



Michele Buonsanti

Aggregate Professor

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Research

My research interests are in the field of continuum mechanics, with special attention for engineering applications as well as, initially, for foundational issues. In recent years I have developed an interest for modelling and analysing problems originally posed by materials scientists, such as phase transition in solids (in particular, crystalline, crack propagation, and polymers). I have also been working in the evolution of microstructure, with special attention for the models that govern their evolution. Another line of research I have been performed with has to do with eddy-currents devices and the study of specimen under form of plates when undergoing to axial and biaxial traction. Finally, I have been working at modelling the effects of strain on multi-physics problems for example chemo-mechanical interaction. Recently, I have in progress a new research line on the microstructural characterization in biological tissue under thermo-mechanical actions other than mechanical aspect in the cell detachment.

Teaching Activity

Since 1995 I has been developed the follows course: Mechanics of Materials, Computational Mechanics of Structures, Science of Constructions (Strength of Materials)

Extend publications list

1. IJ31- REDUCTION OF TRAIN-INDUCED VIBRATIONS BY USING BARRIERS, Research Journal of Applied Sciences, Engineering and Technology 05/2014; 7(17):3623-3632.
2. IJ30- MORPHOMETRIC ANALYSIS OF CRYOFIXED MUSCULAR TISSUE IN A PATHOLOGY LAB, Vircows Archiv, submit, 2014
3. IJ29- A UNIFIED MODEL FOR MICROMECHANICS DAMAGE IN ASPHALT CONCRETE, Key Engineering Materials Vols. 577-578, 465-468, 2014

4. IJ.28- ELECTROMAGNETIC RADIATION IN BIO-TISSUE: A NUMERICAL IMPLEMENTATION, Journal of Biomimetic, Biomaterials Tissue Engineering, vol.18, 1, 2014.
5. IC48 – EXPERIMENTAL AND COMPUTATIONAL MATERIAL DEFECTS INVESTIGATION 8TH Eurosim Conference in Modelling and Simulation, Cardiff, 2013 Proceedings, 167-173, 2013
6. IJ27- ULTRASONIC EXAMINATION OF RAILWAY MATERIALS AND NEURAL NETWORK APPROACH TO DEFECTS CLASSIFICATION. Science Series Data Report, 5, 7, 26-35, 2013.
7. IC47- A MICROMECHANICAL MODEL TO HETEROGENEOUS AND COMPLEX SOLID MATERIALS, in Proceedings 28th Intern. Conference Solid Management Philadelphia, Cd-rom, 1060-1066, 2013.
8. IJ26 – ROTATING ELECTROMAGNETIC SYSTEM FOR RAILWAY DETECTION, ICFMEME, Pechino, 2012 Advanced Materials Research, 875-877, 401-405, 2014
9. IJ25 – MODELING DYNAMICS BEHAVIOR OF MATERIALS: THEORETICAL FRAMEWORK AND APPLICATIONS, in Finite Elements Analysis.- Applications in Mechanical Engineering, F. Ebrahimi Eds., 196-216, INTECH
10. IJ24 – DYNAMIC MODELING OF FREIGHT WAGON WITH MODIFIED BOGIES, European Journal of Scientific Research, vol.86,2, 2012
11. IC46 – THEORETICAL AND COMPUTATIONAL ANALYSIS OF AIRPORT PAVEMENTS REINFORCED WITH GEOGRIDS, 7th International Conference on Pavements Cracking, Delft, 2012
12. IJ23 – FEM ANALYSIS OF AIRPORT FLEXIBLE PAVEMENTS REINFORCED WITH GEOGRIDS, Advance Science Letters, vol.13, 392-395, IIN 1936_6612, 2012
13. IJ22 – FRACTAL ANALYSIS AND BIOPHYSICAL INVESTIGATION OF MUSCULAR TISSUE DAMAGED DUE TO LOW TEMPERATURE: A PILOT STUDY, Journal of Biomimetic, Biomaterials & Tissue Engineering, 14, 43-51, 2012
14. IC45 – NUMERICAL IMPLEMENTATION AND STRAIN ANALYSIS IN THE CELLULAR ADHESION, GNB2012 Conference, Roma, 2012
15. IJ21 – MODELING MICRODAMAGE IN GRANULAR SOLIDS Key Engineering Materials, vol.525, 497-500, 2012
16. IJ20 - A FINITE ELEMENT MODEL TO EVALUATE AIRPORT FLEXIBLE RESPONSE UNDER IMPACT, Applied Mechanics and Materials, vol.138-139, 257-262, 2012.
17. IJ19 - 3-D SIMULATION OF TUNNEL STRUCTURES UNDER BLAST LOADING, Archives of Mechanics and Engineering, 13, 128-134, 2013.
18. IJ18– DYNAMIC BEHAVIOR OF GRANULAR MIXTURE SOLIDS, Key Engineering Materials, vol. 488-489, 541-544, 2012.
19. IJ17 – MITIGATION OF RAILWAY VIBRATIONS USING BARRIERS, Inventi Journal ETC, vol.1, n^o1, 1-5, 2011.

20. IJ16 – A THEORETICAL MODEL TO FRACTURE IN CELL MEMBRANE, *Journal of Biomimetic, Biomaterials & Tissue Engineering*, vol.11, 67-71, 2011.
21. IJ15 - EQUILIBRIUM STATE OF BINARY GRANULAR SOLIDS MIXTURE *Applied Mechanics and Materials*, vol.52-54, 389-392, 2011.
22. IC.44 – IMPACT DYNAMICS ON GRANULAR PLATE, 8th EURO DYN International Conference on Structural Dynamics Proceedings, De Roeck et al. Eds., 3228-3244, Leuven, 2011.
23. IJ14 – CHANGE STABILITY CONFIGURATIONS TO ENDOTHELIAL CELLS, *Procedia Engineering*, vol.10, 1550-1555, 2011
24. IJ13 – 3-D SIMULATION OF SHOCK WAVES GENERATED BY DENSE EXPLOSIVE IN SHELL STRUCTURES, in *Procedia Engineering*, vol.10, 1550-1555, 2011
25. IC.39 – ANALYSES OF THE GROUND BORNE VIBRATION INDUCED BY HIGH-SPEED TRAINS IN FINITE ELEMENT METHOD. *Proceedings of 10TH IWRN*, 369-376, Nagahama, 2010
26. IC38 – A DECOUPLED APPROACH TO THE INVESTIGATION OF THE EQUILIBRIUM AND STABILITY OF A SPHERICAL ANEURYSM, IN THE PRESENCE OF LOCAL CHANGES IN THE BLOOD FLOW DYNAMICS. In proceedings of 3rd Euro-Mediterranean Symposium on A.G.S., vol. 1 Application of non linear continuum mechanics in civil and materials engineering, Doghri et al. Eds. 103-108, 2010.
27. IJ12- EVALUATION OF DEFECTS IN MULTI-LAYER CARBON FIBERS EPOXY FOR AERONAUTICS APPLICATIONS USING ULTRASOUND EMISSION, in *Advances in Acoustic and Vibration*, vol.2009, art.ID 647658, 8-16, 2009
28. IJ11-MITIGATION OF RAILWAY TRAFFIC INDUCED VIBRATIONS: THE INFLUENCE OF BARRIERS IN ELASTIC HALF-SPACE, in *Advanced in Acoustic and Vibration*, vol. 2009, art.ID 956263, 34-41, 2009
29. NJ3-ON THE USE OF FERRARIS EFFECT AND ARTIFICIAL INTELLIGENCE FOR CHARACTERIZING VOIDS IN AERONAUTICAL WELDINGS, " *Rivista italiana di compositi e nanotecnologie*", n. 4, 2008, pp. 1-4, ISSN: 1826-4697.
30. IC37- EMERGING MICROSTRUCTURE IN BIOLOGICAL TISSUE UNDER THERMO-MECHANICAL ACTIONS, in *ECCOMAS Int. Conf. Tissue Engineering*, P.J. Bartolo Eds., IST Press, 2009, ISBN 978-972-8469-90
31. IC36-STUDY OF THE BARRIERS FOR THE MITIGATION OF RAILWAY VIBRATIONS, *ICSV16Th*, Krakow, July, 2009
32. IC35-EVALUATION OF DEFECTS IN MULTI-LAYER CARBON FIBERS EPOXY FOR AERONAUTICS APPLICATIONS USING ULTRASOUND EMISSION, (short version) *AMAV'09 Advanced Materials for Application in Acoustic and Vibration*, Il Cairo, 2009
33. IC34- MITIGATION OF RAILWAY TRAFFIC INDUCED VIBRATIONS: THE INFLUENCE OF BARRIERS IN ELASTIC HALF-SPACE (short version), *AMAV'09 Advanced Materials for Application in Acoustic and Vibration*, Il Cairo, 2009
34. IJ10- NEURO-FUZZY APPROACH FOR RECONSTRUCTING FISSURES IN CONCRETE'S REINFORCING BARS, in *Fuzzy Logic and Applications, Lecture Notes in Artificial Intelligence*, Eds. Goebel et al., 171-178, Springer, N.Y., ISBN 10-3-642-002281-2

35. IC33- MECHANICAL ASPECT IN THE CELLS DETACHMENT, in IFMBE Proceedings 13th ICBME'08 Singapore, Vol.3°, 1842-1846, Springer, N. Y., 2009, ISBN 978-3-540-92840-9
36. IC32- A THEORETICAL MODEL TO CHEMOMECHANICAL DAMAGE IN THE ENDOTHELIAL CELLS, in IFMBE Proceedings 13th ICBME'08 Singapore, Vol.3°, 1945-1949, Springer, N.Y., 2009, ISBN 978-3-540-92840-9
37. NJ2 -NEW OPTIMIZATION ALGORITHM IN CORROSION ANALYSIS, *Rivista di Compositi e Nanotecnologie*, vol. 4, 1-6, 2008
38. IC31-THEORETICAL MODEL FOR DELAMINATION ELASTOMERS SANDWICH in A.Santini, N. Moraci Eds., *MERCEA'08 Seismic Engineering Conference*, vol. 2, 1340-1349, American Institute of Physics Conf. Proc., 1020, Melville, N.Y., 2008
39. IC30- MICRO-CONTACT PROBLEMS IN HISTOLOGICAL TISSUE, in *Collection Science and Technologies, vol.1 Advanced computations of structures and engineering works*, F.Darve, G.Del Piero et al. Eds., 95-102, 2008
40. IC29-INTERACTION OF MICROSTRUCTURE IN BIOLOGICAL TISSUE, 6th *International Conference on Engineering Computational Technology*, Atene, 2008
41. IC28-NON LINEAR DYNAMICS ANALYSES OF FRAME STRUCTURES WITH DIFFERENT PASSIVE DEVICES FOR SEISMIC PROTECTION, Part I: COMPUTATIONAL RESULTS, accettato 14th *World Conference of Earthquake Engineering, Beijing, 2008*
42. IC27- ROTATING MAGNETIC FIELD FOR DETECTION OF CRACKS IN METAL WELDED JOINTS AND QUALITY CONTROL, 9th *International Conference on Computational Technology*, Atene, 2008
43. IJ9-EXPERIMENTAL TESTS AND COMPUTATIONAL ANALYSIS TO INVESTIGATE NECKING PHENOMENA IN THIN METALLIC SHEETS, *Int. Journal Modelling and Simulation*, 27, 4, 306-313, 2007
44. IC26-EMERGING MICROSTRUCTURE IN BIOLOGICAL TISSUE UNDER TERMOMECHANICAL ACTION, VIII° *BIOMAT-BIOMECH*, Catania, 2007
45. IC25-NON DESTRUCTIVE INSPECTION BY A ROTATING MAGNEITC FIELD AND NEURAL NETWORKS FOR CHARACTERIZING VOIDS IN WELDING STRIPS, 6th *International Conference on Engineering Computational Technology*, Atene, 2008
46. IC24-MICROSTRUCTURAL CHANGES IN ELASTOMERIC SEISMIC DEVICES, in A.Santini, N. Moraci Eds., *MERCEA'08 Seismic Engineering Conference*, vol. 2, 1330-1339, American Institute of Physics Conf. Proc., 1020, Melville, N.Y., 2008
47. IC23-ON A MINIMUM PROBLEM IN MICRO STRUCTURED ELASTOMERS, in A.Santini, N. Moraci Eds., *MERCEA'08 Seismic Engineering Conference*, vol. 2, 1350-1359, American Institute of Physics Conf. Proc., 1020, Melville, N.Y., 2008
48. IC22-STRUCTURAL IMPACT AND DYNAMICS RESPONSE IN BRITTLE MATERIALS, in *Pavement Cracking*, Al-Quadi, Scarpas & Loizos Eds., 587-597, Taylor & Francis, CRC Press London, 2008
49. IJ8-FUZZY COMPUTATION FOR CLASSIFYNG DEFECTS IN METALLIC PLATES, *Journal of Applied Electromagnetic and Mechanics*, 25, 325-331, 2007

50. IJ7-EDDY CURRENT AND FUZZY INFERENCE TO CONTROL DEFECTS GROWTH IN REINFORCED CONCRETE, *Key Engineering Materials*, vol.345-346, 1291-1294, 2007
51. IJ6-A GENERAL MODEL TO CHEMO-MECHANICAL EQUILIBRIUM OF A GEOSYNTHETIC POLYMERIC MEMBRANE, *Key Engineering Materials*, vol.345-346, 1031-1034, 2007
52. IC21-THERMAL ANALYSIS OF ROAD TUNNEL, *Proceedings 4TH SIIV Int. Congress*, Palermo, 2007
53. IC20-FREIGHT TRAINS INDUCED VIBRATIONS: ANALYSIS OF WHEEL-TRACK-GROUND INTERACTION, *Proceedings 6TH EUROSIM Congress on Modelling and Simulation*, Blazic S. e al. Eds., vol.2, Ljubljana, 2007
54. IC19-FUZZY ELLIPSOIDAL TECNIQUE TO INVESTIGATE THE NECKING PHENOMENA IN METALLIC SHEETS, *Proceedings 6TH EUROSIM Congress on Modelling and Simulation*, Blazic S. et al. Eds. Vol.2, Ljubljana, 2007
55. NC8- PROBLEMI DI EQUILIBRIO IN SOLIDI CELLULARI, in *Materiali e Metodi Innovativi nell'Ingegneria Strutturale*, G. Oliveto et al. Eds., Aracne Editrice, 2009
56. IC18b- FRAGMENTATION AS A PHASE TRANSITION, in APM2007, *Advanced Problems in Mechanics*, Int. Conference, S.Pietroburgo, 2007
57. IC18-NO-CONVEX ANALYSIS IN MICRO-MECHANICS OF SOLIDS, VI° Int. Conference Stochastic Geometry, Convex Bodies, Empirical Measure & Applications to Engineering of Train Transport, Milazzo, 2007, in *Suppl. ai Rendiconti del Circolo Matematico di Palermo*, M.I.Stoka Eds., n°80, 2008
58. IC17-EVOLVING MICROSTRUCTURES IN PLANE ELASTIC SOLIDS, 8th HSTAM Conference on Mechanics, Proceedings, vol. II°, 579- 584, Patras, 2007
59. NC7-MINIMIZE CORROSION FUNCTION BY PARTICLE SWARM OPTIMIZATION ALGORITHM, IV°Symposio *Tecnologie Avanzate*, Roma 2007, Atti su cd-rom
60. IC16- INTERFACE EVOLUTION IN LAMINATE MICROSTRUCTURE in ICAMEM'06, *International Conference on Advances in Mechanical Engineering and Mechanics*, Hammamet, 2006, Atti su Cd-rom
61. NC6- POLIMERI E MEMORIA DI FORMA: EQUILIBRIO E MICROSTRUTTURE, III° *Symposium sulle Tecnologie Avanzate*, Roma, 2006, Atti su Cd-rom
62. IC15-FUZZY INFERENCE MODELS FOR TREATING EC-NDT EXPERIMENTAL TEST: THE DOMAIN OF BI-PHASE MATERIALS, Proceedings of *First Euro Mediterranean Symp. on Advances in Geomaterials and Structures*, F. Darve et al. Eds., 725-730, Hammamet, 2006
63. IC14-ON THE USE OF JOINT FUZZY INFERENCE SYSTEM AND SUPPORT VECTOR MACHINES FOR CLASSIFYING DEFECTS IN METALLIC PLATES 9th *European Conference on Non-Destructive Testing*, Berlino, 2006, Atti su Cd-rom
64. IJ5-CHEMOMECHANICAL EQUILIBRIUM OF BARS, *Journal of Elasticity*, 84, 167-188, 2006
65. IC13-ULTRASONIC PULSE-ECHOES AND EDDY CURRENT TESTING FOR DETECTION, RECOGNITION AND CHARACTERISATION OF FLAWS DETECTED IN METALLIC

PLATES, 9th *European Conference on Non-Destructive Testing*, Berlino, 2006, Atti su Cd-rom

66. NC5-EDDY-CURRENT EXPERIMENTAL ANALYSIS TO INVESTIGATE THE MECHANISM OF DEGRADATION IN DUCTILE MATERIALS, XVII° *Congresso A.I.M.E.T.A.*, Firenze, 2005, Atti su Cd-rom
67. NC4-RELAXED SOLUTIONS IN TWO-DIMENSIONAL MODELS, XVII° *Congresso A.I.M.E.T.A.*, Firenze, 2005, atti su Cd-rom
68. IC12- EXPERIMENTAL TEST FOR FLEXURE BEAM MODEL WITH NON-CONVEX POTENTIAL, *European Congress on Advanced Materials and Processing EUROMAT '05*, Praga, 2005
69. IJ4-SOLUTION OF DIRECT AND INVERSE PROBLEM IN N.D.E, in *Electromagnetic Nondestructive Evaluation (IX)*, L. Udpa & N. Bowler Eds., series *Studies in Applied Electromagnetics and Mechanics*, vol. 25, IOS Press Publications, 2005
70. IJ3-NEW TRENDS IN ECT APPLICATIONS FROM THE MADEND PROJECT, *Progress in Electromagnetic Research Symposium Proceedings*, 715-718, Pisa, 2004.
71. NJ1-VALUTAZIONE SPERIMENTALE DELLE CARATTERISTICHE DINAMICHE DELLE TORRI-FARO DELL'AEROPORTO DELLO STRETTO, *Ingegneria Sismica* 3, 19-29, 2004
72. IC11-MODELING AND TESTING FOR DAMAGE ANALYSIS IN PLANE SOLID. MCMS '03, *Mediterranean Conference on Modelling and Simulation*, Reggio Calabria, 2003, Atti su Cd-rom
73. IC10-MATERIALS BEHAVIOR AND ADVANCED MODELLING. MCMS '03 *Mediterranean Conference on Modelling and Simulation*, Reggio Calabria, 2003, Atti su Cd-Rom
74. NC2-CARATTERIZZAZIONE MICROSTRUTTURALE DELLA RISPOSTA DI UNA BARRA SOGGETTA A FLESSIONE CON LEGGE COSTITUTIVA NON MONOTONA, XVI° *Congresso A.I.M.E.T.A.*, Ferrara, 2003, atti su Cd-Rom
75. IC9-EDDY CURRENTS AND FUZZY INFERENCES TO CONTROL DEFECTS GROWTH IN REINFORCED CONCRETE, 3rd *IASTED-EuroPES 2003 Int. Conf. Power and Energy Systems*, Marbella, 2003
76. IJ2- FROM 3-D NON-LINEAR ELASTICITY THEORY TO 1-D BARS WITH NON-CONVEX ENERGY, *Journal of Elasticity*, 70, 87-100, 2003,
77. IC8-DEFECTS RECONSTRUCTION ON REINFORCED CONCRETE SPECIMEN 22nd *IASTED*, Innsbruck, 2003, in *Modelling, Identification and Control*, M.H. Hamza Eds., 448-452, Acta Press, Zurigo, 2003
78. NC2-EXPERIMENTAL-THEORETICAL STUDY AND DESIGN OF SHAPE MEMORY ALLOY THERMAL ACTUATOR FOR INDUSTRIAL APPLICATIONS, VI° *Congresso Nazionale S.I.M.A.I.*, Cagliari, 2002, Atti su Cd-rom
79. IC7-DAMAGE ANALYSIS ON STEEL THIN PLATES, *ASEM '02 Advanced Struct. Engineering Mechanics*, Pusan, 2002, atti su Cd-rom
80. IC6-A NOVEL FUZZY APPROACH TO BI-PHASE MATERIALS BASED ON EC.NDT EXPERIMENTAL TEST, 8th *ECNDT International Conference of NDT Experimental Test*, Barcellona, 2002, Atti su Cd-rom

81. IJ1-SHAPE MEMORY MATERIALS STABILITY: CHARACTER OF THE INTERFACIAL ENERGY in *Applied Electromagnetic and Mechanics*, T. Takagi , M. Uesaka, Eds., *JSAEM Studies in Applied Electromagnetics and Mechanics*, vol.9, Tokyo, 2001
82. NC1-MODELLI BIDIMENSIONALI PER IL COMPORTAMENTO DEI MATERIALI, XV° *Congresso A.I.ME.T.A.*, Taormina, 2001, atti su CD-Rom
83. A2-RECENTI SVILUPPI NELLA MECCANICA DEI SOLIDI NON REAGENTI A TRAZIONE. Atti del seminario di studi Facoltà di Ingegneria Reggio Calabria, Aprile 1994.
84. IC5- A GENERAL FORMULATION REGARDING THE PROBLEM OF THE EQUILIBRIUM FOR NO-TENSION MATERIAL. 6° *North American Conference Masonry*, Drexel University, Philadelphia 1993
85. IC4- COMPUTATIONAL MODEL FOR LINEAR DYNAMIC ANALYSIS OF TWO DIMENSIONAL PRECAST MASONRY STRUCTURES TO EARTHQUAKE EXCITATIONS. 3rd. *International Conference on "Applications of Artificial Intelligence to Civil Engineering"*, Edimburgo, 1993
86. IC3- DYNAMIC ANALYSIS OF COUPLED PROBLEMS: LIQUID STRUCTURES INTERACTION IN DEFORMABLE WALLS, 5° *International Conference "Civil and Structural Engineering Computing"*, Edimburgo, 1993
87. IC2-DYNAMIC ANALYSIS OF TWO DIMENSIONAL STRUCTURED IN REINFORCED MASONRY, 3rd *International Conference of British Masonry Society*, London, 1992.
88. IC1-SYSTEM OF COMPONENTS OF REINFORCED BRICK MASONRY PANELS CONTAINED BY INDUSTRIALIZED PROCEDURE WITH THE BRICK MANUFACTURED IN TRADIZIONAL REGION WAY. 9th *International Brick Masonry Conference*, Proceedings, Berlino, 1991
89. A1- PROBLEMI UNILATERI NELLA ANALISI STRUTTURALE:CONCETTI DI BASE ED APPLICAZIONI. *Atti dell'Istituto di Ingegneria Civile*, Facoltà di Ingegneria, Reggio Calabria, 1991
90. NJ1-STABILITA' DELLE TERRE:METODOLOGIE DI ANALISI LIMITE, *Ingegneria Ferroviaria*, 8, 565-571, 1985.