



**Biosignals and Biorobotics
Conference (BRC2011)**

January 6-8, 2011 Vitória BRAZIL

**Instituto Federal do Espírito Santo
(Ifes)**

Conference Program

Welcome to Vitoria, Brazil, to attend the ISSNIP Biosignals and Biorobotics Conference - BRC2011. The conference organizers hope you have a very nice stay in Vitoria, enjoying the city, the people and the conference.

This aim of this conference is to provide an opportunity for scientists from around the world, with special focus for scientists from South America, to exchange notes and discuss research in signal processing, pattern recognition, electronics and computers for helping the disabled, the elderly, and people in special circumstances. It will provide electronic, biomedical and biosignal engineers the chance to interact with clinicians, rehabilitation engineers, rehabilitation nurses and paramedics.

Conference Themes

The conference will consist of the following streams:

1. Biomedical Engineering for Assistive Technologies

Biomedical engineering is a growing field with number of diverse areas. The aim of this stream is to provide a platform for biomedical engineers, clinicians, managers and user of assistive technologies to get together and share their outcomes, ideas, needs and views. Scientific papers that deal with the research, development, testing and future requirements of assistive technologies are invited.

2. Advances in Biosignals

There has been an explosion of biosignal analysis around the world. The aim of this stream is to provide a platform for researchers working in the analysis of signals such as EEG, EMG, and ECG to discuss their research outcomes with their peers, and demonstrate the possibilities of applications to clinicians and users. Scientific papers that provide the research, development and applications of biosignal analysis are invited for this session.

3. Biosignals for Machine Interface

For the past 30 years and more, there has been ongoing research in the field of controlling and commanding computers and machines with biosignals such as EMG, EOG and EEG. Such control provides the user with a natural interface with the machines, and is particularly useful for amputees and the very frail. Scientific papers are invited from researchers working in the field of using biosignals to interface the user with computers and machines. This includes research in biomedical engineering, signal processing, control systems, pattern recognition and rehabilitation engineering.

4. Robots for Assisted Living

Robots have found applications ranging from industrial robots to assemble cars, robots for entertainment and robots for assisting people with limited capabilities such as the elderly, the weak, and the disabled. Scientific papers that detail the

development and research in the fields such as robotic/ prosthetic hands, robotic wheelchairs, etc are invited.

5. Biomedical Image Analysis for Diagnosis and Biometrics

There has been a recent surge in research activity in biomedical image analysis. Research is being reported in the field of reducing radiation dosages, improving the quality of biomedical images and automating the analysis of these images. The activities reported in recent literature include retina scans, mammograms and ultrasonography for identification of tumours. Analysis of images and scans for biometrics applications are also included in this section. Scientific papers that explain the methodology and/ or the analysis of biomedical images are invited.

Organizing Committee of BRC2011:

Professor Rodrigo Varejão Andreão (Ifes, Brazil),
Professor Teodiano Freire Bastos, (UFES, Brazil)

and

Dr. Dinesh Kant Kumar (RMIT/Australia)
Secretary: Katherine Wheeler (RMIT/University)

Conference Committee

General Chairs:	Associate Professor Dinesh Kant Kumar, RMIT University, Australia Professor M Palaniswami, University of Melbourne, Australia
Local Chairs	Professor Rodrigo Varejão Andreão, IFES, Brazil Professor Teodiano Freire Bastos, UFES, Brazil
International Chair	Professor Sri Krishnan, Ryerson University, Canada
Technical Chair	Professor Gert Cauwenberghs, UC San Diego, USA
Tutorial Chair	Professor Sri Krishnan, Ryerson University, Canada
Advisors	Professor Nitish Thakor, John Hopkins University, USA Professor Roberto Merletti, LISiN, Politecnico di Torino, Italy
Program Committee	Evandro Ottoni Teatini Salles, Federal University of Espirito Santo, Brazil Rodrigo Varejão Andreão, IFES, Brazil Luciano Boquete, Alcala University, Spain Ramon Ceres, IAI-CSIC, Spain Leopoldo Calderon, IAI-CSIC, Spain Arturo Forner-Cordero, IAI-CSIC, Spain Jose Luis Pons, IAI-CSIC, Spain Eduardo Rocon de Lima, IAI-CSIC, Spain Fernando di Sciascio, Institute of Automatics National University of San Juan, Argentina Pedro Pablo Escobar, Faculty of Engineering, Universidad Nacional del Centro, Argentina

Hirokazu Shimada, University OITA, Japan
 Marcos Formica, Faculty of Bioengineering, Argentina
 Juan Carlos Garcia Garcia, Universidad de Alcala, Spain
 Ganesh Naik, RMIT University, Australia
 Jorge Vicente Lopes da Silva, Center For Information Technology Renato Archer, Brazil
 Jose Luis Martinez, Grupo de Robotica y Cibernetica. Universidad Politecnica de Madrid, Spain
 Manuel Mazo, University of Alcala, Spain
 Raimes Moraes, Universidade Federal de Santa Catarina, Brazil
 Pedro Noritomi, Centro de Tecnologia da Informacao Renato Archer, Brazil
 Adriana Maria Rios Rincon, Universidad del Rosario, Colombia
 Enrique A. Vargas Cabral, Facultad de Ciencias y Tecnologia - Univ. Católica, Paraguay
 Luca Cernuzzi, Facultad de Ciencias y Tecnologia - Univ. Católica, Paraguay
 Adson Ferreira da Rocha, University of Brasilia, Brazil
 Humberto Ferasoli Filho, UNESP, Brazil
 Aura Campos, Fluminense Federal University, Brazil
 Geovany Araújo Borges, University of Brasilia, Brazil
 Sridhar Arjunan, RMIT University, Australia
 Antônio Borges, Federal University of Rio de Janeiro, Brazil

Thursday, January 6th

08:00 – 13:00: Registration

09:00 – 09:30: Opening Session

Location: *Auditório*

09:30 – 10:30: Plenary Talk - Dinesh K. Kumar

Location: *Auditório*

10:30 – 11:00: Coffee Break

11:00 – 12:30: Oral Session 1: Classification 1

Location: *Auditório*

Session Chair: Sridhar P. Arjunan

1. Decoding Arm Movements by Myoelectric Signals and Artificial Neural Networks, (Gabriela Favieiro, Federal University of Rio Grande do Sul, Brazil)
2. Combining Entropy Measurements and Cepstral Analysis for Pathological Voice Assessment (Nathália Brunet, Federal Institute of Education, Science and Technology of Paraíba, Brazil)
3. Breast Image Classification Based on Texture Features Using Discriminant Analysis (Daniel Costa, Federal University of Maranhão, Brazil)
4. Kurtosis and Negentropy investigation of Myo electric signals during different MVCs (Sridhar Poosapadi Arjunan, RMIT, Melbourne, Australia)

5. Heart Arrhythmia Classification Using the PPM Algorithm
(Amanda Cavalcanti, Universidade Federal da Paraíba, Brazil)

11:00 – 12:30: Oral Session 2: Hardware Considerations

Location: *Mini-auditório*

Session Chair: Luis Eduardo Martins de Lima

1. Harvesting of Vibratory Energy for Biomedical Implants Using Piezoelectric Generator and Variable Capacitor
(Helder Florentino, Federal University of Campina Grande, Brazil)
2. Tip Tracking Control of a Rigid-Flexible Manipulator based on Deflection Estimation Using Neural Networks: Application to Needle Insertion
(Amir Navab Irani, Amirkabir University of Technology, Iran)
3. A low cost signal generator for real time vibrotactile stimulations
(Ilton Luiz Barbacena, Federal Institute of Science and Technology Education of Paraíba, Brazil)
4. An extension of spatial and tactile perception based on haptics
(Alejandro Ramirez, Univali, Brazil)

12:30 – 14:00 Lunch

14:00 – 16:00 Round Table: Robotic Wheelchair and Smart Walker

16:00 – 16:30 Coffee break

16:30 – 18:00 Oral session 3: Human Computer Interface

Location: *Auditório*

Session Chair: André Ferreira

1. Pseudo-Online Classification of Mental Tasks
(Alessandro Benevides, Universidade Federal do Espírito Santo, Brazil)
2. A Four-Class Brain Computer Interface for Robot Control
(Mehrnaz Hazrati, University of Lübeck, Germany)
3. A Low Cost Prototype for an Optical and Haptic Pen
(Nuno Simão Boscaglia, Universidade Federal do Espírito Santo, Brazil)
4. Remote Guide for directing the Visually Impaired
(Luiz Cláudio Locatelli Ventura, Centro de Excelência em Avaliação Física – CEAF, Paraguay)
5. Educational Robotics as a Learning Aid for Disabled Children
(Carlos Valadão, Universidade Federal do Espírito Santo, Brazil)

16:30 – 18:00 Oral session 4: Classification 2:

Classification and search algorithms

Location: *Mini-auditório*

Session Chair: Klaus Fabian Coco

1. Segmentation of Masses in Digital Mammograms
(Tiago Wirtti, Universidade Federal do Espírito Santo, Brazil)
2. An Automated Method for Clustering Single Sweep Local Field Potentials Recorded from Rat Barrel Cortex
(Mufti Mahmud, University of Padova, Italy)
3. Automatic Sleep Staging Using a Single-Channel EEG Modeling by Kalman Filter and HMM
(Evandro Salles, Federal University of Espírito Santo, Brazil)
4. An infotaxis based odor navigation approach
(Alejandro Ramirez, Univali, Brazil)

18:30 – 20:30 h: Welcoming Reception

Friday, January 7th

09:00 – 10:00: Plenary Talk: Jose Principe

Location: *Auditório*

10:00 – 10:30: Coffee-Break

10:30 – 12:30: Oral Session 5: Image analysis for diagnostics and biometrics

Location: *Auditório*

Session Chair: Klaus Fabian Coco

1. Face Detection Based on Adaptive Support Vector Tracker (Cornélia Janayna Passarinho, Federal University of Espírito Santo, Brazil)
2. A Novel On-line Signature Forgery Detection System Using Statistical Modelling and Multi-Fractal Information (Luan Ling Lee, State University of Campinas, Brazil)
3. Use of wavelet transforms and neural networks for identifying individuals through extracted features of the hand palm (Victor Vieira, Federal Institute of Espírito Santo, Brazil)
4. Evaluation of GMM Approach to Fingerprint Classification (Evandro Salles, Federal University of Espírito Santo, Brazil)
5. Automatic Identification of Discoid Lupus Erythematosus (Kesede Rodrigues Julio, State University of Campinas, Brazil)

12:30 – 14:00: Lunch

14:00 – 16:00: Oral Session 6: Biosignals 1

Location: *Auditório*

Session Chair: Anselmo Frizera Neto

1. Study of Muscular Fatigue by EMG Analysis During Isometric Exercise
(Runer Augusto Marson, Federal University of Ouro Preto, Brazil)
2. Sensor Fusion applied on Position Estimation and Gait Identification of an Ankle-Foot Orthosis
(Cleiton Caltran, University of São Paulo, Brazil)
3. Statistical Approach for Angular Position Separability Classes of EMG Data
(Maria Cláudia F Castro, Centro Universitário da FEI, Brazil)
4. Observing Exercise Induced Heart Rate Variability Response
(Sridhar Poosapadi Arjunan, RMIT, Melbourne, Australia)
5. Experimental Evidences for Visual Evoked Potentials with Stimuli Beyond the Conscious Perception Threshold.
(Sérgio G. Ramos-Júnior, Daniel R. Celino, Fáuzi F. Rodor, Moisés R. N. Ribeiro, Sandra M. T. Müller, Teodiano Freire Bastos Filho and Mário Sarcinelli Filho)

16:00 – 16:30: Coffee Break

16:30 – 18:00: Oral Session 7: Biosignals 2: Surface EMG

Location: *Auditório*

Session Chair: Sridhar P. Arjunan

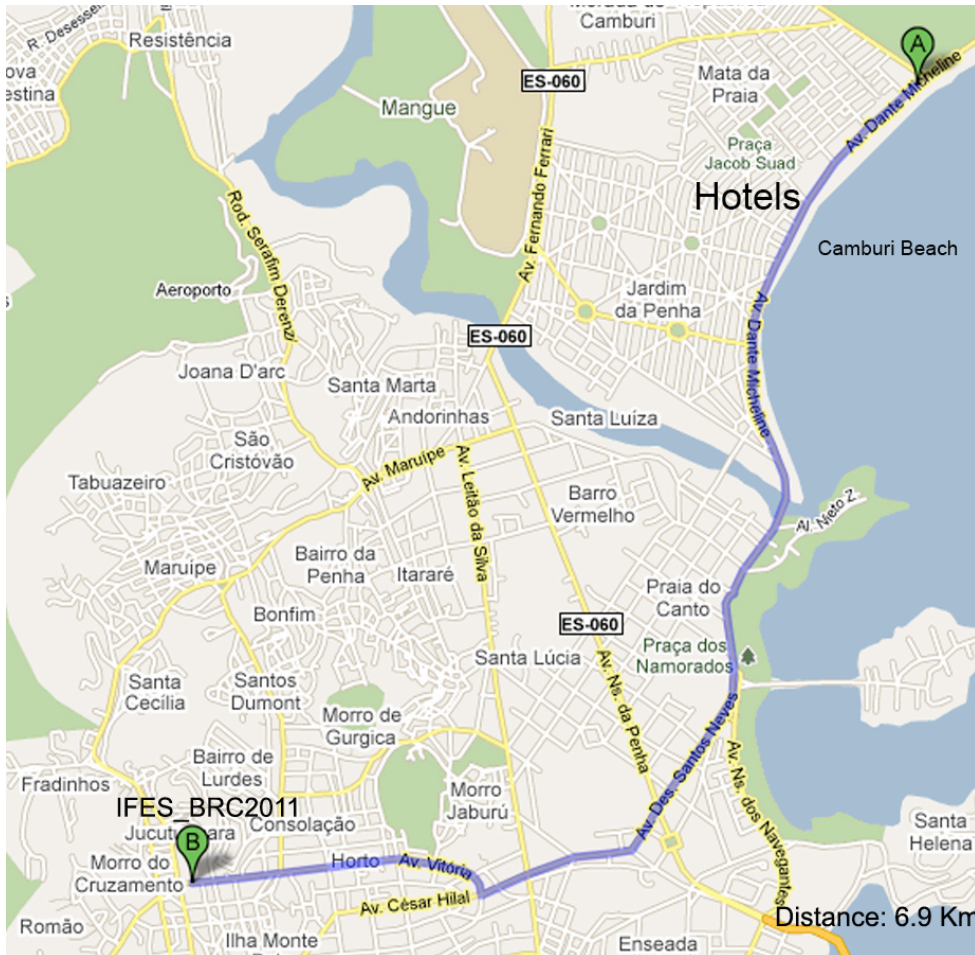
1. Implementing a surface EMG model with accurate parameters and a force output
(Katherine Wheeler, RMIT, Melbourne, Australia)
2. Age and Gender Related Differences in Surface Electromyogram during Maximum Voluntary Contraction
(Chandan Kalra, RMIT, Melbourne, Australia)
3. Spectral properties of surface EMG and Muscle conduction velocity: A study based on sEMG Model
(Sridhar Arjunan, RMIT, Melbourne, Australia)

Saturday, January 8th

Day of Tutorials**Location: *Auditório*****09:00 – 10:00 Tutorial 1: Biosignals for Prosthetic Control****10:00 – 10:30 Coffee break****10:30 – 12:30 Tutorial 1(continued)****12:30 – 14:00 Lunch****14:00 – 15:30 Tutorial 2: EMG Signal Analysis****15:30 – 16:00 Coffee break****16:00 – 17:30 Tutorial 2 (continued)****18:00 – 18:30 Closing Session****Useful information:**

1. There will be free transportation from the hotels in Camburi Beach to the Ifes Campus in the morning and in the end of the day.
2. There will be free transportation for and from the restaurant where the conference dinner will happen.
3. In any case, the free transportation only will be guaranteed for those who present the conference badge.
4. Any person who has registered for the conference will receive this program, all the conference printed material and the CD containing the conference proceedings, and will have the right to participate of any oral session, except for the tutorial, which demands an additional registration fee.
5. Transportation for and from the airport are responsibility of the conference attendees.

Useful Maps



Conference Address:

Instituto Federal do Espírito Santo
Campus Vitória Av. Vitória, 1729
Jucutuquara Vitória
ES

Instituto Federal do Espírito Santo (Ifes)

History of Ifes: On the 23rd of September 1909, the Brazilian president Nilo Peçanha determined the foundation of nineteen schools of arts and métiers. As a consequence, the technical school Escola de Aprendizes e Artífices do Espírito Santo (Arts and Métiers School) was born. Since then, the school name has changed five times: 13th of January 1937, the School name changed to Liceu Industrial de Vitória (Industrial School); 25th of February 1942, the School name changed again to Escola Técnica de Vitória (Technical School of Vitória); 1965, the school changed to Escola Técnica Federal do Espírito Santo (Federal Technical School of Espírito Santo); 22nd of March 1999, the School name changed to Centro Federal de Educação Tecnológica do Espírito Santo (Federal Center of Technological Education of Espírito Santo); 29th of December 2008, the School name changed to Instituto Federal do Espírito Santo - Ifes (Federal Institute of Espírito Santo).

The school name changes were followed by a diversification of the activities and teaching modalities, aiming at providing different course levels.

Ifes Today: Recently, all nine Institute units (situated in different cities namely Vitória, Colatina, Serra, Cachoeiro de Itapemirim, São Mateus, Cariacica, Aracruz, Linhares and Nova Venécia) became Institute campus, and other Federal Technical Schools have joined the Institute Ifes

namely Federal Agro-technical School of Alegre, Colatina and Santa Teresa. The Institute Ifes will still expand to more six new campuses in six different cities of Espírito Santo (Venda Nova do Imigrante, Vila Velha, Piúma, Ibatiba, Guarapari and Centro-Serrano).

The Institute Ifes is an institution which links graduation, undergraduation, technical high school, multiple courses and multiple campuses, specialized in offering professional and technological education in different levels and teaching modalities. Today, the Institute Ifes offers 63 courses, where 46 technical courses, 14 undergraduate courses, 2 Master of Science and 2 specialization courses.