Name of the Institution: University of Bologna

Web: www.unibo.it;
www.ing2.unibo.it/Ingegneria+Cesena/default.htm

Name of the TEMPUS CRH-BME representative (for your Institution): Rita Stagni

BME GROUP/LABORATORY PRESENTATION

The University Profile. The University of Bologna, created 1088, is recognized as the oldest university in the western world, and one of the largest in Italy (with more than 100,000 enrolled students). It is one of most active Italian universities in research and technology transfer. At European Level, the University was partner in more than 220 EU projects in FP5, FP6 and FP7. Among the many challenges which it has met with success, Bologna committed itself to the **European dimension** which has now led to adoption of the new university system. It is heavily involved in many international research projects. The University is at the forefront when it comes to basic, advanced and applied research. It has a reputation for quality teaching and innovative research. In October 2002, Forlì-Cesena became the Second Faculty of the University of Bologna, offering courses in Biomedical engineering, Electronics, Telecommunications, Informatics, Aerospace and Mechanical Engineerign.

The Department Profile. The Department of Electronics, Informatics, and Computer Systems was established in April 1983 as a merger of the Institutes of Automation and Electronics. It has offices in Bologna, Cesena and Pontecchio Marconi. Its headquarters are in Bologna. The department currently has about 140 faculty members. It covers eight main research areas: Automation, Bioengineering, Electromagnetic fields, Electronics, Electronic Measurement, Computer Science, Operational Research, Telecommunication. The department teaches courses in these areas for the bachelor and masters degrees, at the First and Second Faculty of Engineering, and at other Faculties of the University of Bologna. Besides, the department offers three PhD programmes in Information Sciences and Engineering: Bioengineering, Control System Engineering and Operational Research Electronics, Computer Science and Telecommunications. The research and teaching activity of the Department extends beyond the national borders, with a network of international collaborating institutions. The department has developed a relevant experience in the transfer of specifically developed products and methods to medical devices manufacturers and to clinical application. In this context DEIS was the leading partner of the Strategic neTwork for Assistive and Rehabilitation Technology in Emilia-Romagna (STARTER). In 2008 STARTER converged into the High Technology Laboratory AirTechLab, supported by the region Emilia-Romagna, which is designed to transfer to manufacturers products and methods resulting from research technical and Biomedical research projects.

Bioengineering Group Profile. The Bioengineering Group is comprised of 12 members of academic staff, 15 research assistants and Ph.D. students, participating in a number of research and development programs, and 2 technologists. The teaching activity on the Bioengineering Filed consists of the first level 3 year Degree in Biomedical engineering and the second level 2 year Specialised Degree in Biomedical Engineering at the Faculty of Cesena, Specific Curricula and Courses in Biomedical Engineering within other Engineering Degree courses, the PhD Course in Bioengineering, and a Master course in Clinical Engineering at the Faculty of Bologna. The Biomedical Engineering Group has lead or participated to several research projects and has active industrial cooperation.

Academic staff:
Guido Avanzolini, Full Professor

Angelo Cappello, Full Professor

Lorenzo Chiari, Assistant Professor

Luca Cristofolini, Associate Professor

Silvia Fantozzi, Assistant Professor

Emanuele Domenico Giordano, Assistant Professor

Gianni Gnudi, Full Professor

Claudio Lamberti, Associate Professor

Elisa Magosso, Assistant Professor

Stefano Severi, Assistant Professor

Rita Stagni, Assistant Professor

Mauro Ursino, Full Professor

BME EDUCATION

1st Level BME 3 year Curriculum
http://www.eng.unibo.it/PortaleEn/Academic+programmes/Courses/EngineeringCesena/1stDegree/2010/CoursePage20100946.htm

2nd Level BME 2 year Curriculum
http://www.eng.unibo.it/PortaleEn/Academic+programmes/Courses/EngineeringCesena/2ndCycleDegreeM/2010/CoursePage20108198.htm

3 year PhD in Biomedical Engineering
http://www.eng.deis.unibo.it/DEISEN/Research/PhD/PhDBioengineering.htm
http://phd.deis.unibo.it/pubblico/dottorato.php?id_dottorato=2

COURSES AVAILABLE IN ENGLISH? (IF YES, ON WHICH LEVEL?) NOT FOR YEAR 2010-2011

- BSc:
- MSc:
- PhD:

ECTS: Total number

- BSc:
- MSc:
- PhD:

BILATERAL AGREEMENTS WITH OTHER UNIVERSITIES? (LIST THOSE UNIVERSITIES)

- Erasmus Exchange with Reykjavik University (Iceland)
- Erasmus Exchange with Radboud University, Nijmegen (The Nederland)
- Erasmus Exchange with Université de Franche, Comté, Besancon (France)
- Erasmus Exchange with University of Patras (Greece)
- University of Waterloo, Waterloo, Ontario, Canada
- Erasmus Exchange with Universitatea de Medicina si Farmacie « Gr. T. Popa », Iasi, Romania

MAIN BME INTERESTS

- Advanced processing methods (e.g. wavelet transform, independent component analysis) applied to the analysis of biomedical signals:
  - analysis of electroencephalographic signals in epileptic patients
  - analysis of poligraphic signals acquired in patients with sleep disturbances.
- Ambient assisted living
- Biomedical Signal Processing
- Bone tissue and bones biomechanics
- Clinical Engineering
- Cardiac Electrophysiology
- Computational Biology
- Epigenetics
- Hemodialysis
- Human motion analysis
- Mathematical modeling of neural systems (models of semantic memory, multisensory

integration, rhythmic activity in the brain and cortical connectivity)

- Mathematical models of cardiorespiratory regulation
- Medical Imaging
- Modeling and simulation of the cardiovascular and respiratory systems and of their short-term control mechanisms
- Modeling and simulation of respiratory mechanics in artificial ventilation
- Modeling of respiration and muscle metabolism during exercise
- Modeling of cardiovascular dynamics
- Musculo-skeletal modeling
- Neurobiomechanics of posture and movement
- Orthopaedic biomechanics: prosthetics, fixation devices, augmentation
- Rehabilitation Engineering
- Synthetic biology
- Telemedicine
- Tissue engineering/Regenerative medicine
- Wearable sensors

ACTIVE PROJECTS

National

- CARTOON 3D with IRST Meldola (FC)
- PRIN 2008 - Grant of the Italian Ministry of University and Research (MIUR): “A multimodal approach to study the biomechanics of healthy and pathological knee” (grant: 2008845A7J)
- PRIN 2008 – “Advanced methods for the study of cortical connectivity during simple visuo-motor tasks” (Participating Units: University of Bologna, University “La Sapienza” Rome, University of Milano, Politecnico of Milano)
- “Regenerating infarcted myocardium with pharmacologically activated microcarriers” INRC Fondazione Dott. Carlo Fornasini - Poggio Renatico (FE)
- “Molecular interaction among stem cells and biopolymers. A study for regenerative medicine of infarcted myocardium” INRC Compagnai di San Paolo - Torino
- “Epigenetic profiling of prognostic markers and therapy targets in lung cancer” IRST-Ing2

International

- UE 7th FW ARTEMIS Joint Undertaking: CHIRON (Cyclic and person-centric Health management: Integrated appRoach for hOme, mobile and clinical eNvironment)
- Cyclic and person-centric Health management Integrated appRoach for hOme, mobile and clinical eNvironments (CHIRON) – (JU ARTEMIS Grant Agreement # 2009-1-100228)
    - Task 2.2a: Novel solution for the measurement of serum potassium through algorithms analyzing the ECG
    - Task 2.2b: Enhancement of the accuracy of automatic blood pressure measurement by using the ECG signal
- EU-JTI: “Cognitive Adaptive Man-Machine Interfaces – CAMMI”, JTI ARTEMIS: Embedded Computing Systems Initiative - CALL 2008 Subprogramme 8 - Human-Centric Design (HCD)";
- EU-FP7: “Self Mobility Improvement in the eLderly by CounteractING Falls – SMILING”, ICT 1-7.1 – ICT & Ageing

Other

- Studio dell’influenza del trattamento con rene artificiale sull’attività elettrica del cuore (*Influence of the use of the artificial kidney on the electrical activity of the heart*) – (Hospal SpA)
- Sensoristica e modellistica per il monitoraggio ed il controllo di parametri clinici del paziente in terapia dialitica (Sensors and modelling for the monitoring and control of clinical parameters in the patients under dialysis) – (Gambro Dasco SpA)

- Regione Emilia Romagna: "pERsonal health lab – pERhl", Bando “Dai distretti produttivi ai distretti tecnologici”, DGR n. 1631/2009

Patents

- 11 December 2002 – European patent No EP02425761.0 “Apparatus to measure intraoperatively the mechanical stability of an orthopaedic prosthesis implanted by means of press-fitting in the bone” (Inventors: L. Cristofolini, A. Cappello, A. Toni, M. Viceconti)
- 2004 - “A device for conditioning balance and motor co-ordination”, European Patent number 1761167, (14/06/2004)
- 2007 - “A device for conditioning balance and motor co-ordination”, U.S. Patent Application No. 11/570,290, (5/09/2007)
- “BIO REACTOR FOR STEM CELLS STIMULATION”, Application Number: PCT/IB2010/053411; Date of Receipt: 27 July 2010; Receiving Office: International Bureau of the World Intellectual Property Organization.

RECENT PUBLICATIONS (LAST 2 YEARS)

2009:

- D. Abrahamova, M. Mancini, F. Hlavacka, L. Chiari, “The age-related changes of trunk responses to vibration of Achilles tendon”, Neurosci. Lett., Vol. 467 Issue: 3, pp. 220-4, Dec 31 2009.
- Bialoblocka-Juszczyk, E., Baleani, M., Cristofolini, L., Viceconti, M., 2009. Effect of stem preheating on the fatigue behaviour of bone cement around hip prostheses. Proc Inst Mech Eng [H] 223, 637-641.
- Bialoblocka-Juszczyk, E., Cristofolini, L., Erani, P., Viceconti, M., 2010. Effect of long-term physiological activity on the long-term stem stability of cemented hip arthroplasty: in vitro comparison of three commercial bone cements. Proc Inst Mech Eng [H] 224, 53-65.
- V. Camomilla, M. Donati, R. Stagni, A. Cappozzo, 2009. Non-invasive assessment of soft tissue local displacement during movement. Journal of Biomechanics, 42(7), 931-937.
- A. Cedraro, A. Cappello, L. Chiari, “A portable system for in-situ calibration of force platforms: Experimental validation”, Gait Posture., Vol. 29(3), pp. 449-53, April 2009.
- E. Ceseracciu, Z. Sawacha, S. Fantozzi, G. Gatta, C. Cobelli. Markeless analysis of swimmer’s motion: a pilot study. 27th International Conference on Biomechanics in Sport. 17-21 agosto 2009. (pp. 85). Limmerick (Irlanda).
- Ciandrini A, Severi S, Cavalcanti S, Fontanazzi F, Grandi F, Buemi M, Mura C, Bajardi P, Badiali F and Santoro A: Model-based analysis of potassium removal during hemodialysis. Artif Organs, 2009 33(10):835-43
- F. Cona, M. Zavaglia, L. Astolfi, F. Babiloni, M. Ursino, “Changes in EEG power spectral density and cortical connectivity in healthy and tetraplegic patients during a motor imagery task" Computational Intelligence and Neuroscience, vol. 2009, Article ID 279515, 12 pages. Epub 2009 Jun 24.
- C. Corsi, F. Veronesi, C. Lamberti, D.M.E. Bardo, E. Jamison, R.M. Lang, V. Mor- Avi. Automated Frame-by-Frame Endocardial Border Detection from Cardiac Magnetic Resonance Images for Quantitative Assessment of Left Ventricular Function: Validation and Clinical Feasibility. Journal of Magnetic Resonance Imaging, 29(3):560-568, 2009.
- Cristofolini, L., Affatato, S., Erani, P., Tigani, D., Viceconti, M., 2009. Implant fixation in knee replacement: preliminary in vitro comparison of ceramic and metal cemented femoral components. Knee 16, 101-108.
- Cristofolini, L., Conti, G., Juszczyk, M., Cremonini, S., Van Sint Jan, S., Viceconti, M., 2010. Structural behaviour and strain distribution of the long bones of the human lower limbs. J Biomechanics 43, 826-835.
- Cristofolini, L., Erani, P., Bialoblocka-Juszczyk, E., Ohashi, H., Iida, S., Minato, I., Viceconti, M., 2010. Effect of undersizing on the long-term stability of the Exeter hip stem: a comparative in vitro study. Clin Biomech (Bristol, Avon) 25, 899-908.
- Cristofolini, L., Juszczyk, M., Taddei, F., Field, R.E., Rushton, N., Viceconti, M., 2009. Stress-shielding and stress-concentration of contemporary epiphyseal hip prostheses. Proc

Inst Mech Eng [H] 223, 27-44.

- Cristofolini, L., Juszczyk, M., Taddei, F., Viceconti, M., 2009. Strain distribution in the proximal human femoral metaphysis. Proc Inst Mech Eng [H] 223, 273-288.
- Cristofolini, L., Schileo, E., Juszczyk, M., Taddei, F., Martelli, S., Viceconti, M., 2010. Mechanical testing of bones: the positive synergy of FE models and in vitro experiments. Philos Transact A Math Phys Eng Sci 368, 2725-2763.
- Cristofolini, L., Viceconti, M., 2009. Comments on: "In vitro analysis of Exeter stem torsional stability" by Bell CG, Weinrauch P, Pearcy M, Crawford R Published on J Arthroplasty. 2007 Oct; 22(7):1024-30. J Arthroplasty 24, 657-659.
- C. Cuppini, E. Magosso, M. Ursino. "A neural network model of semantic memory linking feature-based object representation and words", BioSystems 96(3): 195-205, 2009
- M. Fabbri, F. Provini, E. Magosso, A. Zaniboni, A. Bisulli, G. Plazzi, M. Ursino, P. Montagna "Detection of sleep onset by analysis of slow eye movements. A preliminary study of MSLT recordings", Sleep Medicine 10(6): 637-640, 2009
- M. Franchi, V. Ottani., R. Stagni, A. Ruggeri, 2010. Tendon and ligament fibrillar crimps give rise to left-handed helices of collagen fibrils in both planar and helical crimps. Journal of Anatomy, vol.216, 301-309. doi: 10.1111/j.1469-7580.2009.01188.x.
- Garofalo P, Cutti AG, Filippi MV, Cavazza S, Ferrari A, Cappello A., Davalli A (2009). Inter-operator reliability and prediction bands of a novel protocol to measure the coordinated movements of shoulder-girdle and humerus in clinical setting. MEDICAL & BIOLOGICAL ENGINEERING & COMPUTING, vol. 47; p. 475 - 486, ISSN: 0140-0118
- D. Giansanti, M. Dozza, L. Chiari, G. Maccioni, A. Cappello, "Energetic assessment of trunk postural modifications induced by a wearable audio-biofeedback system", Med. Eng. Phys., Vol. 31(1), pp. 48-54, January 2009.
- Grandi E, Pasqualini F, Pes C, Corsi C, Zaza A and Severi S: Theoretical investigation of action potential duration dependence on extracellular Ca2+ in human ventricular myocytes. J Mol Cell Cardiol, 46(3) 2009, 332-342
- F.B. Horak, M. Dozza, R. Peterka, L. Chiari, C. Wall III, "Vibrotactile biofeedback improves tandem gait in patients with unilateral vestibular loss", Ann. NY Acad. Sci. , Vol. 1164, pp. 279-81, May 2009.
- R. Lobietti, S. Fantozzi, R. Stagni, S.G.S. Coleman. A Biomechanical Comparison of Jumping Techniques in the Volleyball Block and Spike. 27th International Conference on Biomechanics in Sport. 17-21 agosto 2009. pp. 145 - 148. Limmerick (Irlanda).
- F. Maffessanti, R.M. Lang, C. Corsi, V. Mor-Avi, E.G. Caiani, Feasibility of Left Ventricular Shape Analysis from Transthoracic Real-Time 3D Echocardiographic Images, Ultrasound in Medicine and Biology, 35:1953-1962, 2009.
- E. Magosso, M. Ursino, A. Zaniboni, E. Gardella. "A wavelet-based energetic approach for the analysis of biomedical signals: Application to the electroencephalogram and electro-oculogram", Applied Mathematics and Computation 207(1): 42-62, 2009
- M. Mancini, C. Zampieri, P. Carlson-Kuhta, L. Chiari, F.B. Horak, "Anticipatory Postural Adjustments prior to step initiation are hypometric in untreated Parkinson's disease: an accelerometer-based approach", Eur. J. Neurol., Vol. 16 (9), pp. 1028-34, September 2009.
- M. Pirini, L. Rocchi, M.C. Sensi, L. Chiari, "A computational modelling approach to investigate different targets in deep brain stimulation for Parkinson's disease", J. Comp. Neurosci., Vol. 26(1), pp. 91-107, February 2009.
- S. Severi, C. Corsi, M. Rocchetti, A. Zaza. Mechanisms of ß-adrenergic modulation of IKs in the guinea-pig ventricle: insights from experimental and model-based analysis. Biophysical Journal, 6;96(9):3862-72, 2009.
- S. Severi, C. Corsi, E. Cerbai, From in vivo plasma composition to in vitro cardiac electrophysiology and in silico virtual heart: what about extracellular calcium? Philosophical Transactions of the Royal Society (A), 13;367(1896):2203-23, 2009.
- R. Stagni, S.Fantozzi, A.Cappello, 2009. Double Calibration vs Global Optimisation: performance and effectiveness for clinical application. Gait and Posture, 29(1), 119-122.
- L. Tersi, S. Fantozzi, R. Stagni, 2009. 3D elbow kinematics with mono-planar fluoroscopy: in-silico evaluation. EURASIP Journal on Advances in Signal Processing (Special issue

"Image Processing and Analysis in Biomechanics"), vol. 2010, 1-10, Article ID 142989, doi:10.1155/2010/142989.

- Traina, F., Tassinari, E., Pilla, F., De Fine, M., Biondi, F., Cristofolini, L., Toni, A., 2009. Outcome of hybrid stem fixation in osteoporotic female patients. A minimum five-year follow-up study. Int Orthop 33, 1489-1494.
- M. Ursino, C. Cuppini, E. Magosso, A. Serino, G. Di Pellegrino. "Multisensory integration in the superior colliculus: a neural network model", Journal of Computational Neuroscience 26(1): 55-73, 2009
- M. Ursino, E. Magosso, C. Cuppini. "Recognition of abstract objects via neural oscillators: interaction among topological organization, associative memory and gamma-band synchronization", IEEE Transactions on Neural Networks 20(2): 316-335, 2009
- M. Ursino, M. Giannessi, M. Frapparelli, E. Magosso. "Effect of Cushing response on systemic arterial pressure", IEEE Engineering in Medicine and Biology Magazine 28(6): 63-71, 2009.
- Viceconti, M., Affatato, S., Baleani, M., Bordini, B., Cristofolini, L., Taddei, F., 2009. Pre-clinical validation of joint prostheses: a systematic approach. J. Mechanical Behavior of Biomedical Materials 2, 120-127.
- F. Veronesi, E.G. Caiani, E. Toledo, C. Corsi, K.A. Collins, G. Lammertin, C. Lamberti, R.M. Lang, V. Mor-Avi. Semi-automated analysis of dynamic changes in myocardial contrast from real-time three-dimensional echocardiographic images as a basis for volumetric quantification of myocardial perfusion. European Journal of Echocardiography vol. 10(4):485-490, 2009.
- F. Veronesi, C. Corsi, L. Sugeng, V. Mor-Avi, E.G. Caiani, L. Weinert, C. Lamberti, R.M. Lang. A Study of Functional Anatomy of Aortic-Mitral Valve Coupling Using 3D Matrix Transesophageal Echocardiography Circulation: Cardiovascular Imaging vol. 2(1):24-31, 2009.
- Zavaglia M, Cona F, Ursino M., "A neural mass model to simulate different rhythms in a cortical region", Computational Intelligence and Neuroscience. Vol. 2010, Article ID 456140, 8 pages, Epub 2009 Dec 1.

<u>2010</u>:

- F.Bagalà, V.L.Fuschillo, L.Chiari, A.Cappello (2011). Calibrated 2D Angular Kinematics by Single-Axis Accelerometers: From Inverted Pendulum to N-Link Chain, In press IEEE SENSORS JOURNAL.
- M. Benocci, C. Tacconi, E. Farella, L. Benini, L. Chiari, L. Vanzago, "Accelerometer-based fall detection using optimized ZigBee data streaming", Microelectron. J., Vol. 41(11), pp. 703-10, November 2010 [DOI: 10.1016/j.mejo.2010.06.014]
- L. Bertozzi, R. Stagni, S. Fantozzi, A. Cappello, 2010. In-vivo estimation of the tibio-femoral contact area using thin-plate splines tool. Journal of Mechanics in Medicine and Biology, vol. 10(2), 237-249. doi: 10.1142/10.1142/S0219519410003332.
- M.C. Bisi, R. Stagni, A. Cappello, G. Gnudi, 2010. Non-circular chain-ring allows a reduction of joint loading in cycling. Journal of Mechanics in Medicine and Biology, vol. 10(1), 113-122. doi: 10.1142/S0219519410003228.
- M.C. Bisi, R. Stagni, G. Gnudi, 2010. AUTOMATIC DETECTION OF MAXIMAL OXYGEN UPTAKE AND VENTILATORY THRESHOLD. Comp. Byol. & Med. http://dx.doi.org/10.1016/j.compbiomed.2010.11.001.
- M.C. Bisi, R. Stagni, G.Gnudi, 2010. Sensitivity analysis of an energetic muscle model applied at whole body level in recumbent cycling. Computer Methods in Biomechanics and Biomedical Engineering.
- E. G. Caiani, A. Redaelli, O. Parodi, E. Votta, F. Maffesanti, E. Tripoliti, G. Nucifora, D. De Marchi, G. Tarroni, M. Lombardi, C. Corsi, "Development and validation of Automated Endocardial and Epicardial Contour Detection for MRI Volumetric and Wall Motion Analysis" ISSN 0276-6574 Computing in Cardiology 2010; 37: 1083-1086.
- Ceroni F., Furini S., Giordano E. and S. Cavalcanti. Rational design of modular circuits for gene transcription: A test of the bottom-up approach. J. Biol. Eng. (2010) 4:14.

- E. Ceseracciu E, S. Ceccon, Z. Sawacha, S. Fantozzi, M. Cortesi, C. Cobelli, G. Gatta. Application of CAST technique to 3D motion analysis of front crawl swimming XIth International Symposium on Biomechanics and Medicine in Swimming, pp. 91, 16-19 June 2010, Oslo.
- E. Ceseracciu, Z. Sawacha, S. Fantozzi, M. Cortesi, S. Ceccon, G. Dona', S. Corazza, G. Gatta, C. Cobelli. Markerless analysis of front crawl swimming. XIth International Symposium on Biomechanics and Medicine in Swimming, pp. 64, 16-19 June 2010, Oslo
- C. Cuppini, M. Ursino, E. Magosso, B. A. Rowland, B. E. Stein. "An Emergent Model of Multisensory Integration in Superior Colliculus Neurons", Frontiers in Integrative Neuroscience Vol. 4, Article 6, 2010
- A.G.Cutti, A.Ferrari, P.Garofalo, M.Raggi, Cappello A., A.Ferrari (2010). "Outwalk": a protocol for clinical gait analysis based on inertial and magnetic sensors. MEDICAL & BIOLOGICAL ENGINEERING & COMPUTING, vol. 48; p. 17 - 25, ISSN: 0140-0118
- M. Fabbri, F. Pizza, E. Magosso, M. Ursino, S. Contardi, F. Cirignotta, F. provini, P. Montagna "Automatic slow eye movements (SEM) detection of sleep onset in patients with obstructive sleep apnea syndrome (OSAS): comparison between multiple sleep latency test (MSLT) and maintainance of wakefulness test (MWT)" Sleep Medicine 11(3): 253-257, 2010.
- A. Ferrari, A.G. Cutti, Cappello A. (2010). A new formulation of the coefficient of multiple correlation to assess the similarity of waveforms measured synchronously by different motion analysis protocols. GAIT & POSTURE, vol. 31; p. 540 - 542, ISSN: 0966-6362
- A.Ferrari, A.G.Cutti, P.Garofalo, M.Raggi, M.Heijboer, Cappello A., A.Davalli (2010). First in vivo assessment of "Outwalk": a novel protocol for clinical gait analysis based on inertial and magnetic sensors. MEDICAL & BIOLOGICAL ENGINEERING & COMPUTING, vol. 48; p. 1 - 15, ISSN: 0140-0118
- A. Ferrari, L. Tersi, A. Ferrari, A. Sghedoni, L. Chiari, "Functional reaching discloses perceptive impairment in diplegia children with cerebral palsy", Gait Posture, Vol. 32(2), pp. 253-8, June 2010.
- Focarete M.L., Gualandi C., Scandola M., Govoni M., Giordano E., Foroni L., Valente S., Pasquinelli G., Gao C. and R.A. Gross. Electrospun scaffold of a polyhydroxyalkanoate consisting of w-hydrohylpentenoate repeat units: fabrication and in vitro biocompatibility studies. *J. Biomater. Sci. Polymer* Ed. (2010) 21:1283.
- G. Gatta, S. Fantozzi, M. Cortesi, F. Patti, M. Bonifazi.The Mechanical Power Output in Water Polo Game: a Case Report, XIth International Symposium on Biomechanics and Medicine in Swimming, pp. 84-85, 16-19 June 2010, Oslo.
- Giordano E., Flamigni F., Guarnieri C., Muscari C., Pignatti C., Stefanelli C., Tantini B and C.M. Caldarera. Polyamines in cardiac physiology and disease. Open Heart Fail. J. (2010) 3:25.
- Govoni M., Bonavita F., Shantz L.M., Guarnieri C. and E. Giordano. Overexpression of ornithine decarboxylase increases myogenic potential of H9c2 rat myoblasts. Amino Acids (2010) 38:541.
- E Grandi, S Morotti, KS. Ginsburg, S Severi and DM. Bers: Interplay of Voltage and Ca-dependent inactivation of L-type Ca current. Progr Biophys Mol Biol 2010 Sep;103(1):44-50
- Juszczyk, M., Cristofolini, L., Kaniuk, J., Schileo, E., Viceconti, M., 2010. Novel method to determine time and location of fracture initiation in bones. J. Strain Analysis in Engineering Design 45, 481-493.
- Juszczyk, M., Schileo, E., Martelli, S., Cristofolini, L., Viceconti, M., 2010. A method to improve experimental validation of Finite Element models of long bones. Strain 46, 242-251.
- N. Kachenoura, F. Veronesi, J.A. Lodato, C. Corsi, R. Mehta, B. Newby, R.M. Lang, V. Mor-Avi, Volumetric Quantification of Myocardial Perfusion using Analysis of Multi-Detector Computed Tomography 3D Datasets: Comparison with Nuclear Perfusion Imaging, European Radiology, Eur Radiol. 20(2):337-47, 2010.
- J. Klenk, C. Becker, F. Lieken, S. Nicolai, W. Maetzler, W. Alt, W. Zijlstra, J.M. Hausdorff, R.C. van Lummel, L. Chiari, U. Lindemann, "Comparison of acceleration signals of simulated and real-world backward falls", Med. Eng. Phys., 2010 Nov 29. [Epub ahead of print - doi:10.1016/j.medengphy.2010.11.003]

- M Kruger, S Severi, K Rhode, S Genovesi, FM Weber, A Vincenti, P Fabbrini, G Seemann, R Razavi, O Doessel: Alterations of Atrial Electrophysiology related to Hemodialysis Session: Insights from a Multi-Scale Computer Model. J Electrocardiol 2011 In press
- M. Lemmo, A. Azarine, G. Tarroni, C. Corsi, C. Lamberti, "Estimation of Right Ventricular Volume, Quantitative Assessment of Wall Motion and Trabeculae Mass in Arrhythmogenic Right Ventricular Dysplasia" ISSN 0276-6574 Computing in Cardiology 2010; 37: 805-808.
- E. Magosso, M. Ursino, M. Zavaglia, A. Serino, G. di Pellegrino. "Visuotactile representation of peripersonal space: a neural network study", Neural Computation 22(1): 190-243, 2010
- E. Magosso, A. Serino, G. di Pellegrino, M. Ursino. "Crossmodal links between vision and touch in spatial attention: A computational modelling study", Computational Intelligence and Neuroscience vol. 2010, Article ID 304941, 2010.
- E. Magosso, M. Ursino, G. di Pellegrino, E. Làdavas, A. Serino. "Neural bases of peri-hand space plasticity through tool-use: Insights from a combined computational-experimental approach", Neuropsychologia 48: 812-830, 2010.
- E. Magosso. "Integrating information from vision and touch: A neural network modelling study", IEEE Transactions on Information Technology in Biomedicine 14(3): 598-612, 2010.
- M. Manca, M. Mancini, G. Ferraresi, L. Chiari, M. Sensi, M. Cavallo, R. Quatrale, "Effect of Globus Pallidus internus stimulation on gait in multi-focal dystonia: a case study", Clin. Neurophysiol., Vol. 121(3), pp. 453-6, March 2010.
- R. Mignani, C. Corsi, M. De Marco, E.G. Caiani, G. Santucci , E. Cavagna, S. Severi, L. Cagnoli, Automatic kidney volume measurement in ADPKD based on MRI without injection of contrast medium, American Journal of Nephrology, in press.
- R Mignani, C Corsi, M De Marco, E.G. Caiani, G Santucci, E Cavagna, S Severi, L Cagnoli: Assessment of kidney volume in polycystic kidney disease using MRI without contrast medium. Am J Nephrol 2011 In press
- Muscari C., Capanni C., Giordano E., Stefanelli C., Bonavita F., Stanic I., Bonafè F., Caldarera C.M. and C. Guarnieri. Leupeptin preserves cardiac nitric oxide synthase 3 during reperfusion following long-term cardioplegia. *J. Surg. Res.* (2010) 164:e27.
- M. Pirini, L. Chiari, M. Ursino, "An efficient DWT-ICA approach for artifact removal in EEG", International J. Bioelectromagn. (in press)
- M. Pirini, M. Mancini, E. Farella, L. Chiari, "EEG correlates of postural audio-biofeedback", Hum. Mov. Sci., 2010 Aug 26. [Epub ahead of print - DOI: 10.1016/j.humov.2010.05.016]
- Ruan Y, Denegri M, Liu N, Bachetti T, Seregni M, Morotti S, Severi S, Napolitano C, Priori SG: Trafficking defects and gating abnormalities of a novel SCN5A mutation questions gene-specific therapy in long QT Syndrome type 3. Circ Res, 2010; 106(8):1374-83
- S Severi, D Pogliani, G Fantini, P Fabbrini, MR Viganò, E Galbiati, G Bonforte, A Vincenti, A Stella and S Genovesi: Alterations of atrial electrophysiology induced by electrolyte variations: combined computational and P-wave analysis. Europace 2010 Jun;12(6):842-9
- R. Stagni, S. Fantozzi, F. Catani, A. Leardini. 2010. Can Patellar Tendon Angle reveal sagittal kinematics in Total Knee Arthroplasty?. Surgery, Sports Traumatology, Arthroscopy, vol 18(7), 949-954. doi 10.1007/s00167-010-1075-7.
- Spinelli, M., Affatato, S., Cristofolini, L., Erani, P., Tigani, D., Viceconti, M., 2010. Combined wear behaviour and long-term implant-bone fixation of total knee replacement: a novel in vitro set-up. Artif Organs 34, E177-E183.
- Taddei, F., Martelli, S., Gill, H.S., Cristofolini, L., Viceconti, M., 2010. Finite element modelling of resurfacing hip prosthesis: estimation of accuracy through experimental validation. Journal of Biomechanical Engineering (ASME) 132, 021002 (021011 pages).
- G. Tarroni, A. R. Patel, F. Veronesi, J. Walter, C. Lamberti, R. M. Lang, V. Mor-Avi, C. Corsi, "MRI-Based Quantification of Myocardial Perfusion at Rest and Stress Using Automated Frame-by-Frame Segmentation and Non-Rigid Registration" ISSN 0276-6574 Computing in Cardiology 2010; 37: 1-4.
- Traina, F., Cristofolini, L., De Fine, M., Brunetti, L., Frakulli, I., Abati, C.N., D'Uva, L., Toni, A., 2010. A reproducible and inexpensive method of measuring hip abductor strength. Hip Int 20, 512-517.
- A. Tura, M. Raggi, L. Rocchi, A.G. Cutti, L. Chiari, "Gait symmetry and regularity in

transfemoral amputees assessed by trunk accelerations", J Neuroeng. Rehabil., 7(1):4, 19 January 2010.

- M. Ursino, C. Cuppini, E. Magosso. "A semantic model to study neural organization of language in bilingualism", Computational Intelligence and Neuroscience. Vol. 2010, Article ID 350269, 2010
- M. Ursino, C. Cuppini, E. Magosso. "A computational model of the lexical-semantic system based on a grounded cognition approach", Frontiers in Psychology Vol. 1, Article 221, 2010
- Ursino M, Cona F, Zavaglia M. "The generation of rhythms within a cortical region: Analysis of a neural mass model.", Neuroimage. Vol.52 , 1080–1094, 2010
- Ursino M, Giannessi M. "A Model of Cerebrovascular Reactivity Including the Circle of Willis and Cortical Anastomoses.", Ann Biomed Eng. 2010 Jan 22. [Epub ahead of print]
- Varini, E., Bialoblocka-Juszczyk, E., Lannocca, M., Cappello, A., Cristofolini, L., 2010. Assessment of implant stability of cementless hip prostheses through the frequency response function of the stem-bone system Sensors and Actuators A: Physical 163, 526-532.
- A. Zijlstra, M. Mancini, L. Chiari, W. Zijlstra, "Biofeedback for training balance and mobility tasks in older populations: a systematic review", J Neuroeng. Rehabil. 7:58, 9 December 2010.

COLLABORATION WITH OTHER INSTITUTIONS (OPTIONAL)

Universities:

- Cardiovascular genetic program, Leon H. Charney Division of Cardiology, New York University school of medicine, New York, USA
- Centre for Human Movement Sciences, University of Groningen, NL
- Center of Molecular Medicine (C.I.M.M.B.A.), University of Firenze, Firenze
- Department of Neurodegeneration, University of Tuebingen, Germany
- Department of Pharmacology, University of California, Davis, CA, USA
- Department of Physiology, Pharmacology and Biochemistry, Favaloro University, Buenos Aires, Argentina
- Department of Clinical Sciences, "Luigi Sacco, University of Milano (Dott.. M. Rosanova)
- Dept. Of Human and General Physiology, University of Bologna (Dott.. A. Silvani).
- Division of Cardiology, Department of Medicine, Edward F. Hebert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, MD, USA
- Laboratory of Movement Analysis and Measurement, Ecole Polytechnique Fédérale de Lausanne, CH
- Oxford University Computing Laboratory
- Politecnico di Milano, Italy
- Politecnico di Torino, Italy
- Università di Milano-Bicocca, Milano
- University of Padova, Italy
- University of Siena, Italy
- University of Florida College of Medicine, Gainesville, Florida, USA (Department of Anaesthesiology, Prof. Johannes H. van Oostrom)
- Wake Forest University School of Medicine, Winston-Salem, North Carolina, USA (Department of Neurobiology and Anatomy, Prof. Barry E. Stein)
- Wellcome Trust Centre for Neuroimaging, University College London (Prof. W. Penny)

Research Centers:

- Balance Disorders Lab, Neurological Sciences Institute, Oregon Health & Science University, Portland-Beaverton, OR, USA
- Center for Cognitive Neurosciences, Cesena, Italy (Prof. E. Ladavas)
- Department of Biocybernetics, Institute of Normal & Pathological Physiology, Slovak

Academy of Science, Bratislava, SK
- IRST Meldola (FC)
- Istituto Nazionale per le Ricerche Cardiovascolari (Bologna)
- Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (Meldola – FC)
- Istituto di Scienza e Tecnologie dei Materiali Ceramici (Faenza – RA)
- Molecular Cardiology, IRCCS Fondazione Salvatore Maugeri, Pavia

Medical Institutions:
- Cardiology Center "Fondazione Monzino" IRCCS (Milano)
- Cardiovascular Dept, Santa Maria delle Croci Hospital, Ravenna
- Centre Hospitalier Mahnes, Fleury, France
- Clinica Nefrologica, Azienda Ospedaliera S Gerardo, Monza
- Department of Clinical Gerontology, Robert Bosch Gesellschaft fuer medizinische Forschung, Stuttgart, Germany
- Dipartimento Integrato di Neuroscienze, Università degli Studi di Modena e Reggio Emilia & Azienda USL di Modena, Modena, Italy
- Division of Nephrology and Dialysis, Infermi Hospital, Rimini
- Electrophisiology and Cardiac Pacing Unit, San Gerardo Hospital, Monza
- Hospital de La Pitie, Paris, France
- Hospital Tenon, Paris, France
- Hospital Saint-Louis, Saintes Cedex, France
- Istituto Ortopedico Rizzoli, Bologna
- Laboratorio di Analisi del Movimento - Arcispedale S.Anna, Ferrara, Italy
- Laboratory for Gait & Neurodynamics, Tel-Aviv Sourasky Medical Center, IL
- "L. Sacco" Hospital (Milano)
- Nephrology Unit, Sant'Anna Hospital, Como, Italy
- Ospedale S. Orsola-Malpighi, Bologna
- University of Chicago (USA) Department of Medicine

Other:
- Bellco a.r.l.
- EXEL srl, Bologna, Italy
- Healthcare Systems, Philips Research North America (Ing. N. Chbat)
- Honeywell International sro, Prague, CZ
- Hospal SpA
- INAIL, Vigorso, Italy (www.inail-ricerca.it)
- Italian roller skating federation
- Khymeia srl, Noventa Padovana (PD), Italy
- Medtronic Italia s.p.a, Milano
- Mortara Instrument, Milwaukee, WI, USA and Mortara Rangoni Europe s.r.l., Casalecchio di Reno
- Noemalife spa, Bologna, Italy
- R&D, Gambro Dasco S.p.A., Medolla (MO)
- STMicroelectronics spa, Agrate Brianza (MI), Italy