IMT SCUOLA ALTI STUDI LUCCA

GIMC Gruppo Italiano di Meccanica Computazionale

GMA Gruppo Materiali AIMETA

XXI CONVEGNO ITALIANO DI MECCANICA COMPUTAZIONALE

VIII RIUNIONE DEL GRUPPO MATERIALI AIMETA

LUCCA, 27 - 29 GIUGNO 2016

AUDITORIUM SAN MICHELETTO
Via San Micheletto, 3

Con il patrocinio di:

Città di Lucca

PROVINCIA di Lucca

CONFINDUSTRIA TOSCANA NORD
Lucca Pistoia Prato

Con il supporto di:

Fondazione Cassa di Risparmio di Lucca

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http://gimc-gma2016.imtlucca.it/

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Programma generale / Program at a glance

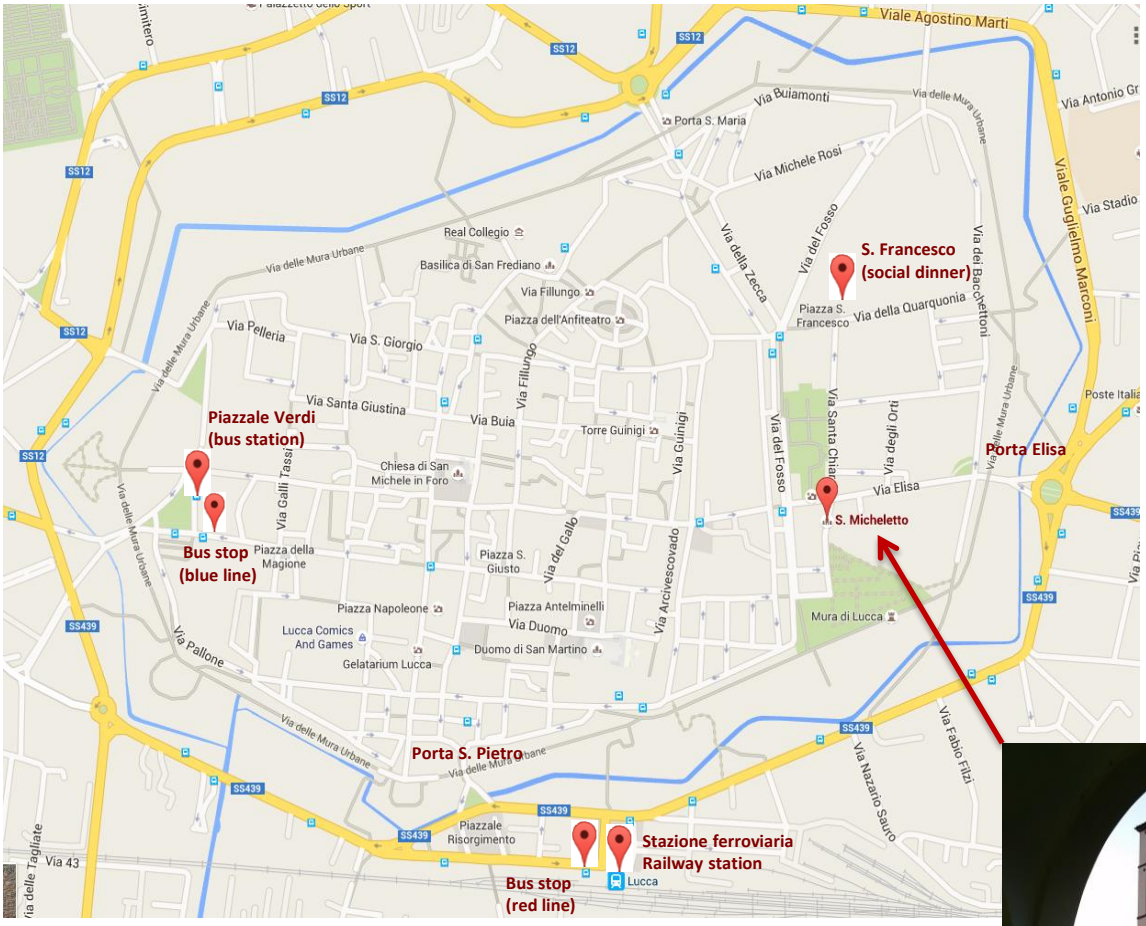
June 26, 2016
17:00 – 19:00 Registration and welcome reception

June 27, 2016
08:00 – 09:00 Registration
09:00 – 09:15 Opening
09:15 – 10:00 Plenary lecture
10:00 – 13:10 Sessions
13:10 – 14:10 Lunch
14:10 – 15:50 Sessions
16:10 – 17:30 GIMC and GMA assemblies
17:30 – 19:30 Guided excursion in Lucca: Santa Caterina church and Prefecture

June 28, 2016
09:00 – 09:45 Plenary lecture
09:50 – 13:00 Sessions
13:00 – 14:00 Lunch
14:00 – 17:30 Sessions (including GIMC Best PhD theses awards)
17:40 – 18:40 ICAR/08 general assembly
20:00 Social dinner in the IMT San Francesco Campus, P.zza San Francesco 19

June 29, 2016
09:00 – 13:10 Sessions
13:10 – 14:00 Lunch

Location / Sito della conferenza



Via San Micheletto, 3

Bus transportation to San Micheletto:

From Stazione FS: **red line** direction San Vito, stop in S. Nicolao

From Piazzale Verdi: **blue line** direction Ospedale S. Luca till Stazione FS and then **red line** as before

GIMC-GMA 2016, IMT School for Advanced Studies Lucca
Programma / Program

Lunedì 27 Giugno / Monday, June 27th

09:15	**Plenary Professor Auricchio** 3D printing: a bridge to the future

	GIMC Chairperson: U. Perego		GMA Chairperson: S. Bennati	
10:00	Mixed finite elements for fiber-induced anisotropy	*F. Auricchio, G. Scalet, J. Schröder, P. Wriggers*	Numerical implementation of flexural waves in infinite beams: a new Perfectly Matched Layer model	*M. Brun, M. Morvaridi*
10:20	Un approccio Lagrangiano ad elementi finiti per la simulazione di frane alla grande scala	*M. Cremonesi, F. Ferri, U. Perego*	On shear stresses in tapered beams	*S. Bennati, P. Bertolini, L. Taglialegne, P.S. Valvo*
10:40	Effective reference and current integration for large displacement interface	*F. Parrinello, G. Borino, R. Caserta*	Modelling compressive strain sensing in Ionic Polymer Metal Composites	*V. Volpini, A. Rodella, L. Bardella, Y. Cha, M. Porfiri*
11:00	A 3D shear-lag formulation combined with model order reduction for thermoelastic stress analysis of photovoltaic laminates	*S.O. Ojo, M. Paggi*	Straw bales as a building material: Investigation on the mechanical behavior under compression	*A.M. Manferdini, M. Maraldi, G. Molari, L. Molari, N. Regazzi*

11:20 **Pausa caffè / Coffee break**

	GIMC Chairperson: S. Marfia		GMA Chairperson: G. Borino	
11:50	On the Finite Element implementation of higher-order gradient plasticity, with focus on theories based on plastic distortion incompatibility	*A. Panteghini, L. Bardella*	An extended version of interface damage model accounting for in plane deformation	*F. Freddi, E. Sacco*
12:10	A virtual element method for nonlinear inelastic applications	*E. Artioli, L. Beirão da Veiga, C. Lovadina, E. Sacco*	A cohesive element approach to fragmentation in tempered glass	*M. Corrado, M. Vocialta, J.-F. Molinari*
12:30	First-order hexahedral element for problems of plastic deformation	*G. Castellazzi, E. Artioli, P. Krysl*	Analysis of failure in quasi-brittle materials by multiplane cohesive zone models combining damage, friction and interlocking	*R. Serpieri, M. Albarella, E. Sacco*
12:50	Can limit analysis be used to assess strength of RC frames?	*L. Leonetti, S. Sessa, F. Marmo, G. Garcea, L. Rosati*	A gradient model of cohesive fracture	*N. Valoroso*

13:10 **Pranzo / Lunch**

	GIMC Chairperson: A. Tralli		GMA Chairman: D. Bigoni	
14:10	A numerical model based on the Non-Smooth Contact Dynamics method for assessing the seismic vulnerability of Roman arches	*G. Lancioni, S. Lenci*	Dispersion of plane strain waves in multilayered plates	*R. Massabò*
14:30	A new semi-analytical approach to smooth and adhesive contact problems	*F. Marmo, S. Sessa, F. Toraldo, L. Rosati*	Curved sandwich beam with shear-compliant core: analytical modelling and approximated method	*L. Galuppi*
14:50	Sui modi di vibrare di strutture con elementi a comportamento unilaterale	*A. Tralli, A. Fabbri, A. Chiozzi, A. Formisano*	FRP-Substrate bonding quality investigation making use of ultrasonic waves	*E. La Malfa Ribolla, M.R. Hajidehi, G. Fileccia Scimemi, G. Giambanco*
15:10	Effectiveness of a TMD system to improve the seismic behavior of rigid block-like structures	*G. Simoneschi, A.M. de Leo, A. Di Egidio*	Thermo-elastic solutions for layered plates through the transfer matrix method	*H. Darban, R. Massabò*
15:30	Parametric analysis of a generic trilith system subject to a base impulsive one-sine excitation	*A.M. de Leo, A. Di Egidio, A. Contento*	Green body density analysis using tomographic reconstruction	*M.S. Swan, A. Piccolroaz, D. Bigoni*
15:50	Post-buckling analysis of variable-angle tow composite plates	*A. Madeo, R.M.J. Groh, G. Zucco, P.M. Weaver, G. Zagari, R. Zinno*	Mechanical wave mitigation in metaconcrete: a proof of concept	*D. Briccola, S. Mitchell, M. Ortiz, A. Pandolfi*

16:10 **GIMC & GMA assemblies**

17:30 **Social program**

Martedì 28 Giugno / Tuesday, June 28th

09:00	**Plenary Professor Deshpande** S.S. Shishvan, A. Vigliotti, V. Deshpande - Statistical mechanics of single cells

	GIMC Chairperson: E. Radi		**GMA** Chairperson: S. Lenci	
09:50	Isogeometric collocation: Results, applications, and open problems	*A. Reali, T.J.R. Hughes*	Snakes, elastic guns and configurational forces	*D. Bigoni, D. Misseroni, F. Dal Corso, C. Armanini*
10:10	Fast kinematic limit analysis of FRP reinforced masonry vaults through a new Genetic Algorithm NURBS-based approach	*A. Chiozzi, G. Milani, A. Tralli*	A non linear finite element approach with cohesive-frictional interfaces for the Mode II Transverse Crack Tension test insight	*G. Borino, F. Parrinello*
10:30	Finite Element Method based on a Strong formulation Isogeometric Analysis	*F. Tornabene, N. Fantuzzi, M. Bacciocchi*	On a reaction-diffusion equations in the continuum physics of inorganic scintillators	*F. Daví*
10:50	A comparative SFEM- and IGA-based numerical prediction of the stress concentration factor in plates with discontinuities	*R. Dimitri, N. Fantuzzi, F. Tornabene, G. Zavarise*	The energy of a Möbius band	*R. Paroni*

11:10 **Pausa caffè / Coffee break**

	GIMC Chairperson: A. Reali		**GMA (*)** Chairperson: P. Vena	
11:40	Fracture energy and internal length scale in phase field models	*F. Freddi*	Active surfaces inspired by the pellicle of Euglenids: a model and its experimental validation	*A. DeSimone, G. Noselli*
12:00	In-plane homogenization of masonry based on an enriched plane state micromechanical model	*D. Addessi, E. Sacco*	Towards the understanding of cytoskeleton fluidisation-solidification transition	*H. López-Menéndez, J.F. Rodríguez Matas*
12:20	Numerical simulation of concrete materials with recycled aggregates enriched with graphene	*G. Mazucco, B. Pomaro, G. Xotta, V. Salomoni, F. Faleschini*	Determinazione di un intervallo di frequenze ottimale per l'uccisione delle cellule cancerogene	*C. Pappalettere, M. Ivone*
12:40	A new computational method for the assessment of the effect of settlements in masonry structures	*A. Iannuzzo, M. Angelillo, F. De Serio, A. Gesualdo*	Mechanical Characterization of Polyurethane scaffolds for cardiac applications	*G. Quagliato, E. Cattarinuzzi, D. Gastaldi, S. Sartori, G. Ciardelli, P. Vena*

13:00 **Pranzo / Lunch**

	GIMC Chairperson: G. Zavarise, A. Pandolfi, A. Reali, S. Marfia		GMA (*) Chairperson: A. DeSimone	
14:00	High-order Arbitrary Lagrangian Eulerian one-step WENO finite volume schemes on tetrahedral meshes for conservative and nonconservative hyperbolic balance laws	*W. Boscheri* (***), *M. Dumbser*	Constitutive modeling of active electro-mechanics with distributed fiber for anisotropic soft tissue	*M. Vasta, A. Gizzi, A. Pandolfi*
14:20	Multiscale and multiphysics modeling of Li-ion battery cells	*D. Grazioli* (***), *A. Salvadori, A.F. Bower*	Novel modeling strategies for arterial multiphysics	*M. Marino, G. Pontrelli, G. Vairo, P. Wriggers*
14:40	Enriched embedded formulations revisited by means of the equivalent eigenstrain approach: Effective Computation of K_I	*E. Benvenuti*	Viscoelastic modeling of articular cartilage under impact loading	*R. Springhetti, N.S. Selyutina*
15:00	Un approccio Lagrangiano ad elementi finiti per la simulazione tridimensionale di fluidi comprimibili	*M. Cremonesi, A. Frangi*	Mechanical testing for viscoelastic characterization of grafts used in Anterior Cruciate Ligament reconstruction: protocol and preliminary results	*M. Zingales, L. Camarda, G. Marchiori, D. Spadaro, L. Deseri, N. Lopomo*
15:20	A FE^2 approach for multiscale modeling of energy harvesting devices	*C. Maruccio, L. De Lorenzis*	Development and experimental validation of a constitutive model for NiTi medical devices subjected to fatigue and plasticity	*L. Petrini, A. Bertini, E. Villa, A. Nespoli, F. Migliavacca*

15:40 **Pausa caffè / Coffee break**

	GIMC Chairperson: A. Pandolfi		GMA (**) Chairperson: L. Gambarotta	
16:10	A biphasic model for avascular tumor growth and drug response	*P. Mascheroni, D.P. Boso, C. Stigliano, M. Carfagna, L. Preziosi, P. Decuzzi, B.A. Schrefler*	A non-local variational approach to damage mechanics: diffuse micro-cracking and strain localization	*G. Lancioni*
16:30	Computational contact mechanics of deformable excitable cells	*A. Gizzi, M. Paggi*	Multi-scale dynamic homogenization of periodic thermo-diffusive composites: overall material properties and generalized Floquet-Bloch spectrum	*A. Bacigalupo, L. Morini, M. Paggi*
16:50	Isogeometric collocation methods for poromechanics	*S. Morganti, C. Callari, F. Auricchio, A. Reali*	Magnetically aligned carbon fibres in elastomer composites with bending and twisting instabilities	*J. Ciambella, S.S. Rahatekar, D.C. Stanier*
17:10	A computational method to simulate thermo-oxidative degradation phenomena of poly(ethylene-co-vinyl) acetate used in photovoltaics	*M. Gagliardi, P. Lenarda, M. Paggi*	Multiscale and multiphysics modeling for Li-ion batteries	*M. Magri, D. Grazioli, A. Salvadori*
17:30	A finite element formulation for localized erosion propagating in porous media	*A. F. Rotunno, C. Callari, F. Froiio*	Homogenization of random composite materials: sensitivity to mechanical parameters and scaling measures	*E. Reccia, M.L. De Bellis, P. Trovalusci, M. Ostoja-Starzewski, R. Masiani*

17:40 **Assemblea SSD ICAR/08 / ICAR/08 General Assembly**
20:00 **Cena sociale / Social dinner**

Mercoledì 29 Giugno / Wednesday, June 29th

	GIMC Chairman: E. Sacco		GMA (**) Chairman: P. Trovalusci	
09:00	A new membrane mixed finite element for nonlinear structure analysis	*N.A. Nodargi, P. Bisegna*	Structural symmetry and nonlocal elasticity	*A.A. Pisano, P. Fuschi*
09:20	Simulazione di fenomeni di taglio e delaminazione in strutture a guscio sottile mono- e multi-strato	*F. Confalonieri, J. Mirzapour, A. Ghisi, U. Perego*	Bloch waves in beam lattice materials with periodic cell without centro-symmetry	*A. Bacigalupo, L. Gambarotta*
09:40	Nonlinearity reduction using mixed solid-shell finite elements in geometrically nonlinear analysis of beams and shells	*D. Magisano, L. Leonetti, G. Garcea*	Cloaking of flexural vibrations in a structured plate	*D. Misseroni, A.B. Movchan*
10:00	A new family of comforming quadrilateral Kirchhoff plate elements	*T. Battiato, L. Greco, M. Cuomo*	Scattering of Shear and Rayleigh-Lamb waves in plate waveguides with double-sharp discontinuities	*A. Pau, D.V. Achillopoulou*
10:20	Homogenization of viscoplastic composites based on the complementary TFA	*F. Covezzi, S. de Miranda, S. Marfia, E. Sacco*	Sensitivity of the acoustic properties to microstructural perturbations in beam lattice materials	*M. Lepidi, A. Bacigalupo*

10:40 **Pausa caffè / Coffee break**

	GIMC Chairman: R. Massabò		GMA (**) Chairman: P. Fuschi	
11:10	A new frequency–based approach to dynamic compliance optimization	*C. Cinquini, P. Venini*	Effective conductivity of materials containing multiple toroidal inhomogeneities	*E. Radi, I. Sevostianov*
11:30	Unified beam theory with higher-order mapping capabilities	*A. Pagani, A. Garcia de Miguel, E. Carrera*	Multi-field asymptotic homogenization of periodic thermo-piezoelectric materials	*F. Fantoni, A. Bacigalupo, M. Paggi*
11:50	A 3D mixed finite element for beams with section warping and damage	*P. Di Re, D. Addessi*	Stress and pore pressure fields around two boreholes in a poroelastic medium	*L. Lanzoni, A. Nobili, E. Radi*
12:10	An Euler-Bernoulli beam element with lumped plasticity applied on RC framed structures	*G. Giambanco, V. Majorana, M.R. Hajidehi, A. Spada*	Elastic properties of hexagonal diatomic sheets through molecular mechanics and discrete homogenization	*A. Genoese, A. Genoese, N.L. Rizzi, G. Salerno*
12:30	Natural parametrization for Kirchhoff rod models	*L. Greco, M. Cuomo*	Numerical analysis of thermally controlled spalling to produce Silicon thin films	*I. Berardone, S. Kajari-Schroeder, J. Hensen, M. Paggi*
12:50	An efficient approach for linear buffeting analysis	*L. Patruno, M. Ricci, S. de Miranda, F. Ubertini*	Asymptotic homogenization approach for the micropolar modelling of periodic composites	*A. Bacigalupo, M.L. De Bellis*

13:10 **Pranzo / Lunch**

(*) Special session "Multiphysics characterization and modeling of biological tissues and biomaterials"
Organizers: P. Vena, M. Marino, M. Conti, L. Cristofolini, D. Gallo

(**) Special session "Modelling of microstructured materials and metamaterials"
Organizers: A. Bacigalupo, F. Dal Corso, M.L. De Bellis

(***) Premi GIMC miglior tesi di dottorato