



VII ANNUAL MEETING

**ITALIAN CHAPTER
EUROPEAN SOCIETY OF BIOMECHANICS**

**ROME 2017
28-29 September**



ESB-ITA 2017

Programme



UNIVERSITY OF ROME
TOR VERGATA



Thursday - 28 September 2017

morning

08:00 **Registration**

09:00 **Meeting Opening Ceremony**

Keynote Lectures

Chairman: Anna Pandolfi

09:30 Philippe Büchler - University of Bern, Switzerland
A biomechanical model of the cornea to guide refractive interventions

10:00 Rodolfo Repetto - University of Genoa, Italy
Models of fluid flow in the vitreous chamber and generation of vitreoretinal tractions

10:30 **Coffee break + free poster exhibition**

Thematic Session [TS1] *Ocular Biomechanics*

Chairman: Philippe Büchler

11:00 E. Lipari, A. Sborgia, M. Nubile, L. Mastropasqua, G. Alessio - *Polarimetric interferometry to objectively evaluate the optical properties of corneal stroma* *

11:15 L. Sala, C. Prud'homme, M. Szopos, G. Guidoboni - *Towards a full model for ocular biomechanics, fluid dynamics and hemodynamics* *

11:30 R. Sacco, A.G. Mauri, A. Cardani, B.A. Siesky, G. Guidoboni, A. Harris - *Multiscale modeling and simulation of neurovascular coupling in the retina*

11:45 M. Dvoriashyna, A. Foss, E. Gaffney, O. Jensen, R. Repetto - *A mathematical model of fluid transport across the retinal pigment epithelium* *

12:00 F. Salerni, R. Repetto, A. Harris, P. Pinsky, C. Prud'homme, M. Szopos, G. Guidoboni - *Mathematical modelling of ocular and cerebral hemo-fluid dynamics: application to VIIP* *

12:15 F. Recrosi, R. Repetto, A. Tatone, G. Guidoboni - *Thermodynamical derivation of a nonlinear poroelastic model describing hemodynamics-mechanics interplay in the Lamina Cribrosa* *

12:30 M. Ferroni, M. Cereda, F. Boschetti - *Saccadic movement effects on intraocular drug delivery for a wet-AMD clinical case* *

12:45 A. Stocchino, R. Repetto, M. Romano - *Assessment of the fluid dynamic performance of a vitreous cutter*

13:00 **Lunch + free poster exhibition**

(*) Eligible for the ESB-ITA Best Oral Presentation Award 2017

Thursday - 28 September 2017

afternoon

Thematic Session [TS2] Ocular Biomechanics

Chairman: Rodolfo Repetto

- 14:00 M.Á Ariza-Gracia, D.P. Piñero, J.F. Rodríguez, B. Calvo - *Computational corneal biomechanics in clinic* *
- 14:15 V. Romano, Zhuola, Z. Chang, B. Steger, H. Levis, S. Kaye, R. Akhtar - *Biomechanical evaluation of central and peripheral Descemet membrane endothelial graft* *
- 14:30 M. Vasta, A. Gizzi, A. Pandolfi - *A stochastic model of stroma: interweaving variability and compressed fibril exclusion*
- 14:45 P. Davvallo Khongar, J.O. Pralits, X. Cheng, P. Pinsky, P. Soleri, R. Repetto - *Effect of an iris-fixated intraocular lens on corneal metabolism: a numerical study* *
- 15:00 M.Á Ariza-Gracia, W.Wu, M.Malve, B.Calvo, J.F. Rodriguez Matas - *Fluid-structure interaction of the non-contact tonometry test*
- 15:15 A. Montanino, M. Angelillo, A. Pandolfi - *A meshfree approach to cornea-aqueous humor interaction during tonometry tests* *

15:30 **Coffee break + free poster exhibition**

General Session [GS1] Cell Mechanics and Tissue Engineering; Miscellany

Chairman: Federica Caselli

- 16:00 D. Massai, E. Bolesani, D. Robles Diaz, C. Kropp, H. Kempf, C. Halloin, U. Martin, T. Braniste, G. Isu, V. Harms, U. Morbiducci, G. Dräger, R. Zweigerdt - *Peristaltic pump-based circulation can promote insulin precipitation in hPSC culture media* *
- 16:15 S. Silvani, I. Cattaneo, M. Figliuzzi, A. Remuzzi - *Effect of substrate mechanical properties on alveolar epithelial cells*
- 16:30 A. Sensini, M.L. Focarete, C. Gualandi, A. Zucchelli, G. Tozzi, L. Boyle, G. Reilly, L. Cristofolini - *Fabrication and characterization of electrospun scaffolds for tendon reconstruction* *
- 16:45 C. Falcinelli, Z. Li, W. Lam, G. Stanisz, A. Agur, C. Whyne - *3D muscle fibre arrangement derived from diffusion-tensor imaging: a validation study* *
- 17:00 P. Lenarda, A. Gizzi, M.Paggi - *A computational framework for electromechanical contact between excitable deformable cells* *
- 17:15 M. Zingales, G. Marchiori, E. Bologna, D. Spadaro, L. Camarda, M. Berni, N.F. Lopomo - *Time-dependent behaviour of native ligament and synthetic grafts used in ACL reconstruction* *

Master Thesis Award Session

Chairman: Giuseppe Vairo

- 17:30 Elisabetta Monaldo - *Modelling and simulation of fluid-structure interaction in arterial vessels via a multiscale constitutive framework*
- 17:40 Andrea Mainardi - *Towards the knee on a chip: development of a microfluidic platform for the mechanical stimulation of three dimensional cartilaginous constructs*
- 17:50 Claudia Atzeni - *Modelling of leukocyte motion in hepatic sinusoids using the Volume of Fluid (VOF) method*
- 18:00 Martina Genta - *Endothelial cells response to combined loading from flow and substrate deformation: a quantitative analysis*

18:20 **Day 1 Closure**

20:30 **Social Dinner**

(*) Eligible for the ESB-ITA Best Oral Presentation Award 2017

Friday - 29 September 2017

morning

08:30 **Registration**

General Session [GS2] Cardiovascular CFD, Hemodynamics

Chairman: Umberto Morbiducci

- 09:00 M.D. de Tullio - Numerical assessment of blood damage through prosthetic heart valves
- 09:15 D. Gallo, P. Bijari, U. Morbiducci, Y. Qiao, Y. Xie, D. Haabets, B. Wasserman, D.A. Steinman - Hemodynamic factors associations with early atherosclerotic changes at the carotid bifurcation *
- 09:30 S. Migliori, M. Bologna, E. Montin, G. Dubini, C. Aurigemma, F. Burzotta, L. Mainardi, F. Migliavacca, C. Chiastra - Reconstruction of stented coronary arteries for CFD analyses: from in vitro to patient-specific models *
- 09:45 A. Finotello, S. Morganti, S. Marconi, R. Romarowski, P. Totaro, F. Auricchio - Double aortic arch: Engineering support to decision making process *
- 10:00 F. Piatti, D. Belkacemi, A. Caimi, F. Sturla, A. Greiser, F. Pluchinotta, M. Carminati, A. Redaelli - On the potential of 4D Flow in guiding CFD analyses: a case study of aortic coarctation *
- 10:15 K. Capellini, E. Costa, M.E. Biancolini, E. Vignali, V. Positano, L. Landini, S. Celi - An image-based and RBF mesh morphing CFD simulation for aTAA hemodynamic *

10:30 **Coffee break + free poster exhibition**

General Session [GS3] Cardiovascular Tissues, Devices and Treatments

Chairman: Michele Marino

- 11:00 F. Sturla, O.A. Pappalardo, M. Selmi, F. Onorati, G. Faggian, E. Votta, A. Redaelli - Biomechanical outcomes of the Mitraclip® procedure: A finite element analysis
- 11:15 D. Allegretti, F. Berti, L. Petrini, G. Pennati, P. Nithiarasu, S. Pant - Identification of NiTi stent material parameters through surrogate-assisted optimisation *
- 11:30 G. Vivoli, E. Gasparotti, M. Rezzaghi, M. Mariani, V. Positano, S. Berti, L. Landini, S. Celi - 3D left atrial appendage modelling: a multimodal imaging approach *
- 11:45 B.M. Fanni, E. Gasparotti, S. Celi, V. Positano, F. Faita, N. Di Lascio, L. Landini, S. Schievano, C. Capelli - Image-based mechanical characterization of large blood vessels *
- 12:00 G.M. Formato, F. Auricchio, A. Frigiola, M. Conti - Luminal narrowing of anomalous coronary arteries: a parametric structural finite element analysis *
- 12:15 D. Bianchi, M. Marino, G. Vairo, P. Wriggers - A computational approach for the coupled chemo-mechano-biological remodelling of arterial tissue constituents *

13:00 **Lunch + free poster exhibition**

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Friday - 29 September 2017

afternoon

General Session [GS4] Orthopaedic Biomechanics; Motion Analysis (1)

Chairman: Rita Stagni

14:00 L. La Barbera, F. Berti, A. Piovesan, D. Allegretti, C. Ottardi, T. Villa, G. Pennati - *Spinal rods contouring: an experimental and finite element study to control fatigue* *

14:15 M.L. Ruspi, M. Palanca, L. Cristofolini - *In vitro full-field strain investigation in intact spine and spinal fixator by means of Digital Image Correlation* *

14:30 B. Innocenti, S. Pianigiani - *Biomechanical analysis of augments in revision total knee arthroplasty*

14:45 P. Vena, D. Gastaldi - *Effect of anisotropic permeability on the dynamic response of cartilage under nanoindentation*

15:00 P. Tamburini, M.C. Bisi, R. Stagni - *Frequency content of gait trunk acceleration: a longitudinal study* *

15:15 V.-D. Tran, P. Dario, S. Mazzoleni - *An upper limb musculoskeletal model including acromioclavicular joint ligaments: preliminary results* *

15:30 **Poster Session [PS]**

16:00 **Coffee break + free poster exhibition**

General Session [GS5] Orthopaedic Biomechanics; Motion Analysis (2)

Chairman: Cristina Falcinelli

16:30 M. Terzini, E.M. Zanetti, A.L. Audenino, L. Gastaldi, S. Pastorelli, E. Panero, A. Sard, C. Bignardi - *Multibody modelling of ligamentous and bony stabilizers in the elbow joint* *

16:45 M. Mannisi, A. Dell'Isola, M.S. Andersen, J. Woodburn - *Musculoskeletal modelling of gait modification in knee osteoarthritis: stairs ascent and descent* *

17:00 R. Di Marco, E. Scalona, E. Palermo, C. Mazzà - *Repeatability analysis of a novel multi-segment model of the foot-ankle complex* *

17:15 D. Giansanti, M. Gionni, G. Maccioni, S. Morelli, C. Daniele, G. D'Avenio, M. Grigioni - *The powered exoskeleton introduction in tele rehabilitation: from the dream to the reality*

17:45 **ESB-ITA Assembly; Executive Board Election; Awards Ceremony**

19:00 **Meeting Closure**

(*) Eligible for the ESB-ITA Best Oral Presentation Award 2017

Poster Session [PS]

Ocular Biomechanics

- * Zhuola, S. Barrett, Y.A. Kharaz, E. Comerford, R. Akhtar - *Nano-structure and mechanical changes in sclera following proteoglycan depletion*
- * F. Stefanoni, A. Harris, M. Szopos, C. Prud'homme, R. Sacco, D. Messenio, M.L. Costantino, G. Guidoboni - *Clinical assessment of intraocular pressure: a whole eye dynamic model*
- * A. Kazaili, R. Akhtar - *Ultrastructural and nanomechanical changes of the cornea following enzymatic degradation*
- * I. Nepita, L. Liggieri, E. Santini, F. Ravera, M.R. Romano, J.O. Pralits, R. Repetto - *The effect of serum proteins on dynamic interfacial properties of silicone oils in vitrectomized eyes*

Cardiovascular CFD, Hemodynamics

- * K. Calò, M. Owais Khan, D. Gallo, S. Scarsoglio, D.A. Steinman, L. Ridolfi, U. Morbiducci - *Exploring intracranial aneurysm hemodynamics with a complex networks approach*
- * G. D'Avenio, M. Grigioni - *Comparison of blood-damage-related turbulence descriptors in the flow field of heart valves*
- * M. Bozzetto, P. Brambilla, B. Ene-Iordache, A. Remuzzi - *Novel strategies for patient-specific modelling of arteriovenous fistula for hemodialysis*
- * A. Dimasi, D. Piloni, L. Spreafico, M. Meskin, E. Votta, R. Vismara, G.B. Fiore, L. Fusini, M. Muratori, P. Montorsi, M. Pepi, A. Redaelli - *Hemodynamic insights of bileaflet mitral prosthetic valve thrombosis: a CFD study*

Cardiovascular Tissues, Devices and Treatments

- * N. Casalini, G. Luraghi, F. Migliavacca, J.F.R. Matas - *On the importance of anisotropy in biological materials: application to aortic tissues*
- * G. Rossini, M. Sabbatini, F. Sturla, A. Della Corte, C. Bancone, S. Dellegrottaglie, A. Redaelli, E. Votta - *Impact of leaflets solid elements discretization on patient-specific aortic root FE models biomechanics*
- * E. Lanzarone, M. Conti, S. Marconi, H.W.L. De Beaufort, S. Trimarchi, F. Auricchio - *Alteration of lumped parameters under stent graft in ex-vivo porcine aortas*
- * E. Monaldo, D. Bianchi, A. Gizzi, M. Marino, S. Filippi, G. Vairo - *Computational multiscale modelling of fluid-structure interaction in arterial vessels: Tissue mechanics and wall shear stress analysis*
- * Z. Chang, M.L. Hansen, P.-Y. Chen, P. Paoletti, L.M. Rasmussen, R. Akhtar - *Nanoscale characterisation of human internal mammary artery with high pulse wave velocity*
- * F. Berti, A. Bertini, D. Allegretti, G. Pennati, F. Migliavacca, L. Petrini - *The role of inelastic deformations in the mechanical response of endovascular nickel-titanium devices*
- * E. Gasparotti, E. Vignali, K. Capellini, G. Vivoli, A.G. Cerillo, V. Positano, S. Berti, L. Landini, S. Celi - *A FE tool to simulate a trans-catheter anchor-based system for mitral valve regurgitation*

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Poster Session [PS]

Motion Analysis

M.C. Bisi, R. Stagni - *Assessment of changes in movement complexity and movement automaticity with maturation*

G. Pacini Panebianco, R. Stagni, S. Fantozzi - *Gait parameters estimation using inertial sensors: comparative analysis of 12 methods*

- * A. Palazzo, F. Crenna, G.B. Rossi - *Biomechanical power measurement in vertical jump*

Orthopaedic Biomechanics

- * A. Aldieri, M. Terzini, A.M. Priola, G. Osella, A. Veltri, A.L. Audenino, C. Bignardi - *Hip fracture risk prediction through FE analysis: influence of HSA parameters*

B. Innocenti, G. Rosellini, S. Pianigiani - *Single-radius vs J-curved femoral designs during walking and squatting*

- * J. Pitocchi, S. Paletti, B. Cominoli, F. Taddei, E. Schileo - *Does cortical bone mapping improve FE strain prediction accuracy at the proximal femur?*

G. Villani, D. Bianchi, M. Marino, G. Vairo - *A simple mechanical model of mineralized collagen fibrils*

- * G. Putame, M. Terzini, C. Bignardi, P. Costa, E. Zanetti, A.L. Audenino - *Biomechanical evaluation of an intramedullary nailing device by multibody analysis*

Cell Mechanics and Tissue Engineering

G. Marchiori, M. Berni, M. Petretta, M. Berni, C. Gualandi, M. Boi, D. Bellucci, M. L. Focarete, V.

- * Cannillo, B. Grigolo, M. Bianchi - *Novel procedure to design 3D printed composite scaffolds for trabecular bone regeneration*

- * P.N. Sergi, I. Tonazzini, M. Cecchini, S. Micera - *Hybrid modelling of neuron-like cells response to gratings*

- * F. Caselli, A. De Ninno, R. Reale, P. Bisegna - *Electrical impedance based monitoring of cells flowing in a microchannel*

Miscellany

- * A. Rizzo, D. Bianchi, G.M. Russo, M. Russo, R. Ferrante, G. Vairo - *A computational model for brain-shift assessment in neurosurgery*

- * D. Bianchi, C. Lorenzi, D. Severino, L. Arcuri, A. Dolci, G. Vairo - *Mechanical behaviour of dental treatments based on an anatomic-functional-geometry (AFG) technique*

G. D'Avenio, A. Amodeo, M. Grigioni - *The role of additional pulmonary blood flow in the cavopulmonary anastomosis*

- * L. Cacopardo, N. Guazzelli, R. Nossa, G. Mattei, A. Ahluwalia - *Engineering viscoelasticity in biomaterials*

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