</sup>; J.P. Vilas-Boas<sup>1</sup>; R.J. Fernandes<sup>1</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(BRAZIL)
- 12:00 Tethered Force Production in Standard and Contra-standard Sculling in Synchronized Swimming P-010  
*V. Diogo<sup>1</sup>; S. Soares<sup>1</sup>; C. Tourino<sup>2</sup>; J.A. Abraldes<sup>2</sup>; C. Ferragut<sup>2</sup>; P. Morouço<sup>1</sup>; P.A. Figueiredo<sup>1</sup>; J.P. Vilas-Boas<sup>1</sup>; R.J. Fernandes<sup>1</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(SPAIN)
- 12:00 Pulling Force Characteristics of 10s Maximal Tethered Eggbeater Kick in Elite Water Polo Players P-011  
*M Dopsaj* (SERBIA)
- 12:00 Motor Coordination during the Underwater Undulatory Swimming Phase of the Start for High Level Swimmers P-012  
*M Elipot; N Houel; P Hellard; G Dietrich* (FRANCE)
- 12:00 Evaluation of the Validity of Radar for Measuring Throwing Velocities in Water Polo P-013  
*C. Ferragut; P.E. Alcaraz; H Vila; J.A. Abraldes; N Rodriguez* (SPAIN)
- 12:00 A Kinematic Study on the Dive-in Behaviour during Swim Start Performance From the Block P-014  
*S Fischer; A Kibele* (GERMANY)
- 12:00 Comparison Between two Different Types of Instruments: an Encoder and an Inertial Sensor Device P-015  
*G. Gatta; M Cortesi; M Zok; N Lanotte; G Vannozzi* (ITALY)
- 12:00 The Mechanical Power Output in Water Polo: a Case Report P-016  
*G. Gatta; S Fantozzi; M Cortesi; F Patti; M Bonifazi* (ITALY)

**Thursday, 17 June 2010****12:00 - 13:00 Poster session Physiology 1 (Chair: K. Keskinen) Room: Poster and Exhibition Hall**

- 12:00 Technology and Swimming: 3 steps beyond Physiology P-048  
*G Berthelot; P Hellard; S Len; M Tafflet; JF Toussaint* (FRANCE)
- 12:00 The Difference in Red Blood Cell Indices between Elite Female Distance and Sprint Swimmers P-049  
*H Guo<sup>1</sup>; Y Lu<sup>2</sup>; JM Stager<sup>1</sup>* <sup>1</sup>(UNITED STATES); <sup>2</sup>(CHINA)
- 12:00 Modeling the Slow Component in Elite Long Distance Swimmers at the Velocity Associated with Lactate Threshold P-050  
*P. Hellard<sup>1</sup>; N. Houel<sup>1</sup>; M. Avalos<sup>1</sup>; X. Nesi<sup>2</sup>; J.F. Toussaint<sup>1</sup>; C. Hausswirth<sup>1</sup>* <sup>1</sup>(FRANCE); <sup>2</sup>(UNITED KINGDOM)
- 12:00 The Impact of Tension in Abdominal and Lumbar Musculature in Swimmers on Ventilatory and Cardiovascular Functions P-051  
*T. W. Henrich<sup>1</sup>; R.B. Pankey<sup>1</sup>; G. J. Soukup<sup>2</sup>* <sup>1</sup>(UNITED STATES); <sup>2</sup>(UNITED KINGDOM)

- 12:00 Relationship between Propelling Efficiency and Swimming Performance in Elite Swimmers P-052  
*Z Huang; K Kurobe; M Nishiwaki; G Ozawa; T Tanaka; N Taguchi; F Ogita (JAPAN)*
- 12:00 The Effect of Snorkel Breathing during Front crawl Swimming on Respiratory Muscle Fatigue P-053  
*C Iggleden; M Lomax; R Fricker; O Jones; S Moffatt; R Poole (UNITED KINGDOM)*
- 12:00 Can High Intensity Workloads be Simulated at Moderate Intensities by Reduced Breathing Frequency P-054  
*J. Kapus; V. Kapus; A. Usaj (SLOVENIA)*
- 12:00 Swimming and Respiratory Muscle Endurance Training: A Case Study P-055  
*F Lemaitre; F Chavallard; D Chollet (FRANCE)*
- 12:00 Comparison of Respiratory Muscle Fatigue between Swimming Strokes in National Standard Age-group Swimmers P-056  
*M Lomax; C Iggleden; A Tourell; S Castle; J Honey (UNITED KINGDOM)*
- 12:00 Effect of Systemic Arterial Stiffness on Underwater Blood Pressure in middle-aged and Elderly Japanese Women P-057  
*N. Matsumoto; H. Yamanaka; M. Miyachi; S. Onodera (JAPAN)*

**Thursday, 17 June 2010**

**12:00 - 13:00 Poster session Training 1 (Chair: B. Ungerechts) Room: Poster and Exhibition Hall**

- 12:00 13th FINA World Championships: Analysis of Swimsuits Used By Elite Male Swimmers P-081  
*HP Neiva; JP Vilas-Boas; TM Barbosa; AJ Silva; DA Marinho (PORTUGAL)*
- 12:00 Swimsuits Used By Elite Male Swimmers in the 13th FINA World Championships: Analysis of Freestyle Events P-082  
*HP Neiva; JP Vilas-Boas; TM Barbosa; AJ Silva; DA Marinho (PORTUGAL)*
- 12:00 Effect of Subjective Effort on Stroke Timing in Breaststroke Swimming P-083  
*M Ohba; S. Sato; Y. Shimoyama; D. Sato (JAPAN)*
- 12:00 Technical and Physiological Changes during Continuous vs. Intermittent Swims at and above Maximal Lactate Steady State P-084  
*M.F. Oliveira<sup>1</sup>; F Caputo<sup>1</sup>; J Dekerle<sup>2</sup>; B.S Denadai<sup>1</sup>; C.C Greco<sup>1</sup> <sup>1</sup>(BRAZIL); <sup>2</sup>(UNITED KINGDOM)*
- 12:00 The Relationship of Arm-Stroke Index to some Physical Characteristics and Performance in Swimming P-085  
*Babtiyar Ozcaldiran (TURKEY)*
- 12:00 Effects of Aerobic and Anaerobic Training on Blood Nitric Oxide Levels and the Role of Gender P-086  
*Z Özkol; F Turgay; S. R Varol; B Özçaldýran; F Vural; T Akpít; G.R. Nalçakan (TURKEY)*

- 12:00 Analysis of the Shots According to Set Playing (6-6) P-087  
Position in Waterpolo Game at European B Waterpolo  
Championships in Lugano 2009  
*Z Ozkol<sup>1</sup>; S Turunc<sup>1</sup>; M Dopsaj<sup>2</sup>* <sup>1</sup>(TURKEY); <sup>2</sup>(SERBIA)
- 12:00 Identification of a Bias in the Natural Progression of Swim P-088  
Performance  
*J. M. Stager; C. L. Brammer; D. A. Tanner* (UNITED  
STATES)
- 12:00 Swimming Performances of Japanese Masters Swimmers P-089  
*M Tachi; J Takahashi; T Takano; T Nomura* (JAPAN)
- 12:00 Tendencies in Natural Selection of Qualified Young P-090  
Swimmers  
*T. Timakova; M.V. Klyuchnikova* (RUSSIAN  
FEDERATION)
- 12:00 Tethered Swimming as an Evaluation Tool for Arm Strength P-091  
Imbalances  
*A. Toubekis; V. Gourgoulis; SP. Tokmakidis* (GREECE)
- 12:00 Blood Lactate Responses During Interval Training P-092  
Corresponding to Critical Velocity in Different Age-group  
Female Swimmers  
*G. Tsalis; A. Toubekis; D. Michailidou; V. Gourgoulis; H. Douda;  
SP. Tokmakidis* (GREECE)
- 12:00 Predicting Performance using Critical Swimming Speed in P-093  
Young Swimmers  
*R. Zacca; F. Castro* (BRAZIL)
- 12:00 Competition Specific Diagnostics and Results for Elite Water P-094  
Polo Players  
*C. Zinner; T. Focke; B. Sperlich; M. Krueger; J. Mester*  
(GERMANY)

**Thursday, 17 June 2010****13:30 - 14:15 Workshop**

- 13:30 Invited Workshop in CFD methodology: its usefulness and WS-001  
basic steps  
*V. Mantha<sup>1</sup>; D. Marinho<sup>1</sup>; P.L. Kjendlie<sup>2</sup>; A. Silva<sup>1</sup>*  
<sup>1</sup>(PORTUGAL); <sup>2</sup>(NORWAY)

**Thursday, 17 June 2010****14:30 - 15:15 Keynote Lecture 4 (Chair: R. Stallman) Room: Aud A**

- 14:30 Invited Lecture: Biomechanical Services for Top Level KL-004  
Swimming Development, the AIS Model  
*Bruce Mason* (AUSTRALIA)

**Thursday, 17 June 2010****16:00 - 17:45 TRAINING GENERAL (Chair: T.M. Barbosa) Room: Aud A**

- 16:00 Aquatic Space Activities – Practice Needs Theory O-025  
*B E Ungerechts; J Klauck* (GERMANY)

- 16:15 Increased Training Intensity and Reduced Volume for 12 weeks has Detrimental Effects on Swimmers Maximal Oxygen Uptake  
*Mogens Theisen Pedersen; A Kilen; TH Larsson; M Jørgensen; B Rocha; NB Nordsborg* (DENMARK) O-026
- 16:30 The Effect of Cognition-Based Technique Training on Stroke Length in Age-Group Swimmers  
*A C Schmidt; B E Ungerechts; W Buss; T Schack* (GERMANY) O-027
- 16:45 Monitoring Swim Training based on Mean Intensity Strain and Individual Stress Reaction of an Elite Swimmer  
*B E Ungerechts; R Steffen; K Vogel* (GERMANY) O-028
- 17:00 Accelerometry as a Means of Quantifying Training Load in Competitive Swimmers  
*Brian / Vincent Wright; M.G. Hinman; J.M. Stager* (UNITED STATES) O-029
- 17:15 Effects of Shoulder Compensatory Strength Training Program in Rotator Cuff Strength of Young Swimmers  
*N. Batalha; A. Raimundo; P. Tomás-Carús; O. Fernandes; J.P. Sousa; A.M. Costa; A.J. Silva* (PORTUGAL) O-030
- 17:30 Zen and the Art of Swimming – Impulses for Teaching and Training. *D. Dahl* (NORWAY) O-031

**Thursday, 17 June 2010**

**16:00 - 17:30 ENERGY COST (Chair: F. Ogita) Room: Aud D**

- 16:00 Effect of Increasing Energy Cost on Arm Coordination at Different Exercise Intensities in Elite Sprint Swimmers  
*J. Komar<sup>1</sup>; P.M. Leprêtre<sup>1</sup>; M. Alberty<sup>1</sup>; J. Vantorre<sup>1</sup>; R.J. Fernandes<sup>2</sup>; P. Hellard<sup>1</sup>; D. Chollet<sup>1</sup>; L. Seifert<sup>1</sup>* (FRANCE); <sup>2</sup>(PORTUGAL) O-032
- 16:15 Effect of Time and Exercise Mode on Metabolic, Stroking Parameters and Stroke Phases Responses at Continuous and Intermittent Exercises  
*JG Pelarigo<sup>1</sup>; BS Denadai<sup>2</sup>; BD Fernandes<sup>2</sup>; DRP Santiago<sup>2</sup>; TEAS César<sup>2</sup>; LF Barbosa<sup>2</sup>; CC Greco<sup>2</sup>* (PORTUGAL); <sup>2</sup>(BRAZIL) O-033
- 16:30 Some Factors Limiting Energy Supply on 200m Front crawl Swimming  
*B. Strumbelj; A. Uaj; N. Kapus; J. Bednarik* (SLOVENIA) O-035
- 16:45 Effect of Intermittent Hypoxic Training on Performance in Elite Swimmers  
*M Anderson; S Widmer* (AUSTRALIA) O-036
- 17:00 The Contribution to Total Power Output from the Arms and Legs using a New Whole-body Swimming Training Machine  
*I Swaine* (UNITED KINGDOM) O-037
- 17:15 Comparison Between the Standard Average Muscle Activation with the Use of Snorkel and Without Snorkel in Breakstroke Technique  
*A. Conceição; H Gamboa; S Palma; T Araújo; N. Nunes; D Marinho; A Costa; A Silva; H Louro* (PORTUGAL) O-034

**Thursday, 17 June 2010****16:00 - 17:30 WATER POLO (Chair: A. Hohmann) Room: 106**

- 16:00 Correlation Between Maximal Dynamic Strength of Specific Muscle Groups and Throwing Speed in Elite Water Polo Players  
*M. Krueger; T. Focke; B. Sperlich; C. Zinner; J. Mester* (GERMANY) O-038
- 16:15 Throwing Accuracy of Water Polo Players of Different Training Age and Fitness Level in Static Position and after Previous Swimming  
*T. Platanou; P. Botonis* (GREECE) O-039
- 16:30 A Markov Chain Model of Elite Water Polo Competition  
*M. Pfeiffer; A. Hohmann; A. Siegel; S. Boehnlein* (GERMANY) O-041
- 16:45 A Model of Vertical Swimming Abilities in Elite Female Senior Water Polo Players  
*M. Dopsaj* (SERBIA) O-042
- 17:00 Models for Assessing General Horizontal Swimming Abilities of Junior Water Polo Players According to Playing Position  
*Z. Ozkol<sup>1</sup>; M. Dopsaj<sup>2</sup>; V. Thanopoulos<sup>3</sup>; Z. Bratusa<sup>2</sup>* <sup>1</sup>(TURKEY); <sup>2</sup>(SERBIA); <sup>3</sup>(GREECE) O-043

**Thursday, 17 June 2010****16:00 - 17:30 COORDINATION (Chair: D. Chollet) Room: 107**

- 16:00 Arm Coordination, Active Drag and Propelling Efficiency in Front crawl  
*L. Seifert<sup>1</sup>; C. Schnitzler<sup>1</sup>; M. Alberty<sup>1</sup>; D. Chollet<sup>1</sup>; H.M. Toussaint<sup>2</sup>* <sup>1</sup>(FRANCE); <sup>2</sup>(NETHERLANDS) O-044
- 16:15 Fatigue Analysis of 100 Meters all-out Front crawl using Surface EMG  
*I. Stirn; T. Jarm; V. Kapus; V. Strojnik* (SLOVENIA) O-045
- 16:30 Relationship between Arm Coordination and Energy Cost in Front Crawl Swimming  
*R.J. Fernandes<sup>1</sup>; P. Morais<sup>1</sup>; K.L. Keskinen<sup>2</sup>; L. Seifert<sup>3</sup>; D. Chollet<sup>3</sup>; J.P. Vilas-Boas<sup>1</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(FINLAND); <sup>3</sup>(FRANCE) O-046
- 16:45 Front Crawl and Backstroke Arm Coordination in Swimmers with Down Syndrome  
*A. Querido<sup>1</sup>; I. Marques-Aleixo<sup>1</sup>; P. Figueiredo<sup>1</sup>; L. Seifert<sup>2</sup>; D. Chollet<sup>2</sup>; J.P. Vilas-Boas<sup>1</sup>; D. Daly<sup>3</sup>; R. Corredeira<sup>1</sup>; R.J. Fernandes<sup>1</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(FRANCE); <sup>3</sup>(BELGIUM) O-047
- 17:00 Co-Ordination Changes during a Maximal Effort 100 m Short Course Breaststroke Swim  
*S. W. Oxford; R. James; M. Price; C. Payton* (UNITED KINGDOM) O-048
- 17:15 Muscular Request of Different Fin Uses  
*G. Gouvernet; G. Rao; C. Barla; L. Grelot; L. Baly; E. Berton* (FRANCE) O-049

- 17:30 Effect of Stroke Drills on Intra-cycle Hip Velocity in Front Crawl O-040  
*R. Arellano; R. Dominguez-Castells; E. Perez-Infantes; E. Sánchez* (SPAIN)

**Friday, 18 June 2010**

**08:30 - 10:15 METHODS (Chair: S. Psycharakis) Room: Aud A**

- 08:30 Markerless Analysis of Front Crawl Swimming O-050  
*E. Ceseracciu<sup>1</sup>; Z. Sawacha<sup>1</sup>; S. Fantozzi<sup>1</sup>; M. Cortesi<sup>1</sup>; S. Ceccon<sup>1</sup>; G. Donà<sup>1</sup>; S. Corazza<sup>2</sup>; G. Gatta<sup>1</sup>; C. Cobelli<sup>1</sup>* (ITALY);  
<sup>2</sup>(UNITED STATES)
- 08:45 50m Race Components Times Analysis Based on a Regression Analysis Model Applied to Age-Group Swimmers O-051  
*E. Morales<sup>1</sup>; R. Arellano<sup>1</sup>; P. Femia<sup>1</sup>; J. Mercade<sup>1</sup>; R. Haljand<sup>2</sup>*  
<sup>1</sup>(SPAIN); <sup>2</sup>(ESTONIA)
- 09:00 The Altitude Project: An International Collaborative Research Project on Altitude Training in Elite Swimmers O-052  
*F.A. Rodríguez<sup>1</sup>; B.D. Levine<sup>2</sup>* (SPAIN); <sup>2</sup>(UNITED STATES)
- 09:15 A New Method to Evaluate Cross-Sectional Area Based on Computer Animation of Swimming O-053  
*B Bideau<sup>1</sup>; G Nicolas<sup>1</sup>; RH Sanders<sup>2</sup>; R Kulpa<sup>1</sup>*  
<sup>1</sup>(FRANCE); <sup>2</sup>(UNITED KINGDOM)
- 09:30 Assessing Mental Workload at Maximal Swimming Intensity Using the NASA-TLX Questionnaire O-054  
*C Schnitzler; L Seifert; D. Chollet* (FRANCE)
- 09:45 Whole Body Observation and Visualized Motion Analysis of Swimming O-055  
*S. Ito; K. Okuno* (JAPAN)
- 10:00 The Validity of a Procedure for Competition Analysis in Swimming Based on Individual Distance Measurements O-056  
*S. Veiga<sup>1</sup>; A. Cala<sup>2</sup>; P. González Frutos<sup>1</sup>; E. Navarro<sup>1</sup>*  
<sup>1</sup>(SPAIN); <sup>2</sup>(NEW ZEALAND)

**Friday, 18 June 2010**

**08:30 - 10:00 MEDICINE II (Chair: D. Daly) Room: 106**

- 08:30 Bronchial Hyper-Responsiveness, Physiological and Psychological Recovery Among Adolescent Swimmers: A preliminary investigation O-057  
*E Kristiansen; T Stensrud; K Stadelmann* (NORWAY)
- 08:45 Immune Status Changes and URTI Incidence in the Initial 7 Weeks of a Winter Training Season in Portuguese Swimmers O-058  
*L. M. Rama; F. Alves; F. Rosado; S. Azevedo; A. Matos; A. Henriques; A. Paiva; AM. Teixeira* (PORTUGAL)
- 09:00 Postexercise Hypotension and Blood Lipoprotein Changes following Swimming Exercise O-059  
*H Tanaka; SM Sommerlad; CP Renzi; JN Barnes; N Nualnim* (UNITED STATES)

- 09:15 Strategy for the Prevention of Shoulder Pains in the Case of Competitive Swimmers O-060  
*S. Pugin* (SWITZERLAND)
- 09:30 The Effect of Hydrotherapy on some Selected Parameters Related to Kyphosis in Kyphotic girls O-061  
*M. Azizi* (ISLAMIC REP. of IRAN)
- 09:45 The Relationship of Respiratory Symptoms and Bronchial Responsiveness in Competitive Swimmers O-062  
*T. Stensrud<sup>1</sup>*; *K. Stadelmann<sup>2</sup>*; K-H. Carlsen<sup>1</sup> <sup>1</sup>(NORWAY); <sup>2</sup>(SWITZERLAND)

**Friday, 18 June 2010**

**08:30 - 10:00 EDUCATION (Chair: K. Moran) Room: 107**

- 08:30 Performance Level Differences in Swimming: Relative Contributions of Strength and Technique O-063  
*R Havriluk* (UNITED STATES)
- 08:45 The Effect of Restricting the Perceptual Task in Temporal Organization of Crawl Swimming: Surface Characteristics O-064  
*C.A.F. Brito; W. C. Belvis; M. Oliveira* (BRAZIL)
- 09:00 Effect of Target Sound made by one Swimmer's Dolphin Kick Movement on Another Swimmer's Dolphin Kick Performance O-065  
*H. Shimajo; H. Ichikawa; S. Tsubakimoto; H. Takagi* (JAPAN)
- 09:15 Technology and Innovation in Educating Swimming Coaches and Teachers O-066  
*H.B. Gudmundsson<sup>1</sup>*; *I.T. Jonsson<sup>1</sup>*; *L. Madsen<sup>2</sup>*; *J. Dam<sup>2</sup>*; *Ken Currie<sup>3</sup>*; *R.H. Sanders<sup>3</sup>*  
<sup>1</sup>(ICELAND); <sup>2</sup>(DENMARK); <sup>3</sup>(UNITED KINGDOM)
- 09:30 Using a Scalogram to Identify an Appropriate Instructional Order for Swimming Items O-067  
*S. J. Langendorfer; J. A. Chaya* (UNITED STATES)
- 09:45 Learning and Improving a Swimming Technique within an Inter-disciplinary and Experience based Teaching Approach with two 7th Grade School Classes O-068  
*Marc Esser-Noethlichs* (NORWAY)

**Friday, 18 June 2010**

**10:30 - 11:15 Keynote Lecture 5 (Chair: B. Ungerechts) Room: Aud A**

- 10:30 Toward a Better Understanding on the Role of Unsteadiness in Swimming Propulsion by Means of PIV KL-005  
*Kazuo Matsuuchi* (JAPAN)

**Friday, 18 June 2010**

**11:15 - 12:00 Keynote Lecture 6 (Chair: B. Ungerechts) Room: Aud A**

- 11:15 Invited Lecture: The Psycho-Physiology of Overtraining and Athlete Burnout in Swimming KL-006  
*Nicolas Lemyre* (NORWAY)

**Friday, 18 June 2010**

**12:00 - 13:00 Poster session Biomechanics 2 (Chair: M. Rejman) Room:  
Poster and Exhibition Hall**

- 12:00 Attack Angle, Resultant Speed and Acceleration of the Hand and Vertical Acceleration of the Greater Trochanter during Sculling Motion: a Case Study  
*L.E. Gomes, J.F. Loss (BRAZIL)* P-017
- 12:00 Comparison of Combinations of Vectors to define the Plane of the Hand in order to calculate the Attack Angle during the Sculling Motion  
*L.E. Gomes; M.O. Melo; M. La Torre, J.F. Loss (BRAZIL)* P-018
- 12:00 Relative Contribution of Drag and Lift Forces in the Separate Phases of the Front Crawl Swimming  
*V. Gourgoulis; A. Boli; N. Aggeloussis; A.G. Toubekis; N. Vezos; P. Kasimatis; G. Mavrommatis (GREECE)* P-019
- 12:00 Kinematics Analysis of the Undulatory Underwater Swimming during a Grab Start of National Level Swimmers  
*N. Houel; M. Elipot; F. Andrée; P. Hellard (FRANCE)* P-020
- 12:00 Comparison of Front Crawl Swimming Drag between Elite and Non-Elite Swimmers Using Pressure Measurement and Motion Analysis  
*H. Ichikawa; T. Miwa; T. Takeda; H. Takagi; S. Tsubakimoto (JAPAN)* P-021
- 12:00 The Study on the Properties of Power Output of Lower Limbs in Collegiate Swimmers during Vertical jumping Performance  
*H. Jigami; K. Takahashi; Y. Shimoyama; N. Endo (JAPAN)* P-022
- 12:00 Relationships between Entry Skill and 15m time in Competitive Swimming start  
*O. Kazumasa; S. Shinji; T. Masahiro (JAPAN)* P-024
- 12:00 Effects of New Hightech-Swim-Suits on Passive Drag  
*S. Keul; A. Bieder; P. Wahl (GERMANY)* P-025
- 12:00 Different Frequential Acceleration Spectrums In Front Crawl  
*J. Madera; L.M. Gonzalez; X. Garcia Massó; J. Benavent; J.C. Colado; V. Tella (SPAIN)* P-026
- 12:00 The Gliding Phase in Swimming: The Effect of Water Depth  
*DA. Marinho<sup>1</sup>; TM. Barbosa<sup>1</sup>; N. Mantripragada<sup>2</sup>; JP. Vilas-Boas<sup>1</sup>; AH. Rouard<sup>3</sup>; V. Mantha<sup>1</sup>; AI. Rouboa<sup>1</sup>; AJ. Silva<sup>1</sup>  
<sup>1</sup>(PORTUGAL); <sup>2</sup>(INDIA); <sup>3</sup>(FRANCE)* P-027
- 12:00 Regression Analysis Model Applied to Age-Group Swimmers: Study of Stroke Rate, Stroke Length and Stroke Index  
*E. Morales; R. Arellano; P. Femia; J. Mercade (SPAIN)* P-028
- 12:00 Measurement of Unsteady Fluid Force Acting on Limbs in Swimming Using a Robot Arm and Its Modeling Using the Swimming Human Simulation Model “SWUM”  
*M. Nakashima; A. Takahashi (JAPAN)* P-030

- 12:00 Estimating the Added Mass and the Active Drag Force During Push-off at Flip Turns P-031  
*S. M. Pereira<sup>1</sup>; S. G. Silva<sup>2</sup>; P. Gonçalves<sup>2</sup>; R. J. Fernandes<sup>2</sup>; L. Machado<sup>2</sup>; H. Roesler<sup>1</sup>; J. P. Vilas-Boas<sup>2</sup>*  
<sup>1</sup>(BRAZIL); <sup>2</sup>(PORTUGAL)
- 12:00 Efficiency Analysis of Swimmers' Start Using Starting Block With Adjustable Raised Foot in Competitions P-032  
*A.V. Petryaev (RUSSIAN FEDERATION)*

**Friday, 18 June 2010**

**12:00 - 13:00 Poster session Physiology 2 (Chair: K. Cumming) Room: Poster and Exhibition Hall**

- 12:00 Markers of Cardiovascular Health in Physically Active Masters Swimmers P-058  
*CM McCracken; SK Head; CD Mattson; AK Peirce, JD Johnston; PR Finn; JM Stager (UNITED STATES)*
- 12:00 Heart rate Responses during Gradual increase and Decrease Exercise in Water P-059  
*K.Nishimura; Y. Nose; A. Yoshioka; H. Karwano; S. Onodera; N. Takamoto (JAPAN)*
- 12:00 Relationship between Heart Rate and Water Depth during Standing in Water P-060  
*S. Onodera; A. Yoshioka; N. Matsumoto; T. Takahara; Y. Nose; M. Hirao; K. Seki; K. Nishimura; W. Baik; H. Hara; T. Murakawa (JAPAN)*
- 12:00 Body Composition Differences in Elite Waterpolo Players P-061  
*Z Ozkol<sup>1</sup>; S Turunc<sup>1</sup>; M Dopsaj<sup>2</sup>* <sup>1</sup>(TURKEY); <sup>2</sup>(SERBLA)
- 12:00 Oxygen Uptake Kinetics Around the Respiratory Compensation Point in Swimming P-062  
*Dalton Müller Pessôa Filho<sup>1</sup>; J. Reis<sup>2</sup>; F. Alves<sup>2</sup>; B. S. Denadai<sup>1</sup>*  
<sup>1</sup>(BRAZIL); <sup>2</sup>(PORTUGAL)
- 12:00 Hormonal, Immune, Autonomic and Mood States Variation at the Initial Preparation Phase of a Winter Season, in Portuguese Male Swimmers P-063  
*L. Rama; F. Alves; AM. Teixeira (PORTUGAL)*
- 12:00 Oxygen Uptake Kinetics in All-Out Arm Stroke, Leg Kicking and Whole Stroke Front Crawl 100-m Swims P-064  
*F.A. Rodríguez<sup>1</sup>; E. Lätt<sup>2</sup>; J. Jürimäe<sup>2</sup>; J. Mäestu<sup>2</sup>; P. Purge<sup>2</sup>; R. Rämson<sup>2</sup>; K. Haljaste<sup>2</sup>; K.L. Keskinen<sup>3</sup>; T. Jürimäe<sup>2</sup>*  
<sup>1</sup>(SPAIN); <sup>2</sup>(ESTONIA); <sup>3</sup>(FINLAND)
- 12:00 Determination and Validity of Critical Velocity in Front Crawl, Arm Stroke and Leg Kick as an Index of Endurance Performance in Competitive Swimmers P-065  
*K. Wakayoshi; T Shiraki; F Ogita; M Kitajima (JAPAN)*
- 12:00 Differences in Methods Determining the Anaerobic Threshold of Triathletes in the Water P-066  
*D Zoretic (CROATIA)*

**Friday, 18 June 2010**

**12:00 - 13:00 Poster session: Educational Science, Advice and Biofeedback  
(Chair: B.H. Olstad ) Room: Poster and Exhibition Hall**

- 12:00 Developing Competence and Swimming Technique through Teaching from an Aesthetic Learning Perspective P-095  
*J.A. Dam (DENMARK)*
- 12:00 The Swimming Ability Of Primary School Children: Achievement Of Desired Competence Goals P-096  
*K Engvig; P-L Kjendlie; R K Stallman (NORWAY)*
- 12:00 The Swimming Ability of Primary School Children: The Influence of Volume and Distribution of Instruction P-097  
*K Engvig; P.L. Kjendlie; R.K. Stallman (NORWAY)*
- 12:00 Analyses of Instruction for Breath Control While Swimming the Breaststroke P-098  
*H Hara; A. Yoshioka; N. Matsumoto; Y. Nose; R. Watanabe; Y. Shibata; S Onodera; Y. Shibata; S. Onodera (JAPAN)*
- 12:00 Evaluation of the Kinaesthetic Differentiation Abilities in Male and Female Swimmers P-099  
*P.L. Invernizzi; S Longo; R Scurati; G Michielon (ITALY)*
- 12:00 Swimming in Eyesight Deprivation: Relationships with Sensory-perception, Coordination and Laterality P-100  
*P.L. Invernizzi; S Longo; F Tadini; R Scurati (ITALY)*
- 12:00 Progression in Teaching Beginning Swimming: Rank Order by Degree of Difficulty P-101  
*M Junge; T Blixt; R K Stallman (NORWAY)*
- 12:00 The Validity of a Traditional 25m Test of Swimming Competence P-102  
*M Junge; T Blixt; R K Stallman (NORWAY)*
- 12:00 School Swimming - a Team Effort: An Intervention Study P-103  
*B.W. Laakso; R.K. Stallman (NORWAY)*
- 12:00 Observation Skills in Learning processes – A didactic Challenge P-105  
*L. Madsen (DENMARK)*
- 12:00 Infants' Behaviors During Aquatic Activities P-106  
*Marta Martins; T. Barbosa; A. Silva; N. Batalba; D. Marinho (PORTUGAL)*
- 12:00 Imagery Training in Young Swimmers: Effects on the Flow State and on the Performance P-107  
*R Scurati; G Michielon; S Longo; PL Invernizzi (ITALY)*
- 12:00 Shallow or Deep Water for Settling in? A study in children aged 3 to 6 years P-108  
*R Scurati; G Michielon; S Longo; PL Invernizzi (ITALY)*
- 12:00 The Role of Verbal Information about Sensory Experience from Movement Apparatus in the Process of Swimming Economization P-109  
*K. Zatoń (POLAND)*
- 12:00 The Informativeness of Field Tests and Laboratory Assessments in Forecasting the Actual Performance of Swimmers P-110  
*IJ Zuozienė; JL Poderys (LITHUANIA)*

**Friday, 18 June 2010**

**13:30 - 14:00 Workshop: "Can You Swim Project" (Chair: R. Stallman)  
Room: 106**

**13:30 - 14:00 Sponsored Workshop: Torrent E-Rack Swim Training and  
Analysis D.H. Hector / Hector Engineering Co. Inc. (Chair:  
B.H. Olstad). Room: Swimming Pool.**

**Friday, 18 June 2010**

**14:30 - 15:15 Keynote Lecture 7 (Chair: R. Stallman) Room: Aud A**

14:30 Applying a Developmental Perspective to Aquatics and Swimming KL-007  
*S. J. Langendorfer (UNITED STATES)*

**16:00 - 17:30 PERFORMANCE I (Chair: J. Stager) Room: Aud A**

16:00 Stability and Prediction of 100-m Breaststroke Performance During Elite Swimmers Career O-069  
*M.J. Costa; D.A. Marinho; V.M. Reis; A.J. Silva; J.A. Bragada; T.M. Barbosa (PORTUGAL)*

16:15 Performance Decrease Following Summer break in Youth Swimmers O-070  
*C. Zinner; B. Sperlich; M. Krueger; J. Mester (GERMANY)*

16:30 Talent Prognosis in Young Swimmers O-071  
*A Hohmann; I Seidel (GERMANY)*

16:45 Reproducibility of Pacing Strategies in High Level Junior Swimmers O-072  
*S. Skorski; O. Faude; K. Rausch; T. Meyer (GERMANY)*

17:00 A Competition-Based New Research Design to Assess an Intervention Affecting Performance of a Squad of Elite Athletes O-073  
*T.J. Vandenbergarde<sup>1</sup>; W.G. Hopkins<sup>1</sup>; D.B. Pyne<sup>2</sup>*  
*<sup>1</sup>(NEW ZEALAND); <sup>2</sup>(AUSTRALIA)*

17:15 Overall Trends and Individual Trajectories of Swimming Performance in a Decade of New Zealand National Championships O-074  
*W.G. Hopkins<sup>1</sup>; J.C. Pike<sup>1</sup>; C. Nottle<sup>2</sup>*  
*<sup>1</sup>(NEW ZEALAND); <sup>2</sup>(AUSTRALIA)*

**Friday, 18 June 2010**

**16:00 - 17:30 COMPUTATIONAL FLUID DYNAMICS (Chair: A.J. da Silva) Room: 106**

16:00 A Full Body Computational Fluid Dynamic Analysis of the Freestyle Stroke of a Previous Sprint Freestyle World Record Holder O-075  
*M. Keys; A. Lyttle; B.A. Blanksby; L. Cheng (AUSTRALIA)*

16:15 Computational Fluid Dynamics Applied to Competitive Swimming: The Role of Finger Position O-076  
*D.A. Marinho<sup>1</sup>; T.M. Barbosa<sup>1</sup>; P.L. Kjendlie<sup>2</sup>; V.M. Reis<sup>1</sup>; J.P. Vilas-Boas<sup>1</sup>; L. Machado<sup>1</sup>; A.I. Rouboa<sup>1</sup>; A.J. Silva<sup>1</sup>*  
*<sup>1</sup>(PORTUGAL); <sup>2</sup>(NORWAY)*

- 16:30 Hydrodynamic Characterization of the First and Second Glide Positions of the Underwater Stroke Technique in Breaststroke O-078  
*L. Costa; J Ribeiro; P Figueiredo; RJ Fernandes; D Marinbo; AJ Silva; A Rouboa; JP Vilas-Boas; L Machado (PORTUGAL)*
- 16:45 3D Computational Fluid-structure Interaction Model for the Estimation of Propulsive Forces of a Deformable Monofin O-079  
*N. Bideau; F Razafimahery; L Monier; B Mahiou; G Nicolas; B Bideau; L Rakotomanana (FRANCE)*
- 17:00 Human Undulatory Swimming: Kinematics, Flow and Mechanical Model O-080  
*S. Hochstein; R. Blickhan (GERMANY)*
- 17:15 Advanced Biomechanical Simulations in Swimming Enabled by Extensions of Swimming Human Simulation Model “SWUM” O-126  
*M. Nakashima; H. Kiuchi; S. Maeda; S. Kamiya; K. Nakajima; H. Takagi (JAPAN)*

**Friday, 18 June 2010**

**16:00 - 17:30 TURN/START I (Chair: R. Arellano) Room: 107**

- 16:00 The Development of a Component Based Approach for Swim Start Analysis O-081  
*J.Cossor; S. E. Slawson; L. M. Justham; P. P. Conway; A. A. West (UNITED KINGDOM)*
- 16:15 Influences of the Back Plate on Competitive Swimming Starting Motion in Particular Projection Skill O-082  
*T Nomura; T Takeda; H Takagi (JAPAN)*
- 16:30 A Biomechanical Comparison of Elite Swimmers Start Performance Using the Traditional Track Start and the New Kick Start O-083  
*KE Honda; PJ Sinclair; BR Mason; DL Pease (AUSTRALIA)*
- 16:45 Comparison Among Three Types of Relay Start in Competitive Swimming O-084  
*T. Takeda; H. Takagi, S. Tsubakimoto (JAPAN)*
- 17:00 Influence of Swimming Start styles on Biomechanics and Angular Momentum O-085  
*J. Vantorre<sup>1</sup>; L. Seifert<sup>1</sup>; B. Bideau<sup>1</sup>; G. Nicolas<sup>1</sup>; R.J. Fernandes<sup>2</sup>; J.P. Vilas-Boas<sup>2</sup>; D. Chollet<sup>1</sup> <sup>1</sup>(FRANCE); <sup>2</sup>(PORTUGAL)*
- 17:15 Learning Flat and Pike Entries during Swim Start from the Block O-086  
*S Fischer; A Kibele (GERMANY)*

**Saturday, 19 June 2010**

**08:30 - 10:15 PERFORMANCE II (Chair: J. Dekerle) Room: Aud A**

- 08:30 Do Fastskin Swimsuits Influence Coordination in Front crawl Swimming? O-087  
*D Chollet; F Chavallard; F Lemaitre; L. Seifert (FRANCE)*
- 08:45 A Comparison of Characteristics of High Functional Swimwear for Competitive Swimming O-088  
*T Gonjo; H Ichikawa; S Tsubakimoto; H Takagi (JAPAN)*

- 09:00 Effects of Swimwear Developed in 2008 on Drag During Front Crawl Swimming O-089  
*F Ogita; Z Huang; K kurobe; G Ozawa; N Taguchi; T Tanaka (JAPAN)*
- 09:15 Shaving and Perceptual Sensory Threshold O-090  
*C.L. Brammer; D. M. Koceja; J. M. Stager (UNITED STATES)*
- 09:30 The Acute Effect of Front Crawl Sprint-resisted Swimming on the Direction of the Resultant Force of the Hand O-091  
*V Gourgoulis; N Aggeloussis; G Mavridis; A Boli; A.G. Toubekis; P Kasimatis; N Vezos; G Mavrommatis (GREECE)*
- 09:45 Mechanical And Propulsive Efficiency Of Swimmers In Different Zones Of Energy Supply O-092  
*Sergei Kolmogorov; A.R. Vorontsov; O.A. Rummyantseva; A.B. Kochergin (RUSSIAN FEDERATION)*
- 10:00 Physiological and Performance Characteristics of 200 m. Continuous Swimming and 4X50m “Broken” Swimming with Different Interval Time.Demands O-093  
*N. Beidaris; P. Botonis; T. Platanou (GREECE)*

**Saturday, 19 June 2010****08:30 - 10:00 RESCUE (Chair: K. Moran & R. Stallman) Room: 106**

- 08:30 Crucial Findings from the 4W Model of Drowning for Practical and Teaching Applications O-094  
*S. Avramidis<sup>1</sup>; J. McKenna<sup>2</sup>; J. Long<sup>2</sup>; R. Butterfly<sup>1</sup>; D.J. Llewellyn<sup>2</sup> <sup>1</sup>(GREECE); <sup>2</sup>(UNITED KINGDOM)*
- 08:45 Real and Perceived Swimming Competency, Risk Estimation, and Preventing Drowning among New Zealand Youth O-095  
*K Moran (NEW ZEALAND)*
- 09:00 Keeping the Safety Messages Simple: The International Task Force on Open-Water Recreational Drowning Prevention O-096  
*K Moran<sup>1</sup>; L. Quan<sup>2</sup>; E Bennett<sup>2</sup> <sup>1</sup>(NEW ZEALAND); <sup>2</sup>(UNITED STATES)*
- 09:15 Movement Economy in Breaststroke Swimming: A Survival Perspective O-097  
*R.K. Stallman; J Major; S Hemmer; G Haavaag (NORWAY)*
- 09:30 A Model for Drowning Prevention in Lake Victoria; A Case Study from East Africa O-098  
*S. Wiebenge (NETHERLANDS)*
- 09:45 Swimming Ability, Perceived Competence and Perceived Risk Among Young Adults O-099  
*R.K. Stallman; D Dahl; K. Moran; P.L. Kjendlie (NORWAY)*

**Saturday, 19 June 2010****08:30 - 10:00 MEDICINE III (Chair: D. Daly) Room: 107**

- 08:30 Dietary Thiamin and Riboflavin Intake and Blood Thiamin and Riboflavin Concentrations in Collegiate Swimmers under Intensive Training O-100  
*A. Sato; Y. Shimoyama; T. Ishikawa; N. Murayama (JAPAN)*

- 08:45 Does the Immersion Affect Cortical Activation in Human? :Functional Near Infrared Spectroscopy study O-101  
*Daisuke Sato; H Onishi; T Iwabe; A Maruyama (JAPAN)*
- 09:00 Is Sight the Only Deterrent to Breaststroke Performance in Visually Impaired Paralympic Swimmers? O-102  
*I.P. Einarsson<sup>1</sup>; J. Martens<sup>2</sup>; D.J. Daly<sup>2</sup> <sup>1</sup>(ICELAND); <sup>2</sup>(BELGIUM)*
- 09:15 Influence of Swimming Speed on the Affected- and Unaffected-Arm Stroke Phases of Competitive Unilateral Arm Amputee Front Crawl Swimmers O-103  
*C.D. Osborough<sup>1</sup>; C.J. Payton<sup>1</sup>; D.J. Daly<sup>2</sup> <sup>1</sup>(UNITED KINGDOM); <sup>2</sup>(BELGIUM)*
- 09:30 Effect of Buoyant Torque on Bodyroll of Unilateral Arm Amputee Front Crawl Swimmers O-104  
*C.J. Payton; C. Osborough; R.H. Sanders (UNITED KINGDOM)*
- 09:45 The Effect of Higher Ambient Air Temperature on Thermoregulatory Responses and Thermal Sensation during Lower Body Immersion in Cool Water O-105  
*H. Wakabayashi<sup>1</sup>; T. Wijayanto<sup>2</sup>; J.Y. Lee<sup>2</sup>; Y. Tochihara<sup>2</sup> <sup>1</sup>(UNITED KINGDOM); <sup>2</sup>(JAPAN)*

**Saturday, 19 June 2010**

**10:30 - 11:15 Keynote Lecture 8 (Chair: K. Keskinen) Room: Aud A**

- 10:30 Training at Real and Simulated Altitude in Swimming: Too High Expectations? KL-008  
*F.A. Rodríguez (SPAIN)*

**11:15 - 12:00 Keynote Lecture 9 (Chair: K. Keskinen) Room: Aud A**

- 11:15 Swimming and Aquatic Exercise for Rehabilitation and Health KL-009  
*Jan Prins (UNITED STATES)*

**Saturday, 19 June 2010**

**12:00 - 13:00 Poster session Biomechanics 3 (Chair: B. Ungerechts) Room: Poster and Exhibition Hall**

- 12:00 Biomechanical Factors Influencing Tumble Turn Performance of Elite Female Swimmers P-033  
*F. Puel; J. Morlier; M. Cid; D. Chollet; P. Hellard (FRANCE)*
- 12:00 Identifying Determinant Movement Sequences in Monofin Swimming Technique P-034  
*M. Rejman; A. Staszkievicz (POLAND)*
- 12:00 Patterns of Behavior in the Crawl Technique of the Elite Portuguese Swimmers P-035  
*N. Ricardo; V. Milheiro; M. Branco; J. Campaniço; J. Freitas; A. Conceição; H. Louro; A. Silva (PORTUGAL)*
- 12:00 Evaluation of the Gliding Capacity of a Swimmer P-036  
*A. Roig (SPAIN)*
- 12:00 Modelling Arm Coordination in Front Crawl P-037  
*L. Seifert; D. Chollet (FRANCE)*

- 12:00 Creating the Best Physical Resources for Performing the Underwater Undulatory Swimming, a Case Study P-038  
*J Setterberg (NORWAY)*
- 12:00 Observation of Standard Breaststroke Technique Stability P-039  
*A Silva; J Freitas; J. R; A. Conceição; J. Campaniço; T. Matos; L. Leitão; H. Louro (PORTUGAL)*
- 12:00 Effects of a Blueseventy™ Bodysuit on Spatial-temporal and Coordinative Parameters during an all-out 50-m Front crawl Swim P-040  
*RP Silveira; JY Kanefuku; FC Moré; FAS Castro (BRAZIL)*
- 12:00 Relationship Between High Elbow Technique and Motion of Shoulder Joint in Front Crawl Swimming P-041  
*H. Suito; H Nunome; Y Ikegami (JAPAN)*
- 12:00 A Study About The 3D Acceleration In Front Crawl And Its Relation With Performance P-042  
*V Tella; J Madera; JC Colado; J Mateu; X García Massó; LM Gonzalez (SPAIN)*
- 12:00 An Analysis of the Underwater Gliding Motion in Collegiate Competitive Swimmer P-043  
*T. Wada; T Sato; K Obishi; T Tago; T Izumi; T Matsumoto; N Yamamoto; T Isaka; Y Shimoyama (JAPAN)*
- 12:00 Investigations into Strength Endurance Exercises for Swimmers P-044  
*M. Witt; J.-K. Götz (GERMANY)*
- 12:00 Head Out Swimming in Water Polo: a Comparison with the Front Crawl in Young Female Players P-045  
*P Zamparo; S Falco (ITALY)*
- 12:00 The Interplay Between Leg Kick Efficiency and Pushing Phase Acceleration in Determining the “Turning Speed” in Front Crawl Swimming P-046  
*P Zamparo; M Vicentini; E Zorzi; A Scattolini; A Rigamonti; M Bonifazi (ITALY)*
- 12:00 Technical Monitoring and Application of Swimming Competition P-047  
*J Zhou; H Ba; W Xie (CHINA)*

### Saturday, 19 June 2010

#### 12:00 - 13:00 Poster session Training 3 (Chair: C. Payton) Room: Poster and Exhibition Hall

- 12:00 Water Training Effect in Shoulder Rotators Strength in Young Swimmers P-067  
*N Batalha; P Tomás-Carús; O. Fernandes; D.A. Marinho; A.J. Silva (PORTUGAL)*
- 12:00 General Indexes of Crawl Swimming Velocity of Junior Water Polo Players at Match P-068  
*F.Z. Bratusa; S.M. Perisic; J.M. Dopsaj (SERBLA)*
- 12:00 Correlation Between Dry Land Strength Measurements and In Water Force Generation P-069  
*D.L. Carl; N Leslie; T Dickerson; B Griffin; A Marksteiner (UNITED STATES)*

12:00	Perceived Exertion at Different Percents of the Critical Velocity in Front Crawl <i>FAS Castro; M Franken; F Diefenthaler (BRAZIL)</i>	P-070
12:00	Tracking the 2004-2008 Olympic Cycle Performance in Long Distance Freestyle Events <i>M.J. Costa; D.A. Marinho; V.M. Reis; A.J. Silva; J.A. Bragada; T.M. Barbosa (PORTUGAL)</i>	P-071
12:00	Changes of Competitive Performance, Training Load and Tethered Force During Tapering in Young Swimmers <i>E Drosou; A. Toubekis; V. Gourgoulis; S. Thomaidis; H. Douda; SP. Tokmakidis (GREECE)</i>	P-072
12:00	Ventilatory and Biomechanical Response Analysis in Short vs. Long Interval Training Sessions in Elite Long Distance Swimmers <i>P. Hellard<sup>1</sup>; J. Dekerle<sup>2</sup>; X. Nes<sup>2</sup>; J.F. Toussaint<sup>1</sup>; N. Houel<sup>1</sup>; C. Hausswirth<sup>1</sup> <sup>1</sup>(FRANCE); <sup>2</sup>(UNITED KINGDOM)</i>	P-073
12:00	Diagnosis of Swimming Technique by fully tethered Swimming <i>A. Hohmann; U. Febr; J. Fankel (GERMANY)</i>	P-074
12:00	Specific Strength Training and Start Performance in Swimming <i>A. Hohmann; U. Febr; A. Reuss; S. Kieser; S. Straub (GERMANY)</i>	P-075
12:00	Relationship between Egg-beater Kick and Support Scull Skills, and Isokinetic Peak Torque <i>M. Homma (JAPAN)</i>	P-076
12:00	The Effects of Straight Leg Kick on Race Performance in the Sprint Butterfly <i>T Ide (JAPAN)</i>	P-077
12:00	Increased Training Intensity and Reduced Volume for 12 Weeks Increases Maximal Swimming Speed on a Sprint Distance in Young Elite Swimmers <i>L Johansen; S Jørgensen; A Kilen; T.H Larsson; M Jørgensen; B Rocha; N.B Nordsborg (DENMARK)</i>	P-078
12:00	Biomechanics and Bioenergetics of 100-m Front Crawl Swimming in Young Male Swimmers <i>E Lätt<sup>1</sup>; J Jürimäe<sup>1</sup>; J Mäestu<sup>1</sup>; P Purge<sup>1</sup>; R Rämson<sup>1</sup>; K.L Keskinen<sup>2</sup>; K Haljaste<sup>1</sup>; T Jürimäe<sup>1</sup> <sup>1</sup>(ESTONIA); <sup>2</sup>(FINLAND)</i>	P-079
12:00	Effects Of Applying Different Work Methods At Swimming School Programme For Beginners <i>E Mirvic; I Radjo; M Hodzic; Z Agacevic (BOSNIA AND HERZEGOVINA)</i>	P-080

**Saturday, 19 June 2010****12:00 - 13:00 Poster session Social Sciences (Chair: N. Vikander) Room: Poster and Exhibition Hall**

- 12:00 Evolution in Swimming Science Research: Content analysis of the “Biomechanics and Medicine in Swimming” Proceedings Books from 1971 to 2006  
*TM Barbosa; E Pinto; AM Cruz; DA Marinbo; AJ Silva; VM Reis; MJ Costa; TM Queirós (PORTUGAL)* P-111
- 12:00 A Model for Raising Water Safety Awareness in a Developing Country: A Case Study from Tanzania  
*S. Kiluswa<sup>1</sup>; R. Namkoveka<sup>1</sup>; N. Ahmed<sup>1</sup>; J. Massudi<sup>1</sup>; J. Belela<sup>1</sup>; T. Ongala<sup>1</sup>; A. Mwaipasi<sup>1</sup>; R.K. Stallman<sup>2</sup>*  
<sup>1</sup>(UNITED REPUBLIC OF TANZANIA); <sup>2</sup>(NORWAY) P-112
- 12:00 Cognitive Profiles and Neuro-motor Properties of Physically Active Masters Swimmers  
*CM McCracken; K Kitano; SK Head; JD Johnston; PR Finn; JM Stager (UNITED STATES)* P-113
- 12:00 Water Safety and the Environment: A Model for Developing Countries - A Case Study from Tanzania  
*N. Ahmed; T. Ongala<sup>1</sup>; R. Namkoveka<sup>1</sup>; Mwaipasi, A; R.K. Stallman<sup>2</sup>*  
<sup>1</sup>(TANZANIA (UNITED REPUBLIC)); <sup>2</sup>(NORWAY) P-114
- 12:00 A Social-Cognitive Investigation of the Coach-Created Motivational Climate and Coaching Behavior in Norwegian Youth Swimming  
*B.E. Rustad; P.N. Lemyre (NORWAY)* P-115

**Saturday, 19 June 2010****12:00 - 13:00 Poster session Other (Chair: N. Vikander) Room: Poster and Exhibition Hall****This session will start after the previous session (after P-115)**

- 12:00 Framework for Drowning Prevention based on the Haddon Matrix  
*S. Avramidis; J. McKenna (UNITED KINGDOM)* P-116
- 12:00 Head Depth and Velocity during Swim Starts in Competition in 1.22 m Depth Pool  
*A C Cornett; J.C. White; B.V. Wright; A.P. Willmott; J.M. Stager (UNITED STATES)* P-117
- 12:00 Athletic Rehabilitation of a Platform Diver after Shoulder Dislocation for Return to Competitions  
*O Fujinawa; Y. Kondo; K. Tachikawa; H. Jigami; K. Hirose; H. Matsunaga (JAPAN)* P-118
- 12:00 Comparisons of Water- and Land- based Physical Activity Interventions in Japanese Subjects with Metabolic Syndrome  
*A Hanai; K Yamatsu (JAPAN)* P-119
- 12:00 The Influence of Ai Chi on Balance and Fear of Falling in Older Adults: a Randomized Clinical Trial  
*Johan Lambeck<sup>1</sup>; F Neto<sup>2</sup>; R Teixeira<sup>2</sup>* <sup>1</sup>(BELGIUM); <sup>2</sup>(PORTUGAL) P-120

**Saturday, 19 June 2010**

**12:00 - 13:00 Poster session Other (Chair: N. Vikander) Room: Poster and Exhibition Hall**

**This session will start after the previous session (after P-120)**

- 12:00 Predictors of Performance in Pre-Pubertal and Pubertal Male and Female Swimmers P-121  
*H. Douda; A. Toubekis; C. Georgiou; V. Gourgoulis; SP. Tokmakidis (GREECE)*
- 12:00 Competitive Systematization in Age-group Swimming: an Evaluation of Performances, Maturational Considerations, and International Paradigms P-122  
*K Kojima; J.M. Stager (UNITED STATES)*
- 12:00 The Effect of an Intervention Program of Swim Learning on the Development of Fundamental Motor Skills of Boys and Girls P-123  
*A.G. Nikolopoulos; E.K Skordilis (GREECE)*
- 12:00 Wireless Activity Monitoring System for the Water Walking P-124  
*Y. Ohgi; K Kaneda; C Tanaka (JAPAN)*
- 12:00 The Effects of Rubber Swimsuits on Swimmers Measured by a Lactic Acid Curve Test P-125  
*T. Shiraki; K. Wakayoshi; H Hata; T Yamamoto; M Tomikawa (JAPAN)*
- 12:00 Comparison of the Development of Underwater Exercise between China and Japan P-126  
*Y. Wang<sup>1</sup>; H. Miwako<sup>2</sup>; T. Shozo<sup>2</sup> <sup>1</sup>(CHINA); <sup>2</sup>(JAPAN)*
- 12:00 Preliminary Results of a “Multi-2D” Kinematic Analysis of “Straight- vs. Bent-arm” Freestyle Swimming, Using High-Speed Videography P-127  
*Jan Prins; N.M. Murata; J.S.III. Allen (UNITED STATES)*
- 12:00 Electromyography in Water Cycling at different Cadences P-128  
*A Conceição; H Gamboa; V Milheiro; J Freitas; R Fernandes; JP Vilas Boas; A Silva; H Louro (PORTUGAL)*

**Saturday, 19 June 2010**

**14:00 - 15:30 THRESHOLD (Chair: I. Swaine) Room: Aud A**

- 14:00 Front Crawl Technique at and Around Maximal Lactate Steady State O-106  
*J. Deckerle<sup>1</sup>; M Alberty<sup>2</sup>  
<sup>1</sup>(UNITED KINGDOM); <sup>2</sup>(FRANCE)*
- 14:15 Determination of Lactate Threshold with Four Different Analysis Techniques for Pool Testing in Swimmers O-107  
*K.L. Keskinen; O.P. Keskinen; T. Pöyhönen (FINLAND)*
- 14:30 Can Blood Glucose Threshold be Determined in Swimmers early in the Swimming Season? O-108  
*Y Sengoku; K Nakamura; T Takeda; Y Nabekura; S Tsubakimoto (JAPAN)*
- 14:45 Evaluation of Force Production and Fatigue Using an Anaerobic Test Performed by Differently Matured Swimmers O-109  
*S. Soares; R. Silva; I. Aleixo; L. Machado; R. Fernandes; J. Maia; J.P. Vilas-Boas (PORTUGAL)*

- 15:00 Stroke Phases and Coordination Index around Maximal Lactate Steady State in Swimming O-110  
*JG Pelarigo<sup>1</sup>; BS Denada<sup>2</sup>; BD Fernandes<sup>2</sup>; DRP Santiago<sup>2</sup>; TEAS César<sup>2</sup>; LF Barbosa<sup>2</sup>; CC Greco<sup>2</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(BRAZIL)

**Saturday, 19 June 2010**

**14:00 - 15:30 TECHNIQUE AND PERFORMANCE (Chair: F. Castro)**

**Room: 106**

- 14:00 Quantitative Data Supplements Qualitative Evaluations of Butterfly Swimming O-111  
*T Becker, R. Havriluk* (UNITED STATES)
- 14:15 The Usefulness of the Fully Tethered Swimming for 50-m Breaststroke Performance Prediction O-112  
*A Barbosa<sup>1</sup>; M Dopsaj<sup>2</sup>; T Okicic<sup>2</sup>; O Andries Júnior<sup>1</sup>* (BRAZIL); <sup>2</sup>(SERBIA)
- 14:30 Characteristics of Pressure Distribution and Flow Patterns around the Hand during Sculling Motion O-113  
*T Miwa; S Shimada; H Ichikawa; H Takagi; K Matsuuchi; J Sakakibara; S Tsubakimoto* (JAPAN)
- 14:45 100m Freestyle: Factors Affecting Performance O-114  
*S T Aspenes; P-L Kjendlie* (NORWAY)
- 15:00 Shoulder and Hip Roll Differences between Breathing and Non-breathing Conditions in Front Crawl Swimming O-115  
*S Psycharakis; C McCabe* (UNITED KINGDOM)
- 15:15 Lactate Concentration Comparison Between 100m Freestyle and Tethered Swimming of Equal Duration. O-116  
*V Thanopoulos; G Rozi; T Platanou* (GREECE)
- 15:30 Biophysical Analysis of the 200m Front Crawl Swimming: a Case Study O-117  
*P Figueiredo<sup>1</sup>; A Sousa<sup>1</sup>; P Gonçalves<sup>1</sup>; P Suzana<sup>2</sup>; S Susana<sup>1</sup>; JP Vilas-Boas<sup>1</sup>; RJ Fernandes<sup>1</sup>* <sup>1</sup>(PORTUGAL); <sup>2</sup>(BRAZIL)

**Saturday, 19 June 2010**

**14:00 - 15:30 TURN/START II (Chair: B. Mason) Room: 107**

- 14:00 Graphic Removal of Water Wave Impact in the Pool Wall during the Flip Turn O-118  
*S.M. Pereira<sup>1</sup>; P. Gonçalves<sup>2</sup>; R.J. Fernandes<sup>2</sup>; L. Machado<sup>2</sup>; H. Roesler<sup>1</sup>; J.P. Vilas-Boas<sup>2</sup>* <sup>1</sup>(BRAZIL); <sup>2</sup>(PORTUGAL)
- 14:15 A Study of Apnea Turn, A New Underwater Turning Method for Butterfly and Breast Stroke Races O-119  
*K. Taichi; T. Tsuyoshi; T. Hideki; T. Shozo* (JAPAN)
- 14:30 A Study About the Cognitive Interplay Between Sensory and Biomechanical Features While Executing Flip Turns Wearing Different Swim Suits O-120  
*S. Vieluf<sup>1</sup>; B E Ungerechts<sup>1</sup>; H M Toussaint<sup>2</sup>; H Lex<sup>1</sup>; T Schack<sup>1</sup>* <sup>1</sup>(GERMANY); <sup>2</sup>(NETHERLANDS)

- 14:45 Effect of Specific Training on Swimming Start's Performance O-121  
*B. De la Fuente; R. Arellano (SPAIN)*
- 15:00 Relay Start Strategies in Elite Swimmers O-122  
*A Kibele; S Fischer (GERMANY)*
- 15:15 Analysis of Swim Turning, Underwater Gliding and Stroke Resumption Phases in Top Division Swimmers using a Wearable Inertial Sensor Device O-123  
*G. Vannozzi; M Donati; G Gatta; A Cappozzo (ITALY)*

**Saturday, 19 June 2010**

**16:00 - 17:30 POOL SIDE DEMONSTRATION & RELAY RACE  
 (Chair: B.H. Olstad) Room: Swimming Pool**

- 16:00 Applications of Wireless EMG Measurements in Water O-124  
*Ingi Þór Einarsson<sup>1</sup>; J. Martens<sup>2</sup>; S.A. Arngrimsson<sup>1</sup>; J. Lambeck<sup>2</sup>;  
 D. Daly<sup>2</sup> <sup>1</sup>(ICELAND); <sup>2</sup>(BELGIUM)*
- 16:00 User-Friendly Portable Poolside Video Analysis O-125  
*Rh Sanders, G. Machtsiras; G Scott (UNITED KINGDOM)*
- 16:00 Self Testing of New Swimming Training Equipment
- 16:00 Torrent E-Rack Swim Training  
*DH Hector (USA).*
- 16:00 Free Simulation Software "Swimsuit" to Learn and Research Biomechanics in Swimming P-029  
*M. Nakashima; H. Kiuchi; S. Maeda; S. Kamiya; K. Nakajima;  
 H. Takagi (JAPAN)*

**Saturday, 19 June 2010**

**18:00 - 19:00 Closing Ceremony**

**1900-00:00 Banquet in NIH Gardens**

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