Ernesto DI MAIO

FIRST NAME:	Ernesto
LAST NAME:	Di Maio
ADDRESS:	Via Settembrini coop. Nadir, 81100 Caserta Italy
DATE OF BIRTH:	April 18th 1975
PLACE OF BIRTH:	Naples
NATIONALITY:	Italian
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EDUCATION

1/2004 to date **Assistant Professor** in Materials Science and Technology Department of Materials and Production Engineering, Faculty of Engineering, Università degli Studi di Napoli Federico II

2001-2004 **Researcher** in Polymer Science at Institute of Composite and Biomedical Materials, National Research Council, Italy

1998-2001 **PhD** in Technology of Materials and Process
University of Naples
Faculty of Engineering
Department of Materials and Production Engineering
Tutors: Prof L. Nicolais, Prof. S. Iannace

*My PhD Thesis was about the **physics** and the **thermodynamics** of **foaming process** of biodegradable thermoplastic polymers; I also modeled the mechanical and thermal properties of the cellular structures.*

Fall Sem 2001 **Visiting Research Scholar**
Department of Chemical Engineering, University of Houston, Houston, Tx
Prof. Raimond W. Flumerfelt

1993-1998 **Degree** in Materials Engineering
University of Naples Faculty of Engineering

Specialization:	Structural materials
Average grade:	29.7 out 30
Final grade obtained:	110 out 110 cum laude
Experimental Thesis in:	Composite materials; Prof. G. Caprino, dept. of Materials and Production University of Naples.

*My thesis was about **delamination of composite materials**. I made tests in **mode I**, **II** and mixed **I/II** and evaluated the energy released upon delamination.*

1988-1993 **Scientific-oriented High school**, Caserta

PUBLICATIONS ON INTERNATIONAL JOURNALS

P1. S. Iannace, E. Di Maio, L. Nicolais, *Preparation and characterization of polyurethane porous membranes by particulate-leaching method*, Cellular Polymers, 5 (2001) 321-338, ISSN: 0262-4893

P2. Y. Di, S. Iannace, E. Di Maio, L. Nicolais, *Nanocomposites by Melt Intercalation Based on Polycaprolactone and Organoclay*, Journal of Polymer Science: Part B: Polymer Physics, 41 (2003) 670-678, ISSN: 0887-6266

P3. S. Cotugno, E. Di Maio, C. Ciardiello, S. Iannace, G. Mensitieri, L. Nicolais, *Sorption Thermodynamics and Mutual Diffusivity of Carbon Dioxide in Molten Polycaprolactone*, Industrial and Engineering Chemistry Research, 42 (2003) 4398-4405, ISSN: 0888-5885

P4. E. Di Maio, S. Iannace, Y. Di, E. Del Giacomo, L. Nicolais, *Heterogeneous bubble nucleation in PCL/clay nanocomposite foams*, Plastics Rubbers and Composites, 32 (2003) 313-317, ISSN: 1465-8011

P5. E. Di Maio, S. Iannace, L. Sorrentino, L. Nicolais, *Isothermal crystallization in PCL/clay nanocomposites investigated with thermal and rheometric methods*, Polymer, 45 (2004) 8893-8900, ISSN: 0032-3861

P6. E. Di Maio, G. Mensitieri, S. Iannace, L. Nicolais, W. Li, R.W. Flumerfelt, *Structure optimization of PCL foams by using mixtures of CO_2 and N_2 as blowing agents,* Polymer Engineering and Science, 45 (2005) 432-441, ISSN: 0032-3888

P7. Y. Di, S. Iannace, E. Di Maio, L. Nicolais, *Poly(lactic acid)/Organoclay Nanocomposites: Thermal, Rheological Properties and Foam Processing*, Journal of Polymer Science, Part B: Polymer Physics, 43 (2005) 689-698, ISSN: 0887-6266

P8. S. Cotugno, E. Di Maio, and G. Mensitieri, S. Iannace, G. W. Roberts, R. G. Carbonell, and H. B. Hopfenberg, *Characterization of Microcellular Biodegradable Polymeric Foams Produced from Supercritical Carbon Dioxide Solutions*, Industrial and Engineering Chemistry Research 44 (2005) 1975-1803, ISSN: 0888-5885

P9. E. Di Maio, S. Iannace, C. Marrazzo, M. Narkis, L. Nicolais, *Effect of Molecular Modification on PCL Foam Formation and Morphology of PCL*, Macromolecular Symposia 228 (2005) 219-227, ISSN: 1022-1360

P10. L. Sorrentino, S. Iannace, E. Di Maio, D. Acierno, *Isothermal Crystallization Kinetics of Chain-Extended PET*, Journal of Polymer Science, Part B: Polymer Physics 43 (2005) 1966-1972, ISSN: 0887-6266

P11. Di Y., Iannace S., Di Maio E., Nicolais L., *Reactively Modified Poly(lactic acid): Properties and Foam Processing*, Macromolecular Materials and Engineering, 290 (2005) 1083-1090, ISSN: 1438-7492

P12. S. Acierno, E. Di Maio, S. Iannace, N. Grizzuti, *Structure development during crystallization of polycaprolactone*, Rheologica Acta, 45 (2006) 387-392, ISSN: 0035-4511

P13. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *A predictive approach based on the Simha-Somcynsky free volume theory for the effect of dissolved gas on viscosity and glass transition temperature of polymeric mixtures*, Journal of Polymer Science: Part B: Polymer Physics, 44 (2006) 1863-1873, ISSN: 0887-6266

P14. C. Marrazzo, E. Di Maio, S. Iannace, L. Nicolais, *Foaming of synthetic and natural biodegradable polymers*, Journal of Cellular Plastics, 43 (2007) 123-133, ISSN: 0021-955X

P15. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, P. A. Netti, *Design and preparation of μ-bimodal porous scaffold for tissue engineering*, Journal of Applied Polymer Science, 106 (2007) 3335-3342, ISSN: 0021-8995

P16. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, *Thermoplastic foams from zein and gelatin*, International Polymer Processing, 22 (2007) 480-488, ISSN: 0930-777X

P17. C. Marrazzo, E. Di Maio, S. Iannace, L. Nicolais, *Process-structure relationship in PCL foamimg*, Journal of Cellular Plastics, 44 (2008) 37-52, ISSN: 0021-955X

P18. C. Marrazzo, E. Di Maio, S. Iannace, *Conventional and nanometric nucleating agents in PCL foaming: crystals vs. bubbles nucleation*, Polymer Engineering and Science, 48 (2008) 336-344, ISSN: 0032-3888

P19. L.Verdolotti, E. Di Maio, M.Lavorgna, S.Iannace, L. Nicolais, *Polyurethane-cement based foams: characterization and potential uses*, Journal of Applied Polymer Science, 107 (2008) 1-8, ISSN: 0021-8995

P20. A. Salerno, E. Di Maio, S. Iannace, PA Netti, *Engineering of foamed structures for biomedical application*, Journal of Cellular Plastics, 45 (2009) 103-117, ISSN: 0021-955X

P21. Salerno A, Guarnieri D, Iannone M, Zeppetelli S, Di Maio E, Iannace S, Netti PA, *Engineered μ-Bimodal Poly(ε -caprolactone) Porous Scaffold for Enhanced hMSCs Colonization and Proliferation*, Acta Biomaterialia, 5 (2009) 1082-1093, ISSN: 1742-7061

P22. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, P. A. Netti, *Design of porous polymeric scaffolds by gas foaming of heterogeneous blends*, Journal of Material Science: Materials in Medicine, 20 (2009) 2043-2051, ISSN: 0957-4530

P23. M. Oliviero, E. Di Maio, S. Iannace, *Effect of Molecular Structure on Film Blowing Ability of Thermoplastic Zein*, Journal of Applied Polymer Science, 115 (2010) 277-287, ISSN: 0021-8995

P24. A. Salerno, M. Oliviero, E. Di Maio, P.A. Netti, C. Rofani, A. Colosimo, V. Guida, B. Dallapiccola, P. Palma, E. Procaccini, A.C. Berardi, F. Velardi, A. Teti, S. Iannace, *Design of novel three-phase PCL/TZ-HA biomaterials for use in bone regeneration applications*, Journal of Materials Science: Materials in Medicine, 21 (2010) 2569-2581, ISSN: 0957-4530

P25. L. Sorrentino, E. Di Maio, S. Iannace, *Poly(ethylene terephthalate) foams: correlation between polymer properties and foaming process*, Journal of Applied Polymer Science, 116 (2010) 27-35, ISSN: 0021-8995

P26. G. Iannace, M. Masullo, E. Di Maio, L. Verdolotti, *Proprietà acustiche di un nuovo materiale per l'edilizia a base di cemento e poliuretano espanso (Acoustics properties of a new construction hybrid composite foams material)*, Nota tecnica su (Technical note on) Rivista Italiana di Acustica, 33 (2009) 49-51, ISSN 0393-1110

P27. E. Di Maio, R. Mali, S. Iannace, *Investigation of Thermoplasticity of Zein and Kafirin proteins: Mixing Process and Mechanical Properties*, Journal of Polymers and the Environment, 18 (2010) 626–633, ISSN

P28. L. Verdolotti, E. Di Maio, G. Forte, M. Lavorgna, S. Iannace, *Hydration Induced Reinforcement of Polyurethane-Cement Foams: Solvent Resistance and Mechanical Properties*, Journal of Materials Science, vol 45 (2010) 3388-3391, ISSN: 0022-2461

P29. A. Salerno, E. Di Maio, S. Iannace and P.A. Netti, *Tuning the Microstructure and Biodegradation of Three-Phase Scaffolds for Bone Regeneration Made of PCL, Zein and HA*, Journal of Cellular Plastics, accepted

P30. A. Salerno, E. Di Maio, S. Iannace, P.A. Netti, *Tailoring the pore structure of PCL scaffolds for tissue engineering prepared via gas foaming of multi-phase blends*, Journal of Porous Materials, accepted (2011)

P31. A. Salerno, S. Zeppetelli, E. Di Maio, S. Iannace, P.A. Netti, *Novel 3D porous multi-phase composite scaffolds based on PCL, thermoplastic zein and ha prepared via supercritical CO2 foaming for bone regeneration*, Composites Science and Technology 70 (2010) 1838-1846

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P33. G. Mensitieri, E. Di Maio, G.G. Buonocore, I. Nedi, M. Oliviero, L. Sansone, S. Iannace, *Processing and Shelf Life Issues of Selected Food Packaging Materials and Structures from Renewable Resources*, Trends in Food Science & Technology, accepted, 2011

P34. M. G. Pastore Carbone, E. Di Maio, S. Iannace, G. Mensitieri, *Simultaneous experimental evaluation of solubility, diffusivity, interfacial tension and specific volume of polymer/gas solutions*, Polymer Testing, 30 (2011) 303-309

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P36. I. Nedi, E. Di Maio, S. Iannace, *Bionanocomposites based on thermoplastic zein and montmorillonite*, Journal of Agricultural and Food Chemistry, submitted

P37. A. Zinno, V. Scognamiglio, A. Prota, D. Acierno, *Experimental characterization of phenolic-impregnated honeycomb sandwich structures for transportation vehicles*, Composite Structures, submitted

CHAPTERS IN BOOKS

M1. S. Iannace, E. Di Maio, Y.W. Di, G. Mensitieri, L. Nicolais, *The foaming process of biodegradabile polyesters*, Biodegradable Polymer and Plastics, E. Chiellini Ed., Kluver Academic/Plenum Publishers, London, 2003, ISBN 0-306-47884-6

M2. S. Cotugno, E. Di Maio, S. Iannace, G. Mensitieri, *Microcellular Biodegradable Polymeric Foams Produced From Supercritical Fluids and Nanocomposite Solutions*, in Material & Process Technology-The Driver for Tomorrow's Improved Performance, Ed. K. Drechsler, Publ. by SAMPE EUROPE (Aalsmeer, NL), pag. 400-405 (2004), ISBN 3-9522677-1-6

M3. S. Cotugno, E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *Biodegradabile foams* in Handbook of Biodegradable Polymeric Materials and their Applications, Ed. B. Narasimhan e S.K. Mallapragada, American Scientific Publishers, 2005, ISBN 1-58883-053-5

M4. E. Di Maio, S. Iannace, *Foaming analysis of poly(ε-caprolactone) and poly(lactic-acid) and their nanocomposites*, in Polymeric Foams: Technology and Developments in Regulation, Process and Products. Ed. S.-T. Lee e D. Scholz, Taylor and Francis, 2009, ISBN 978-1-4200-6125-3

M5. A. Salerno, M. Oliviero, E. Di Maio, S. lannace, P. Netti, Controlled preparation of porous scaffolds by gas foaming of heterogeneous blends, in *International Conference on Times of Polymers (TOP) and Composites*, edited by D. Aciemo, A. D'Amore, and L. Grassia, 2008 American Institute of Physics, 978-0-7354-0570-7/08

M6. A. Salerno, E. Di Maio, S. Iannace, Natural Based Foams for Tissue Engineering Applications, submitted for inclusion in Foams, Ed. H. Naguib

PATENTS

B1. S. Iannace, E. Di Maio, L. Verdolotti, M. Lavorgna, *Un Materiale Ibrido Polimero Espanso/Legante Inorganico Avente Densità e Morfologia Controllata, Metodo per la sua Preparazione e suoi Usi*, Brevetto Italiano No. MI 2006 A 001325 del 7 Luglio 2006.

B2. S. Iannace, E. Di Maio, L. Verdolotti, M. Lavorgna, *An Hybrid from a Polymeric Foam and an Inorganic Binder with Controlled Density and Morphology*, PCT/IB2007/001842 – WO 2008/007187 A2

CONFERENCE AND TECHNICAL PAPERS

A1. S. Iannace, E. Di Maio, L. Nicolais, *Struttura e proprietà di schiume poliuretaniche ottenute mediante dissoluzione di NaCl da compositi PU/NaCl*, AIM 1999, Salerno, Italia

A2. C. Ciardiello, E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *Modellazione e realizzazione di espansi biodegradabili a base di poliesteri termoplastici*, AIM 2001, Trieste, Italia

A3. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *Biodegradable foams based on PCL processed with CO_2*, presentato alla Gordon Conference 2001 on Biodegradable Polymers, Oxford, Great Britain

A4. S. Iannace, E. Di Maio, G. Mensitieri L. Nicolais, *Modeling and experimental investigation of foaming processes of biodegradabile polyesters*, COMAT 2001, Mar del Plata, Argentina

A5. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *Modeling and Experimental Investigation of Foaming Processes of Biodegradable Polymers*, ICCE, 2001, Tenerife, Spagna

A6. R. Zullo, E. Di Maio, S. Iannace, L. Nicolais, *Effect of post-condensation on foaming of PLLA*, PPS 2001, Antalya, Turchia

A7. S. Iannace, Y.W. Di, E. Di Maio, L. Nicolais, *The Foaming Process of Biodegradabile Polyesters*, 7th Word Conference on Biodegradable Polymers & Plastics 2002, Pisa, Italia

A8. Y. Di, E. Di Maio, S. Iannace, G. Mensitieri, *Preparation, characterization and foaming process of biodegradable nanocomposites*, PPS 2002, Guimarães, Portogallo

A9. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *Caratterizzazione morfologica di PCL espanso con miscele di CO_2 ed N_2*, AIMAT 2002, Modena, Italia

A10. Y. Di, S. Iannace, E. Di Maio, L. Nicolais, *Poly(L-lactide)/organoclay nanocomposites by melt mixing and their thermal, rheological properties*, International conference on times of polymers (TOP), Oct. 20-24, 2002, Ischia, Italy

A11. S. Iannace, E. Di Maio, Y. Di, L. Nicolais, *Foam and Nanocomposites from Biodegradabile Polymers*, COMAT 2003, Merida, Messico (2003)

A12. M. Aurilia, E. Di Maio, R. Ali, S. Iannace, L. Nicolais, *Preparazione e caratterizzazione di film edibili a base di proteine*, Workshop AIM 2003 per l'industria, Polimeri per imballaggi nel settore alimentare e biomedico, Gargnano, Italia (2003)

A13. E. Di Maio, S. Iannace, L. Nicolais, *Espansi biodegradabili*, Workshop AIM 2003 per l'industria, Polimeri per imballaggi nel settore alimentare e biomedico, Gargnano, Italia (2003)

A14. E. Di Maio, S. Iannace, *Natural Fiber Reinforced Foams*, 1st International Workshop on Natural Fibre Composites, Ischia (2003)

A15. E. Di Maio, S. Iannace, *Cristallizzazione di policaprolattone reticolato con perossidi*, Reo 2004, Ischia (Na), Italia (2004)

A16. E. Di Maio, C. Marrazzo, S. Iannace, M. Narkis, *Effect of Branching on Foam Morphology of PCL*, 2nd International Conference on Times of Polymers (TOP), Ischia (Na), Italia (2004)

A17. Y. Di, S. Iannace, E. Di Maio, L. Nicolais, *Reactive chain extension of poly(lactic acid): characterization and foam processing*, 2° International Conference on Times of Polymers (TOP), Ischia (Na), Italia (2004)

A18. S. Cotugno, E. Di Maio, S. Iannace, G. Mensitieri, *Microcellular Biodegradable Polymeric Foams Produced from Supercritical Fluids and Nanocomposite Solutions*, SAMPE Europe 2004, Paris, France, (2004)

A19. A. Conte, G.G. Buonocore, S. Iannace, E. Di Maio, M.A. Del Nobile, *Influence of Processing Conditions on Barrier Properties of Zein Films Intended for Food Packaging Applications*, ILSI Europe, 3rd Int. Symp. on Food Packaging, Barcelona, Spain (2004)

A20. S. Iannace, E. Di Maio, L. Nicolais, *Process rheology for polymers and compositesiodegradable Polymer and Composites*, Polymers and Composites, Arab School for Science and Technology, Damascus, Syria, (2004)

A21. S. Iannace, E. Di Maio, C. Marrazzo, L. Nicolais, *Heat transfer in foam and composite material*, Polymers and Composites, Arab School for Science and Technology, Damascus, Syria, (2004)

A22. S. Iannace, E. Di Maio, L. Nicolais, *Recent Advances in Production Techniques for Foam Materials*, Polymers and Composites, Arab School for Science and Technology, Damascus, Syria, (2004)

A23. E. Di Maio, C. Marrazzo, S. Iannace, *Effetto del branching sulla morfologia del policaprolattone espanso*, GRICU 2004, Ischia (Na), Italia, (2004)

A24. E. Di Maio, C. Marrazzo, S. Iannace, *Foaming Map of a Biodegradable Polyester*, PPS 20, Akron, Ohio, USA, (2004)

A25. E. Di Maio, C. Marrazzo, Y. Di, S. Iannace, L. Nicolais, *Nanocomposite foams based on biodegradable polymers*, International Conference "Present situation and forecasts of nanotechnology in: materials, health and medical systems, energy", November 4-5, 2004, Roma, Italia

A26. S. Acierno, E. Di Maio, S. Iannace, N. Grizzuti, *Structure development during crystallization in polycaprolactone-based systems*, AERC 2005, 2nd Annual European Rheology Conference, Grenoble, France (2005)

A27. Y. Di, E. Di Maio, C. Marrazzo, S. Iannace, *Biodegradable foams based on PCL and PLA: how to improve the foaming process by means of reactive processing and nanocomposites*, Blowing Agents and Foaming Processes, Rapra Technology Limited, Stuttgart, Germany (2005)

A28. Y. Di, E. Di Maio, C. Marrazzo, S. Iannace, *Improving the foamability of PCL and of PLA by means of reactive processing and nanocomposites*, PPS-21, Leipzig, Germany (2005)

A29. C. Marrazzo, E. Di Maio, S. Iannace, *How to control thermoplastic foam structure and properties by means of chemical modification, blending and nanometric filling*, Theplac, Lecce, Italy (2005)

A30. C. Marrazzo, E. Di Maio, S. Iannace, *Effect of nanoclay and chemical modification on the foamability of biodegradable polymers*, COMAT , Buenos Aires, Argentina (2005)

A31. C. Marrazzo, E. Di Maio, S. Iannace, *Cellular structure of biodegradable nanocomposite foams*, Blowing Agents and Foaming Processes, Rapra Technology Limited, Munich, Germany (2006)

A32. A. Salerno, M. Oliviero, E. DI Maio, S. Iannace, A. Colosimo, V. Guida, B. Della Piccola, D. Pressato, A. Nataloni, A. Berardi, E. Procaccino, F. Velardi, *Novel PCL composite scaffolds for bone tissue engineering*, ICAB, Capri, Italy (2006)

A33. A. Salerno, E. Di Maio, S. Iannace, P.A. Netti, *Micro-Bimodal porous scaffolds for tissue engineering*, ICAB, Capri, Italy (2006)

A34. S. Iannace, E. Di Maio, C. Marrazzo, L. Nicolais, *Gas foaming of synthetic and natural polymers for biodegradable scaffolds*, ICAB, Capri, Italy (2006)

A35. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *A predictive approach based on the Simha-Somcynsky free volume theory for the effect of dissolved gas on viscosity and glass transition temperature of polymeric mixtures*, TOP, Ischia, Italy (2006)

A36. C. Marrazzo, E. Di Maio, S. Iannace, *Conventional and nanometric nucleating agents in foaming of polycaprolactone: crystals vs. bubbles nucleation*, PPS 22, Yamagata, Japan (2006)

A37. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *A predictive approach based on the Simha-Somcynsky free volume theory for the effect of dissolved gas on viscosity and glass transition temperature of polymeric mixtures*, PPS 22, Yamagata, Japan (2006)

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A39. E. Di Maio, S. Iannace, G. Mensitieri, L. Nicolais, *A predictive approach based on the Simha-Somcynsky free volume theory for the effect of dissolved gas on viscosity and glass transition temperature of polymeric mixtures*, AERC 4, Naples, Italy (2007)

A40. P.A. Netti, E. Di Maio, S. Iannace, A. Salerno, *Engineering of foamed structures for biomedical application*", 9th Blowing Agents and Foaming Processes, Rapra Technology Limited, Frankfurt, Germany (2007), pag. 1-6

A41. E. Di Maio, S. Iannace, F. Scavello, S. Capuano, P. Lomellini, Effect of Molecular Structure and Weight Distribution on Foaming of PS, PPS 2007, Brazil

A42. L. Sorrentino, S. Iannace, E. Di Maio, M. Marrone, L. Oriani, S. Cobror, Poly(ethylene terephthalate) foams: effect of molecular architecture on foaming, PPS 2007, Brazil

A43. L. Verdolotti, S. Colini, E. Di Maio, M. Lavorgna, S. Iannace, *Schiume ibride poliuretano-cemento per applicazioni strutturali* convegno Difesa Roma

A44. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, P.A. Netti, *"Gas foaming of co-conntinuous blends: a novel route to engineer biofoams microstructure"*, 9th Polymer Blends Symposium, Palermo, Italy (2007)

A45. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, *Foams from thermoplastic zein and gelatin biofoams*, BIOFOAMS, Capri, Italy (2007)

A46. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, P. A. Netti, *Tailoring the micro-bimodal porous structures from biodegradable blends of pcl and thermoplastic gelatin*, BIOFOAMS, Capri, Italy (2007)

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A49. S. Iannace, E. Di Maio, *Tailoring the cellular morphology of biodegradable foams by using micro- and nano-structured polymeric systems*, COMAT, Rio de Janeiro, Brazil (2007)

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A51. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, *Biodegradable Thermoplastic foams from synthetic and natural resources*, PPS24, Salerno, Italy (2008)

A52. M. Oliviero, E. Di Maio, S. Iannace. "*Films from thermoplastic zein: effect of molecular structure on elongational rheological properties and filmability*" Slim2008, Ischia, Italy (2008)

A53. E. Di Maio, S. Iannace, Gas foaming based techniques for the tailoring of cellular structures of biobased polymers, International Workshop on Biomacromolecules, Stochkolm, Sweden, (2008)

A54. E. Di Maio, S. Iannace, G. Mensitieri, M. Oliviero, L. Sansone, R. Zullo, *Biodegradable Flexible Films for High Pressure Sterilization and Pasteurization*, EFFOST 1st European Food Congress, Ljubljana, Slovenia (2008)

A55. S. Iannace, E. Di Maio, *Timescales in bubble nucleation events for the formation of microcellular biodegradable foams*, TOP, Ischia, Italy (2008). AIP Conference Proceedings 1042, pp. 3-5 0 Permalink: http://link.aip.org/link/?APCPCS/1042/3/1

A56. A. Salerno, M. Oliviero, E. Di Maio, S. Iannace, P.A. Netti, *Controlled preparation of porous scaffolds by gas foaming of heterogeneous blends*, TOP, Ischia, Italy (2008). AIP Conference Proceedings 1042, pp. 102-104 Permalink: http://link.aip.org/link/ ?APCPCS/1042/102/1

A57. M. Oliviero, E. Di Maio, S. Iannace, *Film a base di zeina termoplastica: effetto della struttura molecolare sulle proprietà reologiche elongazionali e sulla filmabiltà*, GRICU, Le Castella, Italy (2008)

A58. S. Iannace, E. Di Maio, G. Mensitieri, M.Oliviero, L. Sansone, *Challenges in Packaging: the use of materials from renewable resources and their implications for processing and properties*, EFFOST 2nd European Food Congress, Budapest, Hungary (2009)

A59. A. Salerno, M. Oliviero, E. Di Maio, C. Rofani, A.C. Berardi, F. Velardi, S. Iannace, P.A. Netti, Design of Novel Multi-Phase Composite Scaffolds for Bone Regeneration, International Conference on Composite Materials (ICCM-17) (2009)

A60. C. Rofani, A. Colosimo, B. Dallapiccola, A. Salerno, S. Iannace, F. Velardi, A. C. Berardi, "Lngfr+cells generate osteoblasts on novel PCL scaffolds" ISEH 37th Annual Scientific Meeting / Experimental Hematology 2008, 36, S1 (2008)

A61. A.Salerno, E. Di Maio, S. Zeppetelli, S. Iannace, P. A. Netti, Design of Novel Three-Phase Biodegradable Scaffolds for Bone Regeneration, Biofoams 2009, Toronto, Canada (2009)

A62. E. Di Maio, S. Iannace, *Biodegradable foams, an overview of potentials and applications*, INSTM Conference, Tirrenia, Italy (2009)

A63. M.G. Pastore Carbone, A. Catapano, M.L. Fariello, M. Aurilia, L. Sorrentino, E. Di Maio, S. Iannace, G. Mensitieri, *Gas sorption and pVT properties of PES nanocomposites*, INSTM Conference, Tirrenia, Italy (2009)

A64. Verdolotti L, Forte G, Germino N, Di Maio E; Lavorgna M e Iannace S (2010) Functional and structural properties of hybrid polyurethane-cement foam. ICPIC Proc 273-278

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SCIENTIFIC AND TECHNICAL ACTIVITIES

The research work is focused on the production of cellular structures made with biodegradable and natural polymers. This study covers two aspects: a) the basic study of thermodynamics and physics of foam formation and b) the technological process of foam formation, both targeted to these specific class of materials. The aim is to understand the influence of the processing parameters, composition as well as the molecular architecture on the morphology and properties of the cellular structures. In the following, some details of the activities in the different research areas are given.

Microcellular Foams. The activity aimed at the analysis of the phenomena leading to the formation of a foamed structure and the correlations among process, structures and performances. The activity led to the design and development of new equipments for the production of microcellular foams by continuous as well as batch technologies and to the production of foams with PCL, PLA, PET and with natural polymers such as gluten, zein, kafirin and starch.

Polymer/blowing agent mixtures. Sorption thermodynamics and kinetics of blowing agents in the polymers were studied. Sanchez and Lacombe and Simha and Somcynsky equations of state have been used to predict solubilities. The mixtures were also characterized from a rheological point of view, with in-line measurements during extrusion and rheological properties have been modelled with an original extension of the Simha and Somcynsky theory.

Nanocomposites. Nanocomposites from biodegradable polymers were produced by melt mixing and were characterized rheologically, mechnically and thermically. Properties were modelled by using a percolation theory approach. Nanocomposites proved to be optimal material for foaming, since the nanometric filler does not reduce the deformability of the polymeric matrix while enhancing the elongational and mechanical properties. Concurrent nucleation effects on both the bubble formation and the crystalline phase formation have been evidenced and analyzed.

Natural polymers, thermoplasticization and foaming. Proteins and polysaccharides have been studied and new processing technologies for the massive production of films or foams with these materials have been introduced. In particular, a "biological" study has been coupled with a "processing" one, to evidence, for example, the relationships among molecular structure and arrangement, rheological properties in elongation and film blowing ability of the biopolymers.