

## Maria Giovanna Pastore Carbone

ΜΗΧΑΝΙΚΟΣ ΥΛΙΚΩΝ,  
ΔΙΔΑΚΤΩΡ ΠΑΝΕΠΙΣΤΗΜΙΟΥ ΤΗΣ ΝΑΠΟΛΗΣ FEDERICO II



### ΠΡΟΣΩΠΙΚΑ ΣΤΟΙΧΕΙΑ

Ημ. γέννησης: 27/05/1983

Τόπος γέννησης: Νάπολη (Ιταλία)

Ιθαγένεια: Ιταλική

Οικ. κατάσταση: Έγγαμη με ένα παιδί

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(ΙΤΕ/ΙΕΧΜΗ)

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Scopus: <https://www.scopus.com/authid/detail.uri?authorId=36970906800>

### ΤΡΕΧΟΥΣΑ ΘΕΣΗ

*Μεταδιδακτορική Ερευνήτρια*, Ίδρυμα Τεχνολογίας και Έρευνας, Ινστιτούτο Ερευνών Χημικής Μηχανικής (ΙΤΕ/ΙΕΧΜΗ), Πάτρα (Ελλάδα).

*Κύριες δραστηριότητες/ ενδιαφέροντα*: πειραματική διερεύνηση της μηχανικής του γραφενίου και άλλων δισδιάστατων υλικών / strain engineering/ ultra-thin μεμβράνες/ ανάπτυξη πολυλειτουργικών συστημάτων βασισμένων σε σύνθετα πολυμερή/ γραφένιο και άλλα δισδιάστατα υλικά / υποστήριξη στην επιστημονική και οικονομική διαχείριση ερευνητικών προγραμμάτων.

### ΕΡΕΥΝΗΤΙΚΑ ΕΝΔΙΑΦΕΡΟΝΤΑ

Τα ερευνητικά ενδιαφέροντα της Δρ. Maria Giovanna Pastore Carbone βρίσκονται σε όλες τις πτυχές των σχέσεων μεταξύ δομής και λειτουργικών ιδιοτήτων πολυφασικών υλικών – κυρίως πολυμερές και σύνθετα υλικά ενισχυμένα με γραφένιο και άλλα δισδιάστατα υλικά. Υιοθετεί μια ολιστική προσέγγιση, που βασίζεται στην εφαρμογή φασματοσκοπικών και μικροσκοπικών τεχνικών ως μοναδικών εργαλείων να συσχετίσει τις προαναφερθείσες ιδιότητες στη μακρο-μικρο-και νανο-κλίμακα, με ιδιαίτερη έμφαση στη μηχανική και θερμοδυναμική συμπεριφορά. Χρησιμοποιώντας μη συμβατικές τεχνικές που βασίζονται στην in situ φασματοσκοπία Raman και τη μικροσκοπία ατομικής δύναμης, η εργασία της διερευνά την εφαρμογή καταπόνησης σε νανοϋλικά και νανοςύνθετα για την κατανόηση των μηχανισμών παραμόρφωσής τους και των εγγενών μηχανικών ιδιοτήτων τους, προς την ανάπτυξη συσκευών για εφαρμογές υψηλής τεχνολογίας. Η τρέχουσα έρευνά της επικεντρώνεται στην ενσωμάτωση γραφενίου και συναφών υλικών για την ανάπτυξη πολυλειτουργικών συστημάτων, όπως ελαφριά σύνθετα υλικά για

εφαρμογές ηλεκτρομαγνητική θωράκισης και επιστρώσεις για προστασία από την υπεριώδη ακτινοβολία και τη διείδυση αερίων/ατμών, και βιώσιμα σύνθετα υλικά ενισχυμένα με γραφένιο και άλλα δισδιάστατα υλικά. Ενσωματώνοντας έννοιες της επιστήμης των υλικών, της φυσικής, της χημείας και της νανοτεχνολογίας, η έρευνά της στοχεύει σε διάφορες εφαρμογές που θα επηρεάσουν την κοινωνία μας στο μέλλον, όπως νανοσύνθετα υλικά υψηλής απόδοσης, βιώσιμα σύνθετα υλικά, διατήρηση της πολιτιστικής κληρονομιάς, ευαίσθητους αισθητήρες και ενεργοποιητές.

Τα κύρια ερευνητικά θέματα μπορούν να συνοψιστούν ως εξής:

**Γραφένιο και άλλα δισδιάστατα υλικά:** Σύνθεση γραφενίου και άλλων δισδιάστατων υλικών. Τροποποίηση επιφάνειας και δομικός χαρακτηρισμός. Μηχανικές ιδιότητες σε εφελκυσμό και συμπίεση. Strain engineering. Παραγωγή νανοσύνθετων υλικών με πολυμερική μήτρα. Μηχανικές και φυσικές ιδιότητες σύνθετων υλικών ενισχυμένων με γραφένιο και δισδιάστατα υλικά.

**Πολυμερή και σύνθετα υλικά:** Επεξεργασία. Μοντελοποίηση συμπεριφοράς δομής/ιδιότητας σε θερμοπλαστικά πολυμερή και ελαστομερή. Μορφολογικός και δομικός χαρακτηρισμός. Μηχανικές ιδιότητες. Φασματοσκοπικός χαρακτηρισμός πολυμερών και νανοπληρωτικών.

**Μη-Καταστροφική Μηχανική Δοκιμή Υλικών:** Εφαρμογή της φασματοσκοπίας Laser Raman για μετρήσεις τάσης ή παραμόρφωσης σε εύκαμπτα σύνθετα υλικά και σε συστήματα γραφενίου/πολυμερούς.

**Ρόφηση και επιφανειακές ιδιότητες διαλυμάτων πολυμερών/αερίων – υπερκρίσιμο καθεστώς:** εφαρμογή της φασματοσκοπίας υπέρυθρων και Raman για τη διερεύνηση της θερμοδυναμικής ρόφησης και της αλληλεπίδρασης ένωσης χαμηλού μοριακού βάρους σε πολυμερή. Μεταφορά μάζας σε πολυμερή και νανοσύνθετα.

## ΣΠΟΥΔΕΣ

**2011 Διδακτορικό στην Μηχανικής των Υλικών και Κατασκευών**, Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλίας), σε συνεργασία με Bridgestone Technical Center Europe, Ρώμη (Ιταλία),

Τίτλος Διδακτορικής Διατριβής: *Investigating mechanical behavior of cord-rubber composites by multi-scale experimental and theoretical approach*

Επιβλέπων Καθηγητής: Δρ. Giuseppe Mensitieri

**2008 Πτυχίο (Laurea specialistica) Μηχανικής των Υλικών, magna cum laude** (άριστα), Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλίας),

Τίτλος μεταπτυχιακής εργασίας: *“Proprietà funzionali e strutturali di hydrogel cellulosici per rilascio controllato di fitofarmaci” (Functional and structural properties of cellulosic hydrogels for phytopharmaceutical drug release)*

Επιβλέπων Καθηγητής: Δρ. Giuseppe Mensitieri

**2005 Πτυχίο Επιστήμης και Μηχανικής των Υλικών, magna cum laude** (άριστα), Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλίας),

Τίτλος πτυχιακής εργασίας: *“Preparazione e caratterizzazione reologica di nano compositi a matrice termoplastica” (Preparation and rheological characterization of nanocomposites with thermoplastic matrices)*

Επιβλέπων Καθηγητής: Δρ. Domenico Acierno

## ΕΠΑΓΓΕΛΜΑΤΙΚΑ ΠΡΟΣΩΝΤΑ

2009 Άδεια Εξάσκησης Επαγγέλματος Βιομηχανικού Μηχανικού από το Πανεπιστήμιο της Νάπολης Federico I (Αρ. μητρώου 027004964)

## ΞΕΝΕΣ ΓΛΩΣΣΕΣ

Ιταλική  
Άλλες

Μητρική Γλώσσα

	Understanding		Speaking		Writing
	Listening	Reading	Spoken Interaction	Spoken production	
<b>English</b>	C1	C2	C1	C1	C2
<b>Greek</b>	C2	C2	C2	C2	C1

**Τίτλοι πτυχίων** Spoken English for Speakers of Other Languages, grade 8 – level B2.2  
Trinity College. “Passed with Distinction”  
Πιστοποιητικό ελληνομάθειας” Κέντρον Ελληνικής Γλώσσας, Γ1

## ΕΡΕΥΝΗΤΙΚΗ ΕΜΠΕΙΡΙΑ

**Μεταδιδακτορική Ερευνήτρια**, Ίδρυμα Τεχνολογίας και Έρευνας, Ινστιτούτο Ερευνών Χημικής Μηχανικής (ΙΤΕ/ΙΕΧΜΗ), Πάτρα (Ελλάδα), απο Φεβ. 2015 έως σήμερα.

Απρ. 2020 έως σήμερα *Graphene Core 3 – FET*

Μάιος 2018 – Μαρ. 2020 *Graphene Core 2 – FET*

Νοε. 2017 – Μαρ. 2018 *Graphene Core 1 - FET*

Φεβ. 2015 – Οκτ. 2017 *Tailor Graphene - ERC Advanced Grant*

Μέλος της επιστημονικής ομάδας / άμισθος σύμβουλος στα προγράμματα: *Graphenart (ERC PoC)*, *APACHE (H2020)*, *Greenart (Horizon Europe)*

### Αντικείμενα Εργασίας

Synthesis of graphene and related materials. Quality assessment via Raman spectroscopy, SEM. Production and characterization of graphene micro-ribbons. Deposition of atomically-thin and ultra-thin films on several substrates (polymers, elastomers, Si/SiO<sub>2</sub> wafers, metals, glass, paper/cardboard/canvas). Investigation of mechanical properties in tension of graphene through tensile testing, AFM-nanoindentation and QNM mapping, in-situ Raman combined with uniaxial tensile testing, picoindentation.

Production and characterization of graphene-based nanocomposites for the development of multi-functional systems (elastomeric sensors/ actuators, foams for EMI shielding, coatings for protection against UV-vis radiation and permeation of gases/vapours). Mechanical properties. Viscoelasticity. Assessment of barrier properties and ageing resistance.

Development of graphene-based systems for the protection of artworks and preventive conservation of cultural heritage.

Development of green composites enhanced with graphene.

**Μεταδιδακτορική Ερευνήτρια με υποτροφία**, Dept. of Chemical, Materials and Production Engineering, Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλία), Οκτ. 2012- Οκτ. 2014, υποτροφία στα πλαίσια του εθνικού (ιταλικού) προγράμματος *Rete di Eccellenza MASTRI "Materiali e Strutture Intelligenti"*

**Αντικείμενα Εργασίας**

Investigation of thermodynamics and mass transport of polymer-gas solutions that are adopted in polymer foaming processes. Development of the experimental setup for the simultaneous measurement of solubility, diffusivity, specific volume and surface tension of molten polymer/ gas solutions. High Temperature/ High pressure for polymer processing. Interfacial phenomena. Pendant Drop Method/ Axisymmetric Drop Shape Analysis. Foaming with CO<sub>2</sub> and supercritical fluids. Investigation of sorption phenomena and of the interaction between polymer and low molecular weight compounds via Infrared spectroscopy and Raman line spectroscopy. Modelling of sorption process. Dilatometric measurements on polymers (pressure-Volume-Temperature, pVT).

**Μεταδιδακτορική Ερευνήτρια**, CRdC Tecnologie Scarl, Regional Competence Center for Energy, Materials, Electronics and Industrial Design, Νάπολη (Ιταλία). Μαρ. 2012 - Νοε. 2012; Οκτ. 2014 – Ιαν. 2015

Μαρ. 2012 - Νοε. 2012      εθνικό (ιταλικό) πρόγραμμα *B.A.S. Made in Italy*

Οκτ. 2014 – Ιαν. 2015      εθνικό (ιταλικό) πρόγραμμα *SCILLA-M*

**Αντικείμενα Εργασίας**

Synthesis of biodegradable, superabsorbent hydrogels. Characterization of structure/morphology and of thermodynamics of water sorption and swelling. Modelling of sorption process via Finite Elements Analysis.

Production of carbon fiber reinforced polymers. Mechanical and thermal characterization.

**Επισκέπτης Ερευνήτρια**, Advanced Raman Scattering Laboratory, School in Advanced Optical Technologies, Erlangen (Germany), Μαρ. 2012 και Οκτ. 2013

**Αντικείμενα Εργασίας**

Investigation of supercritical CO<sub>2</sub> sorption in molten polycaprolactone (PCL) via time-resolved Raman line spectroscopy. Determination of concentration gradients via quantitative analysis of Raman spectra.

**Επισκέπτης Ερευνήτρια**, Composites and Nanomaterials Laboratory, Ίδρυμα Τεχνολογίας και Έρευνας, Ινστιτούτο Ερευνών Χημικής Μηχανικής (ΙΤΕ/ΙΕΧΜΗ), Πάτρα (Ελλάδα), Μαρ.-Σεπτ. 2011

**Αντικείμενα Εργασίας**

Deformation mechanism on molecular level of PET fibres via Raman spectroscopy. Investigation of micromechanical behaviour of rubber-cord composites via in situ Raman spectroscopy combined with tensile testing. Micromechanical models of flexible composites. Efficiency of reinforcement.

**Υποψήφια Διδάκτωρ**, Dept. of Chemical, Materials and Production Engineering, Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλία), Sept.2008 – Dec. 2011

Sept. 2008-Feb. 2009      *MACE– MIUR εθνικό (ιταλικό) πρόγραμμα*

Dec. 2008-Nov. 2011      *Υποτροφία, Bridgestone Technical Centre Europe*

**Αντικείμενα Εργασίας**

Production of flexible composites. Mechanical and thermal characterization.

Mechanical characterization in tension, analysis of viscoelasticity of rubber and PET filaments and cords and of rubber-cord composites adopted in tyres. Analytical modelling of mechanical properties of cords and ropes. Finite Element Model of rubber-cord composite.

## **ΔΙΔΑΚΤΙΚΗ / ΕΚΠΑΙΔΕΥΤΙΚΗ ΕΜΠΕΙΡΙΑ**

### **Διδακτικό Έργο σε Μεταπτυχιακό κύκλο σπουδών**

**Lecturer**, Εκπαιδευτικό ερευνητικό πρόγραμμα για Μεταπτυχιακούς Φοιτητές “Comportamento di materiali compositi in Condizioni Estreme: alta Temperatura - COCET” (Συμπεριφορά σύνθετων υλικών σε ακραίες συνθήκες: υψηλή θερμοκρασία), Dept. of Chemical, Materials and Production Engineering, Πανεπιστήμιο της Νάπολης Federico II. Αυτοδύναμο διδακτικό έργο με σύμβαση εργασίας ιδιωτικού δικαίου ορισμένου χρόνου, διδασκαλία του μαθήματος “Polymer Matrix Composites: structure and mechanical properties”, 36 ώρες / ένα εξάμηνο (2014)

**Lecturer**, Εκπαιδευτικό ερευνητικό πρόγραμμα για Μεταπτυχιακούς Φοιτητές “Processi Ausiliari: le giunzioni adesive e il repairing, PRADE” (Βοηθητικές διεργασίες: συγκολλημένης άρθρωσης και επισκευή), Dept. of Chemical, Materials and Production Engineering, Πανεπιστήμιο της Νάπολης Federico II. Διαλέξεις: “Sorption and thermodynamics of polymer-gas solutions at high pressures” (3 ώρες) and “Composite micromechanics through applied Raman spectroscopy” (3 ώρες) (ένα εξάμηνο, 2014)

### **Διδακτικό Έργο σε Προπτυχιακό κύκλο σπουδών**

**Teaching Assistant**, Πτυχίο Μηχανικής των Υλικών Πανεπιστημίου της Νάπολης Federico II, Μάθημα Επιστήμη και Τεχνολογία Υλικών. Διαλέξεις: “Ελαστομερές” και “Σύνθετα Υλικά”, 2009-2011.

### **Συνεπιβλέψη 4 διπλωματικών εργασιών προπτυχιακών και μεταπτυχιακών φοιτητών**

- Guido Lippiello, B.Sc., Verso la misura accoppiata di tensione superficiale, diffusività, solubilità, volume specifico di fusi e soluzioni polimeriche (Towards the coupled measurement of surface tension, diffusivity, solubility and specific volume of polymer melt and solutions) (Degree of Materials Science and Engineering of the University of Naples Federico II, 2010) (Συνεπιβλέπουσα καθηγήτρια)
- Alfieri Francesco, B.Sc., Verso la misura accoppiata di tensione superficiale, diffusività, solubilità, volume specifico di fusi e soluzioni polimeriche: aspetti critici del Pendant Drop Method (Towards the coupled measurement of surface tension, diffusivity, solubility and specific volume of polymer melt and solutions: critical aspects of Pendant Drop Method) (Degree of Materials Science and Engineering of the University of Naples Federico II, 2010) (Συνεπιβλέπουσα καθηγήτρια)
- Nadia Perillo, M.Sc., Misura simultanea di volume specifico, solubilità, diffusività e tensione superficiale della soluzione PCL fuso/CO<sub>2</sub> (Simultaneous measurement of specific volume, solubility, diffusivity and surface tension of molten PCL/CO<sub>2</sub> solution) (Degree of Materials Engineering of the University of Naples Federico II, 2011) (Συνεπιβλέπουσα καθηγήτρια)
- Mariarosaria Telesco, B.Sc., Preparazione e caratterizzazione di espansi polimerici biodegradabili caricati con ossido di grafene per la realizzazione di scaffold (Preparation and characterization of biodegradable polymeric foams doped with graphene oxide for the fabrication of scaffolds) (Degree of Materials Science and Engineering of the University of Naples Federico II, 2014) (Συνεπιβλέπουσα καθηγήτρια)

### **Εργαστηριακή επίβλεψη διπλωματικών εργασιών προπτυχιακών φοιτητών**

- Παπαδάτου-Γιγάντε Ιωάννα, Σύνθεση και χαρακτηρισμός νανοςύνθετων υλικών ελαστομερικής μήτρας, τμήμα Χημικής Μηχανικής του Πανεπιστήμιο Πατρών (2018)
- Ειρήνη Καλλίτση, Foamed graphene-based nanocomposites: Production & Characterization, τμήμα Χημικής Μηχανικής του Πανεπιστήμιο Πατρών (2022)

### **Εργαστηριακή επίβλεψη 3 υποψήφιων διδακτόρων**

- Fabrizia Cilento, Innovative Composite Materials with high graphene content, PhD in Industrial Product and Processes Engineering, Dept. of Chemical, Materials and Production Engineering, University of Napoli Federico II, 2021
- Χρήστος Παυλου, Production and characterization of graphene-based polymer nanolaminates, τμήμα Χημικής Μηχανικής του Πανεπιστήμιο Πατρών, 2022
- Έλλι Μπελλου, Μελέτη θραυστομηχανικής συμπεριφοράς 2D υλικών, τμήμα Χημικής Μηχανικής του Πανεπιστήμιο Πατρών

### **Συμμετοχή σε Ακαδημαϊκές Επιτροπές Διδακτορικών Διατριβών**

- Enea De Meo, Development of multifunctional materials for aesthetical and smart automotive components, PhD degree “Chemical and Materials Science” cycle XXXIII, University of Torino, 2021
- Marika Falciano, Eco-sustainable materials development and validation to support circular economy in automotive sector, PhD degree “Chemical and Materials Science” cycle XXXIII, University of Torino, 2021

## **ΕΡΕΥΝΗΤΙΚΗ ΚΑΙ ΕΡΓΑΣΤΗΡΙΑΚΗ ΕΜΠΕΙΡΙΑ**

### ***Synthesis and manipulation of graphene and related materials***

- Mechanical exfoliation
- Chemical Vapour Deposition
- Liquid-phase exfoliation
- Nanomanipulation and nanolithography
- Deposition of large-size graphene sheets through wet (scooping) and dry (lamination, stamping) techniques
- Deposition of ultra-thin self-assemblies of graphene and other 2D materials

### ***Production and manipulation of ultra-thin polymer films***

- Spin coating
- Dip coating
- Deposition via lift-off/float-on technique

### ***Characterization of graphene and nanomaterials at the nano- and micro-scale***

- Atomic Force Microscopy (Quantitative NanoMechanical characterization, Nanoindentation of suspended and supported nanomembranes, Friction/ Lateral Force Microscopy, Electrical properties)
- In-situ monitoring of flake topography under mechanical loading via AFM combined with micro-tensile tester
- Optical Microscopy and Scanning Electron Microscopy
- Tensile testing of nanomembranes via different platforms (Hysitron PI85 equipped with Push-To-Pull tools, design of custom-made systems)

- UV-Vis spectroscopy
- Raman spectroscopic mapping for quality assessment and strain engineering

***Processing of polymers and polymer nanocomposites:***

- Membranes: casting, spin coating
- Nanocomposites/ Mixed matrices composites: mixing, solution blending, extrusion
- Elastomeric composites: rubber compounding, lamination, vulcanization

***Characterization of polymers, elastomers, polymer-graphene composites and of polymer/ gas mixtures:***

- Mechanical properties – viscoelasticity (universal testing machine, MTS, Instron, Deben micro-tensile tester; Dynamic Mechanical Analysis)
- Thermal properties (Differential Scanning Calorimetry, Thermogravimetric Analysis)
- Rheology
- X-Ray Diffraction (XRD)
- Dilatometry (pressure-Volume-Temperature)
- Mass transport – sorption (gas sorption, liquid immersion)
- Interfacial/surface tension (pendant drop and contact angle measurements)
- Infrared and Raman spectroscopy for the investigation of sorption phenomena and of polymer-penetrant interactions
- Raman line imaging for the assessment of composite interfacial properties (stress build-up, ISS, efficiency of reinforcement)

***Supercritical gases***

- Polymer processing
- Gas foaming – production of microcellular foams
- Characterization of sorption dynamics and molecular interactions

***Proposal writing/ Project management/ Scientific reporting/ Financial reporting***

***Attitude towards scientific and practical problem solving in both academic and industrial environments.***

**ΚΡΙΤΗΣ - ΣΥΜΜΕΤΟΧΗ ΣΕ EDITORIAL ΣΕ ΕΠΙΣΤΗΜΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ**

- Editorial Board Member για το περιοδικό “Journal of Composite Science”, IF 3.3
- Guest Editor για το special issue “Advanced Graphite Epoxy Composites” στο περιοδικό “Journal of Composite Science” (*ongoing*)
- Referee για τα ακόλουθα επιστημονικά περιοδικά
  - Composite Science and Technology, IF 9.1
  - Graphene and 2D Materials, IF *not yet*
  - Nanoscale, IF 6.7
  - Journal of Cellular Plastics, IF 3.07
  - Advanced Composite Letters, IF 1.673
  - Plastics, Rubber and Composites: Macromolecular Engineering, IF 1.843



## ΥΠΟΤΡΟΦΙΕΣ-ΔΙΑΚΡΙΣΕΙΣ-ΒΡΑΒΕΥΣΕΙΣ

- Υποτροφία για 3 έτους Doctorate Scholarship, University of Naples Federico II, πλήρως χρηματοδότηση από Bridgestone Technical Centre Europe (2008-2011)
- Μεταδιδακτορική Υποτροφία για 2 έτους Rete di Eccellenza MASTRI “Materiali e Strutture Intelligenti” Postdoctoral Fellowship, University of Naples Federico II (2012-2014)
- Best poster award στο συνέδριο 3<sup>rd</sup> International Symposium on Frontiers in Polymer Science, Sitges, Spain (21/23 May 2013) για την δημοσίευση “Probing mass transport and molecular interaction in PCL/CO<sub>2</sub> solutions by using Raman line imaging”.
- Best poster award στο συνέδριο 13<sup>ο</sup> Πανελλήνιο Επιστημονικό Συνέδριο Χημικής Μηχανικής, Πάτρα, Ελλάδα (4/5 Ιουνίου 2022) για την δημοσίευση “Thermoplastic Polyurethane-graphene microcellular foams: production and characterization”
- “Βραβείο Εξαιρετης Δημοσίευσης Παναγιώτης Κανελλόπουλος 2022 από το Πανεπιστήμιο Πατρών για την δημοσίευση “Effective EMI shielding behaviour of thin graphene/PMMA nanolaminates in the THz range” (P24)
- Πρόγραμμα Επιχορήγησης Δαπανών για την Κατοχύρωση Διπλωμάτων Ευρεσιτεχνίας από το Ίδρυμα Μποδοσάκη για το δίπλωμα ευρεσιτεχνίας “Art protection with the use of 2D-materials such as graphene” (2019)

## ΣΥΜΜΕΤΟΧΗ ΣΕ ΕΡΕΥΝΗΤΙΚΑ ΠΡΟΓΡΑΜΜΑΤΑ

### Ευρωπαϊκά Προγράμματα

ΈΡΓΟ	ΠΕΡΙΟΔΟ	ΑΝΤΙΚΕΙΜΕΝΟ ΕΡΓΑΣΙΑΣ
ERC AdvG Tailor Graphene	Feb.2015- Oct. 2017	Investigation of mechanical properties in tension of graphene through tensile testing, AFM, Raman spectroscopy, picoindentation. Production and characterization of graphene micro-ribbon via UV lithography. Assistance in the scientific and financial management of the ERC AdvG.
Graphene Flagship Core 1	Nov.2017 – Mar. 2018	Mechanical properties of graphene and other 2D materials via AFM nanoindentation and in-situ Raman combined with uniaxial tensile testing. Graphene deposited on elastomeric substrates to withstand large deformations. Production and characterization of graphene-based elastomeric nanocomposites for the development of multi-functional systems (sensors/ actuators, foams for EMI shielding).
Graphene Flagship Core 2	May 2018– Mar. 2020	Integration of graphene and related materials for the development of multi-functional systems (such as lightweight composites for EMI shielding applications and coatings for protection against UV-vis radiation and permeation of gases/vapours). Assistance in the scientific management of WP “Composites”.
Graphene Flagship Core 3	Apr. 2020 – Sept. 2023	Production of graphene nanocomposites from industrial masterbatches dilution. Mechanical properties. Assessment of barrier properties and ageing resistance. Development of laminates systems with enhanced mechanical and EMI shielding behaviour. Assistance in the scientific management of WP “Composites”.



ERC PoC Graphenart	Oct.2017- Mar.2019	Development of graphene veils for the protection of artistic paints. Manipulation of large-size CVD graphene membranes. Mechanical integrity and fatigue of graphene veils. Accelerated ageing measurements. Colorimetry.
APACHE	Jan.2019- June 2022	Development of CVD graphene-based glazing. Mechanical and barrier properties of graphene membranes. Accelerated ageing tests.
Greenart	Oct.2022-to date	Eco-friendly production and manipulation of graphene and related materials. Development of green composites enhanced with graphene.

### **Εθνικά (Ιταλικά) Προγράμματα**

<b>ΕΡΓΟ</b>	<b>ΠΕΡΙΟΔΟ</b>	<b>ΑΝΤΙΚΕΙΜΕΝΟ ΕΡΓΑΣΙΑΣ</b>
MACE Materiali Compositi per L'Edilizia – project MIUR	Sept. 2008- Feb. 2009	Assessment of structural and functional properties of polymer and inorganic-organic hybrid materials.
Rete di Eccellenza MASTRI “Materiali e Strutture Intelligenti”	Feb. 2015- 2017	Investigation of thermodynamics and mass transport of polymer-gas solutions that are adopted in polymer foaming processes. Development of the experimental setup for the simultaneous measurement of solubility, diffusivity, specific volume and surface tension of molten polymer/ gas solutions. Spectroscopic investigation of sorption phenomena and polymer/gas interactions in collaboration with SAOT (Erlangen, Germany) and IPCB-CNR (Naples).
B.A.S. (Bio Absorbent Structure) - Industrial Project “Nuove Technologie per il Made in Italy” (New Technologies for Made in Italy), No. MI01_00062.	Mar. 2012 - Nov. 2012;	Synthesis of biodegradable, superabsorbent hydrogels. Characterization of structure/morphology and of thermodynamics of water sorption.
PON01_00519 “Strutture, Componenti Innovativi Light per Applicazioni Metro – SCILLA-M” – No. CUP B61C11000550005	Oct. 2014 – Jan. 2015	Technical assessment of fire behaviour of composite systems for railway

### **ΕΘΝΙΚΕΣ ΚΑΙ ΔΙΕΘΝΕΙΣ ΣΥΝΕΡΓΑΣΙΕΣ**

Η Dr Maria Giovanna Pastore Carbone έχει αρκετές συνεργασίες με την ευρωπαϊκή επιστημονική κοινότητα, όπως αποδεικνύεται από μια πληθώρα κοινών δημοσιεύσεων. Έχει επίσης συνεργαστεί με τα τμήματα E&A πολλών βιομηχανιών (Bridgestone, Procter and Gamble, BASF, Avanzare, Centro Ricerche Fiat, Nanesa).

<b>LABORATORY/ DEPT./ UNIVERSITY</b>	<b>CONTACT</b>	<b>TOPIC</b>	<b>PUBLIC ACTIONS</b>
Dept. of Physics, U. of Naples Federico II	Prof. Antonello Andreone	development/ characterization/ modelling of graphene-based composites as shield for EMI	P20, P24

CSGI, U. of Florence	Prof. Piero Baglioni	development of graphene-based tools for cultural heritage preservation	P25, P27
pVT and Mass Transport Properties of Polymers, Dept. of Chemical, Materials and Production Engineering, U. of Naples Federico II	Prof. Giuseppe Mensitieri/ Prof. Giuseppe Scherillo	development/ characterization/modelling of graphene-based composites for gas barrier	P26
Foam Lab, Dept. of Chemical, Materials and Production Engineering, U. of Naples Federico II	Prof. Ernesto Di Maio	development of microcellular foams derived from graphene and 2D materials – polymer composites; interfacial phenomena	P17, P20
IPCB – CNR (Naples)	Dr. Mariagrazia Raucci/ Dr. Vincenzo Guarino	development of graphene composite for biomedical applications	P22
IPCB – CNR (Naples)	Dr. Michele Giordano/ Dr. Alfonso Martone	development and characterization of graphene composites with high loadings	P23
IPCB – CNR (Naples)	Dr. Pellegrino Musto/ Dr. Marianna Pannico	vibrational spectroscopic tools/ theoretical models for the investigation of molecular interactions between low molecular weight compounds and polymer/ polymer composites	P10, P12, P13
Dept. Civil, Environmental, Mechanical Engineering, U. of Trento	Prof. Maria F. Pantano,	mechanical characterization of ultra-thin polymer and polymer/graphene films.	P21
Advanced Raman Scattering Laboratory, SAOT, Erlangen (Germany)	Dr. Andreas Braeuer	investigation of gas/ supercritical fluid sorption in molten polymers by time-resolved Raman line mapping	P05, P13
U. of Manchester	Prof. Kostya Novoselov	fabrication of graphene ribbons for mechanical investigation	P16
Department of Food Science and Technology, Ionian University	Prof. Nikolaos Kopsahelis	development and characterization of sustainable composite materials from waste and nanomaterials	S1
Dept. of Structures for Engineering and Architecture, U. of Napoli “Federico II	Prof. Massimiliano Fraldi	investigation of wrinkle in polymeric films	P07

## ΔΥΠΛΩΜΑΤΑ ΕΥΡΙΣΤΕΧΝΙΑΣ

“Art protection with the use of two-dimensional materials such as graphene”. Date of granting: 01-06-2020. From: Hellenic Industrial Property Organisation. No: 1009757. Valid until 01-01-2039.

“Art protection with the use of Graphene Materials” Date of filing: 18-12-2019. To: EPO. Status: Pending. Currently passed PCT examination and entered the national phase.

“Use of graphene and other 2D materials for the improvement of properties of commercial glazings and showcases”. Date of publication: 10.08.2022. From: EPO. No. EP 4 039 848 A1.

“ΕΞΥΠΙΝΕΣ ΒΑΦΕΣ ΧΡΗΣΙΜΟΠΟΙΩΝΤΑΣ ΟΞΕΙΔΙΟ ΤΟΥ ΓΡΑΦΕΝΙΟΥ ΚΑΙ ΑΛΛΑ ΔΙΔΙΑΣΤΑΤΑ ΥΛΙΚΑ”. “Smart paint based on graphene oxide and other two-dimensional materials”. Date of filing: 29/03/2023. To: Hellenic Industrial Property Organisation. Application No. 2023-0100267. Status: Pending.

“Λεπτά και εύκαμπτα ναοσύνθετα θερμαντικά στοιχεία με βάση το γραφένιο χημικής εναπόθεσης”. “Thin and flexible heating elements based on CVD graphene nanocomposites”. Date of filing: 18-07-2023. To: Hellenic Industrial Property Organisation. Application No. 2413-0004730353. Status: Pending.

“Μέθοδος παραγωγής καινοτόμων πολύστρωτων πολυμερικών ναοσυνθέτων φιλμ ενισχυμένων από υψηλά ευθυγραμμισμένες νιφάδες δισδιάστατων υλικών”. “Production method of innovative nanolaminated plastic films reinforced with highly oriented 2D materials”. Date of filing: 18-07-2023. To: Hellenic Industrial Property Organisation. Application No. 2413-0004730381. Status: Pending.

## ΠΡΟΣΚΕΚΛΗΜΕΝΗ ΟΜΙΛΙΕΣ/ ΣΕΜΙΝΑΡΙΑ

- “*Probing thermodynamics, mass transport and molecular interaction of molten PCL/CO<sub>2</sub> solutions towards new CO<sub>2</sub>-assisted foaming process design*”, **M.G. Pastore Carbone**. Seminar at BASF, Ludwigshafen am Rhein, Germany (13/10/2013)
- “*Graphene in composites: the challenge of the interface*”, **M.G. Pastore Carbone**. Invited presentation at the Fringe Session on Interfaces, Graphene Week 2017 (Athens, 25-29 September 2017)
- “*Overview of Graphene and its Polymer Composites with emphasis on current developments*”, **M.G. Pastore Carbone**. Lecture at BEST Local Course “Extraordinary Nanomaterials for a New Megaworld”, University of Patras, Patras, Greece (18/06/2021)
- “*Examining the response of graphene and other 2D crystals under mechanical loads*”, E. Koukaras, C. Galiotis, K. Papagelis, G. Kalosakas, J. Parthenios, I. Polyzos, Ch. Androulidakis, G. Anagnostopoulos, D. Sfyris, G. Tsoukleri, **M.G. Pastore Carbone**, Invited presentation at International Conference of the Condensed Matter Division of the European Physical Society (EPS) (CMD26), 4 – 9 September 2016, Groningen, The Netherlands (presented by co-author)
- “*Multi-functional CVD graphene/polymer nanolaminates*”, C. Galiotis, C. Pavlou, **M. G. Pastore Carbone**, A. Manikas, G. Trakakis and A. Zurutuza, Keynote presentation at Imagine Nano 2018, Bilbao, Spain, March 13-16 2018 (presented by co-author)
- “*Graphene-Based Composites: From Nano to Macro Applications*”, C. Galiotis G. Anagnostopoulos, M. G. Pastore Carbone, P. N. Pappas, A. Manikas, N. Kontis, G. Paterakis, N. Koutroumanis, C. Pavlou. Keynote presentation at Graphene 2023, 27-30 June 2023, Manchester, UK (presented by co-author)

## ΔΙΟΡΓΑΝΩΣΗ ΣΥΝΕΔΡΙΩΝ/ WORKSHOPS/ ΘΕΡΙΝΑ ΣΧΟΛΕΙΑ

2022, **3<sup>rd</sup> Annual Meeting** of the **APACHE project** (Athens-Greece) – 60 συμμετέχοντες

2021, **BEST Local Course** “Extraordinary Nanomaterials for a New Megaworld” (Patras-Greece)– 30 συμμετέχοντες

2019, **Graphene Flagship WP14 Composites Workshop** (Athens Greece) – 40 συμμετέχοντες

2017, **Graphene Week** (Athens, Greece) – >500 συμμετέχοντες

## ΣΥΓΓΡΑΦΙΚΟ ΕΡΓΟ

### Διδακτορική Διατριβή<sup>1</sup>

Τίτλος: “*Investigating mechanical behavior of cord-rubber composites by multi-scale experimental and theoretical approach*”

Ίδρυμα: Πανεπιστήμιο της Νάπολης Federico II, Νάπολη (Ιταλίας)

Επιβλέπων Καθηγητής: κ. Giuseppe Mensitieri

DOI: <http://www.fedoa.unina.it/8562/>

### Δημοσιεύσεις σε διεθνή περιοδικά με κριτές<sup>2</sup>

- P29. “Highly stretchable strain sensors based on Marangoni self-assemblies of graphene and its hybrids with other 2D materials”, by Antonios Akouros, Nikolaos Koutroumanis, Anastasios C Manikas, George Paterakis, **Maria Giovanna Pastore Carbone**, George Anagnostopoulos, Marinos Dimitropoulos, Costas Galiotis, *Nanotechnology* 3,4 295501 (2023) (Doi: 10.1088/1361-6528/acccfe)
- P28. “Graphene nanoplatelets and other 2D-materials as protective means against the fading of coloured inks, dyes and paints”, by M. Kotsidi, G. Gorgolis, **M. G. Pastore Carbone**, G. Paterakis, G. Anagnostopoulos, G. Trakakis, A. C. Manikas, Pavlou, N. Koutroumanis and C. Galiotis, *Nanoscale* 15 (11), 5414-5428 (2023) (doi: 10.1039/d2nr05795f)
- P27. “Graphene as effective anti-fading agent for the protection of artworks”, by Maria Kotsidi, George Gorgolis, **Maria Giovanna Pastore Carbone**, George Anagnostopoulos, George Paterakis, Giovanna Poggi, Piero Baglioni, Costas Galiotis, *Invention Disclosure* 2 100005 (2022) (10.1016/j.inv.2022.100005)
- P26. “Chemical Vapour Deposition Graphene–PMMA Nanolaminates for Flexible Gas Barrier”, by Antonio Baldanza, **Maria Giovanna Pastore Carbone**, Cosimo Brondi, Anastasios C. Manikas, Giuseppe Mensitieri, Christos Pavlou, Giuseppe Scherillo and Costas Galiotis, *membranes*, 12, Article Number: 611 (2022) (<https://doi.org/10.3390/membranes12060611>)
- P25. “Preventing colour fading in artworks with graphene veils”, by, Maria Kotsidi, George Gorgolis, **Maria Giovanna Pastore Carbone**, George Anagnostopoulos, George Paterakis, Giovanna Poggi, Anastasios Manikas, George Trakakis, Piero Baglioni and Costas Galiotis, *Nature Nanotechnology* (2021) (doi: [10.1038/s41565-021-00934-z](https://doi.org/10.1038/s41565-021-00934-z))
- P24. “Effective EMI shielding behaviour of thin graphene/PMMA nanolaminates in the THz range”, by, Christos Pavlou, **Maria Giovanna Pastore Carbone**, Anastasios C. Manikas, George Trakakis, Can Koral, Gianpaolo Papari, Antonello Andreone and Costas Galiotis, *Nature Communications*, 12, Article Number: 4655 (2021) (doi: <https://doi.org/10.1038/s41467-021-24970-4>)
- P23. “Nacre-like GNP/Epoxy composites: Reinforcement efficiency vis-à-vis graphene content”, by Fabrizia Cilento, Alfonso Martone, **Maria Giovanna Pastore Carbone**, Costas Galiotis, and

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<sup>1</sup> Στο ΑΠΕΛΛΑ: PastoreCarbone\_PhD Thesis (Το αντικείμενο αναλύεται στο Υπόμνημα του Ερευνητικού Έργου)

<sup>2</sup> Στο ΑΠΕΛΛΑ: Αρχεία Publications (P) 1 έως 29: 29 Άρθρα σε περιοδικά αναγνωρισμένου κύρους με σύστημα κριτών. Όλες οι δημοσιεύσεις περιγράφονται αναλυτικά και στο Υπόμνημα του Ερευνητικού Έργου

Michele Giordano, *Composites Science and Technology*, **211**, Article Number: 108873 (2021) (<https://doi.org/10.1016/j.compscitech.2021.108873>)

- P22. “In Vitro Cell Interactions on PVDF Films: Effects of Surface Morphology and Polar Phase Transition”, by Marco A Alvarez-Perez, Valentina Cirillo, **Maria Giovanna Pastore Carbone**, Marianna Pannico, Pellegrino Musto, Vincenzo Guarino, *Materials* 14(18) 5232 (2021) 10.3390/ma14185232
- P21. “Highly Deformable, Ultrathin Large-Area Poly(methyl methacrylate) Films”, by Maria Pantano, Christos Pavlou, **Maria Giovanna Pastore Carbone**, Costas Galiotis, Nicola M. Pugno and Giorgio Speranza, *ACS OMEGA*, **6**, Issue:12, 8308-8312 (2021) (*doi*: 10.1021/acsomega.1c00016)
- P20. “Thermoplastic polyurethane–graphene nanoplatelets microcellular foams for electromagnetic interference shielding”, by **Maria Giovanna Pastore Carbone**, Maxime Beaugendre, Can Koral, Anastasios C Manikas, Nikolaos Koutroumanis, Gian Paolo Papari, Antonello Andreone, Ernesto Di Maio, Costas Galiotis, *Graphene Technology* 5, 33-39 (2020) (10.1007/s41127-020-00034-0)
- P19. “Wettability of graphene by molten polymers”, by **Maria Giovanna Pastore Carbone**, Tammaro Daniele, Manikas Anastasios C., Paterakis George, Di Maio Ernesto and Galiotis Costas, *Polymer*, 180, Article Number: UNSP 121708 (2019) (*doi*: 10.1016/j.polymer.2019.121708)
- P18. “Stress transfer at the nanoscale on graphene ribbons of regular geometry”, by A. C. Manikas, **M. G. Pastore Carbone**, C. R. Woods, Y. Wang, I. Souli, G. Anagnostopoulos, M. Hadjinicolaou, K. S. Novoselov and C. Galiotis, *Nanoscale*, 11, 14354 – 14361 (2019) (*doi*. 10.1039/C9NR03166A)
- P17. “Production and Mechanical Characterization of Graphene Micro-Ribbons”, by **Maria Giovanna Pastore Carbone**, Georgia Tsoukleri, Anastasios C. Manikas, Eleni Makarona, Christos Tsamis and Costas Galiotis, *Journal of Composites Sciences*, **3** (42) (2019) ([doi.org/10.3390/jcs3020042](https://doi.org/10.3390/jcs3020042))
- P16. “Mosaic pattern formation in exfoliated graphene by mechanical deformation”, by **Maria Giovanna Pastore Carbone**, Anastasios Manikas, Ioanna Souli, Christos Pavlou, and Costas Galiotis, *Nature Communications*, 10, Article Number: 1572 (2019)
- P15. “3-Arm star pyrene-functional PMMAs for efficient exfoliation of graphite in chloroform: fabrication of graphene-reinforced fibrous veils” by Sandra Gkempoura, Konstantinia D. Papadimitriou, Emmanuel N. Skountzos, Ioannis Polyzos, **Maria Giovanna Pastore Carbone**, Athanasios Kotrotsos, Vlasis G. Mavrantzas, Costas Galiotis and Constantinos Tsitsilianis, *Nanoscale*, 11, 3, 915-931, Jan 2019, (*doi*. 10.1039/c8nr06888g)
- P14. “Wrinkling formation in simply-supported graphenes under tension and compression loadings”, by Charalampos Androulidakis, Emmanuel N. Koukaras, **Maria Giovanna Pastore Carbone**, Maria Hadjinicolaou and Costas Galiotis, *Nanoscale*, 9, 18180 (2017)
- P13. “Raman Line Imaging of Poly( $\epsilon$ -caprolactone)/Carbon Dioxide Solutions at High Pressures: A Combined Experimental and Computational Study for Interpreting Intermolecular Interactions and Free-Volume Effects”, by **Maria Giovanna Pastore Carbone**, Pellegrino

- Musto, Marianna Pannico, Andreas Braeuer, Giuseppe Scherillo, Giuseppe Mensitieri and Ernesto Di Maio, *The Journal of Physical Chemistry* 120 (34), pp 9115–9131 (2016)
- P12. “Easy-to-fill Asymmetric Polymeric Micro-Reservoirs”, by Vincenzo Contaldi, **Maria Giovanna Pastore Carbone**, Ernesto Di Maio, Anastasios C. Manikas, Paolo Antonio Netti, *RCS Advances* 6 (68) 64140-64146 (2016)
- P11. “Polyether polyol/CO<sub>2</sub> solutions: solubility, mutual diffusivity, specific volume and interfacial tension by coupled gravimetry-Axisymmetric Drop Shape Analysis”, by Maria Rosaria Di Caprio, Maria Rosaria Di Caprio, Giovanni Dal Poggetto, **Maria Giovanna Pastore Carbone**, Ernesto Di Maio, Sara Cavalca, Vanni Parenti, Salvatore Iannace, *Fluid Phase Equilibria* 425 342-350 (2016)
- P10. “Water sorption thermodynamics in poly(propylene sebacate)”, by Giuseppe Scherillo, **Maria Giovanna Pastore Carbone**, Mauro Petretta, Pietro La Manna, Costas Panayiotou, Dimitrios N. Bikiaris, Pellegrino Musto, Giuseppe Mensitieri, *Polymer* 97 346-361(2016)
- P9. “A novel lab-scale batch foaming equipment: the mini-batch”, by Daniele Tammaro, Vincenzo Contaldi, **Maria Giovanna Pastore Carbone**, Ernesto Di Maio, Salvatore Iannace, *Journal of Cellular Plastics* (2015)
- P8. “On the unexpected non-monotonic profile of specific volume observed in PCL/CO<sub>2</sub> solutions”, by **Maria Giovanna Pastore Carbone**, Ernesto Di Maio, Pellegrino Musto, Andreas Braeuer, Giuseppe Mensitieri, *Polymer* 56, 252–255 (2015)
- P7. “Delamination onset and design criteria of multilayer flexible packaging under high pressure treatments”, M. Fraldi, A. Cutolo, L. Esposito, G. Perrella, **M.G. Pastore Carbone**, L. Sansone, G. Scherillo, G. Mensitieri, *Innovative Food Science & Emerging Technologies* 23, 39–53 (2014)
- P6. “Assessing micromechanical behaviour of PET cords in rubber matrix composites by laser Raman microscopy”, by **M.G. Pastore Carbone**, J. Parthenios, G. Tsoukleri, S. Cotugno, G. Mensitieri, C. Galotis, *Composite Science and Technology* 85, 104-110 (2013)
- P5. “Investigation of CO<sub>2</sub> sorption in molten polymers at high pressures using Raman line imaging”, O. Knauer, **M.G. Pastore Carbone**, A. Braeuer, E. Di Maio, A. Leipertz, *Polymer* 54 812-818 (2013)
- P4. “Solubility, mutual diffusivity, specific volume and interfacial tension of molten PCL/CO<sub>2</sub> solutions by a fully experimental procedure: effect of pressure and temperature”, by **M. G. Pastore Carbone**, E. Di Maio, S. Iannace, G. Mensitieri, *Journal of Supercritical Fluids*, (2012)
- P3. “Modeling of the Isobaric and Isothermal Glass Transitions of Polystyrene”, by L. Grassia, **M.G. Pastore Carbone**, A. D’Amore, *Journal of Applied Polymer Science* 122 (6) 3752-3757 (2011)
- P2. “Modeling of density evolution of PLA under ultra-high pressure/temperature histories”, by L. Grassia, **M.G. Pastore Carbone**, G. Mensitieri, A. D’Amore, *Polymer* 52 (18) 4011-4020 (2011)

P1. “Simultaneous experimental evaluation of solubility, diffusivity, interfacial tension and specific volume of polymer/gas solutions”, by **M.G. Pastore Carbone**, E. Di Maio, S. Iannace, G. Mensitieri, *Polymer Testing* 30 (3) 303-309 (2011)

## **Εργασίες που έχουν υποβληθεί (ή βρίσκονται στο στάδιο υποβολής) σε διεθνή επιστημονικά περιοδικά αναγνωρισμένου κύρους με κριτές:**

S1. “Grafting bacterial cellulose nanowhiskers into whey protein/essential oil film composites: Effect on structure, essential oil release and antibacterial properties of films”, by Aikaterini Papadaki, Iliada K. Lappa, Anastasios C. Manikas, **Maria Giovanna Pastore Carbone**, Aikaterini Natsia, Vasiliki Kachrimanidou and Nikolaos Kopsahelis, submitted to *Food Hydrocolloids*

S2. Mechanical integrity and reinforcement efficiency of graphene grown on liquid copper by chemical vapour deposition, by Ilias Sfougaris, Christos Tsakonas, Anastasios C. Manikas, **Maria Giovanna Pastore Carbone**, Irene M. N. Groot, Mehdi Saedi, Gertjan van Barlee, Marc de Voogd, Valentina Belova, Maciej Jankowski, Oleg V. Konovalov, Gilles Renaud, and Costas Galiotis, submitted to *Advanced Materials*

PP1. “Layer-by-layer polymer-graphene laminates based on Marangoni self-assembly for EMI shielding”, by Christos Pavlou, Nikolaos Koutroumanis, Maria Giovanna Pastore Carbone, Anastasios Manikas, Zahra Mazaheri, Antonello Andreone, Costas Galiotis

PP2. “Highly efficient, flexible heaters based on layer-by-layer polymer-graphene laminates via Marangoni self-assembly”, by Christos Pavlou, Nikolaos Koutroumanis, Maria Giovanna Pastore Carbone, Anastasios Manikas, Costas Galiotis

PP3. “Production and characterization of high-performance CVD Graphene/Polyether-imide Nanolaminates for advanced Next-Generation Composite Applications”, by Christos Pavlou, Maria Giovanna Pastore Carbone, Anastasios C. Manikas, Costas Galiotis

PP4. “Lightweight, compressible and electrically conductive PEBA/rGO microcellular foams”, by Maria Giovanna Pastore Carbone, Nikolaos Koutroumanis, Anastasios C. Manikas, Ernesto Di Maio and Costas Galiotis

PP5. “Stretching 2D materials to high strains by evading out-of-plane failure”, by Maria Giovanna Pastore Carbone, Anastasios C. Manikas, and Costas Galiotis

## **Κεφάλαια σε ξένους συλλογικούς τόμους (referred):**

B3. “*Interfacial Tension*”, by **Maria Giovanna Pastore Carbone**, Giuseppe Scherillo, in *Supercritical Fluid Science and Technology* (Eds. Ernesto Di Maio, Salvatore Iannace, Giuseppe Mensitieri), Elsevier

B2. “*Relevant Properties for the Formation of Porous and Cellular Structures in Biofoams*”, by Giuseppe Scherillo, Ernesto Di Maio, Giuseppe Mensitieri, **Maria Giovanna Pastore Carbone**, in *Biofoams, Science and Applications of Bio-Based Cellular and Porous Materials* (Eds. S. Iannace and C.B. Park), CRC Press



B1. “*On-line analytical methods: axisymmetric drop shape analysis*”, by **Maria Giovanna Pastore Carbone** and Ernesto Di Maio, in *Supercritical Fluid Nanotechnology: Advances and Applications in Composites and Hybrid Nanomaterials* (Eds.), Pan Stanford

## Δημοσιεύσεις σε πρακτικά συνεδρίων με κριτές

C41. “*Graphene-Based Composites: From Nano to Macro Applications*”, C. Galiotis G. Anagnostopoulos, **M. G. Pastore Carbone**, P. N. Pappas, A. Manikas, N. Kontis, G. Paterakis, N. Koutroumanis, C. Pavlou, Graphene 2023, 27-30 June 2023, Manchester, UK (keynote presentation)

C40. “*Preventing colour fading in artworks with graphene membranes*”, **M. G. Pastore Carbone**, M. Kotsidi, G. Gorgolis, G. Anagnostopoulos, G. Paterakis, A. C. Manikas, G. Poggi, G. Trakakis, P. Baglioni, C. Galiotis, The Plastics Heritage Congress 2022, 17-19 October 2022, Naples, Italy (oral presentation)

C39. “*CVD graphene as an effective tool for the protection of artworks*”, G. Gorgolis, M. Kotsidi, **M.G. Pastore Carbone**, G. Paterakis, G. Anagnostopoulos, G. Trakakis, A. Manikas, C. Galiotis, EGF 2022, 26-28 October 2022, Athens, Greece (oral presentation)

C38. “*Investigating stress concentration around a circular notch in monolayer graphene/polymer model composite*”, E. Bellou, S. Peloni, **M.G. Pastore Carbone**, A.C. Manikas, C. Tsakonas, C. Pavlou, N. Kontis and C. Galiotis, Graphene Week, 5-9 September 2022, Munich (poster presentation)

C37. “*Extraordinary mechanical and multifunctional properties of CVD graphene/polymer nanolaminates*”, Ch. Pavlou, **M. G. Pastore Carbone**, A. C. Manikas, G. Trakakis, C. Galiotis, 13th Panhellenic Scientific Conference in Chemical Engineering, 2-4 June 2022, Patras, Greece (oral presentation)

C36. “*Preventing colour fading in artworks with graphene veils*”, M.Kotsidi, G.Gorgolis, **M.G. Pastore Carbone**, G. Anagnostopoulos, G. Paterakis, A. Manikas, G. Trakakis, C. Galiotis, 13th Panhellenic Scientific Conference in Chemical Engineering, 2-4 June 2022, Patras, Greece (oral presentation)

C35. “*Thermoplastic polyurethane–graphene microcellular foams: Production and Characterization*”, E. Kallitsi, **M. G. Pastore Carbone**, A. C. Manikas, E. Di Maio, C. Galiotis, 13th Panhellenic Scientific Conference in Chemical Engineering, 2-4 June 2022, Patras, Greece (poster presentation, best poster award)

C34. “*Investigation of stress concentration around a circular hole in monolayer graphene/polymer model composite by raman spectroscopy*”, E. Bellou, S. Peloni, **M.G. Pastore Carbone**, A.C. Manikas, C. Tsakonas, C. Pavlou, N. Kontis and C. Galiotis, 13th Panhellenic Scientific Conference in Chemical Engineering, 2-4 June 2022, Patras, Greece (poster presentation)

C33. “*Preventing colour fading in artworks with graphene veils*”, C. Galiotis, M. Kotsidi, George Gorgolis, **M. G. Pastore Carbone**, G. Anagnostopoulos, G. Paterakis, G. Poggi, A. Manikas, G. Trakakis and P. Baglioni, Graphene Week 2021 Virtual Conference, 20 September-24 September 2021 (oral presentation)

C32. “Record Terahertz Shielding Behavior of Lightweight CVD Graphene Nanolaminates”, C. Pavlou, **M. G. Pastore Carbone**, A. C. Manikas, G. Trakakis, C. Koral, G. Papari, A. Andreone and C. Galiotis, ICEAF 6th International Virtual Conference of Engineering Against Failure, 23 - 25 June, 2021 (oral presentation)

C31. “Mechanically strong, electrically conductive and light-weight CVD graphene nanolaminates for highly efficient EMI shielding”, **M. G. Pastore Carbone**, C. Pavlou, A. C. Manikas, G. Trakakis, C. Koral, G. Papari, A. Andreone and C. Galiotis, PolyChar27, Naples (Italy), 14-17 October 2019 (oral presentation)

C30. “Strong and lightweight multifunctional macroscale CVD\_graphene/PMMA nanolaminates”, C. Pavlou, **M. G. Pastore Carbone**, A. Manikas, G. Trakakis, C. Koral, G. Paterakis, A. Andreone and C. Galiotis, Graphene Week 2019, Helsinki, Finland, 23-27 September 2019, (poster presentation)

C29. “Wrinkling formation in simply-supported graphenes upon mechanical deformation”, **M. G. Pastore Carbone**, I. Souli, A. C. Manikas, E. Koukaras, Ch. Androulidakis, C. Galiotis, Panhellenic Conference on Solid State Physics and Materials Science, Patras, Greece, 11-14 September 2019, (poster presentation)

C28. “THz EMI Shielding in Graphene/PMMA Multilayers”, C. Koral, G. Papari, **M. G. Pastore Carbone**, C. Pavlou, A. Manikas, G. Trakakis, C. Galiotis, and A. Andreone, IRMMW-THz, Paris, 01-06 September 2019 (poster presentation)

C27. “Lateral buckling and mosaic formation in simply supported monolayer graphene”, A. C. Manikas, **M. G. Pastore Carbone**, I. Souli, E. Koukaras, Ch. Androulidakis and C. Galiotis, Graphene 2019 Rome, Italy, 25-28 June 2019 (poster presentation)

C26. “Mechanical characterization at the nanoscale: exploring the mechanics of 2d materials and their heterostructures”, M. Dimitropoulos, **M. G. Pastore Carbone**, A. C. Manikas and C. Galiotis, Graphene 2019 Rome, Italy, 25-28 June 2019 (poster presentation)

C25. “Strong and light-weight CVD graphene nanolaminates for highly efficient EMI shielding”, C. Pavlou, **M. G. Pastore Carbone**, G. Trakakis, C. Koral, A. Andreone, and C. Galiotis, Graphene 2019 Rome, Italy, 25-28 June 2019 (oral presentation)

C24. “Production and characterization of macro-scale CVD graphene/PMMA nanolaminates”, C. Pavlou, **M. G. Pastore Carbone**, A. C. Manikas, G. Trakakis and C. Galiotis, EPF 2019 Crete, Greece 9-14th June 2019 (oral presentation)

C23. “Multi-functional CVD graphene/polymer nanolaminates”, C. Galiotis, C. Pavlou, **M. G. Pastore Carbone**, A. Manikas, G. Trakakis and A. Zurutuza, Imagine Nano 2018, Bilbao, Spain, March 13-16 2018 (oral presentation)

C22. “Development of multi-functional macro-scale CVD graphene/polymer nanolaminates”, C. Pavlou, **M. G. Pastore Carbone**, A. C. Manikas, G. Trakakis and C. Galiotis, Graphene Week 2018, San Sebastian 10-14 September 2018 (oral presentation)

C21. “Out-of-plane phenomena and fracture of graphene/polymer systems”, **M. G. Pastore Carbone**, A. Manikas, I. Souli and C. Galiotis, Graphene Week 2018, San Sebastian 10-14 September 2018 (oral presentation)

- C20. “*Development of graphene-based elastomer composites for improved mechanical and electrical properties*”, **M.G. Pastore Carbone**, K.D. Papadimitriou, J. Gigante, A.C. Manikas, G. Trakakis, G.N. Tomara, S.N. Georga, C.A. Krontiras, C. Galiotis, ECCM18 - 18th European Conference on Composite Materials, Athens, Greece, 24-28th June 2018, (poster presentation)
- C19. “*Development of graphene/elastomer nanocomposites*”, K. D Papadimitriou, **M.G. Pastore Carbone**, G. Trakakis, A.C. Manikas, G.N. Tomara, S.N. Georga, C.A. Krontiras, C. Galiotis, 11th Panhellenic Scientific Conference of Chemical Engineering, Thessaloniki, 25-27 May 2017 (poster presentation)
- C18. “*Development of Graphene/Elastomer Nanocomposites for Improved Mechanical and Electrical Properties*”, K.D. Papadimitriou, **M.G. Pastore Carbone**, G. Trakakis, A.C. Manikas, G.N. Tomara, S.N. Georga, C.A. Krontiras, C. Galiotis, “Eurofillers Polymer Blends 2017”, 23-27 April (2017) Heraclion, Greece, (poster presentation)
- C17. “*Stress Transfer Mechanisms for Graphene/Polymer Systems*”, G. Anagnostopoulos, **M.G. Pastore Carbone**, Ch. Androulidakis, A. C. Manikas, J.Parthenios, K. Papagelis, C. Galiotis, 11th Hellenic Polymer Society International Conference, 3-5 November (2016), Heraklion, Greece (oral presentation)
- C16. “*Examining the response of graphene and other 2D crystals under mechanical loads*”, E. Koukaras, C. Galiotis, K. Papagelis, G. Kalosakas, J. Parthenios, I. Polyzos, Ch. Androulidakis, G. Anagnostopoulos, D. Sfyris, G. Tsoukleri, **M.G. Pastore Carbone**, International Conference of the Condensed Matter Division of the European Physical Society (EPS) (CMD26), 4 – 9 September 2016, Groningen, The Netherlands (invited presentation)
- C15. “*Uniaxial loading of polymer-embedded graphene: Is orthogonal buckling avoidable?*”, **M.G. Pastore Carbone**, G. Tsoukleri, I. Polyzos, J. Parthenios, K. Papagelis, C. Galiotis, ECCM 17, 26-30 June (2016), Munich, Germany (oral presentation, presenter)
- C14. “*Graphene polymer composites to withstand large deformations*”, G. Tsoukleri, **M. G. Pastore Carbone**, G. Anagnostopoulos, N. Delikoukos, C. Tsamis, E. Makarona, J. Parthenios, K. Papagelis and C. Galiotis, Graphene Week, Manchester, UK (2015) (poster presentation)
- C13. “*Production of Graphene micro-ribbons to withstand large deformations*”, G. Tsoukleri, **M. G. Pastore Carbone**, C. Tsamis, E. Makarona, J. Parthenios, K. Papagelis and C. Galiotis, 10<sup>th</sup> Panhellenic Scientific Conference of Chemical Engineering, Patras, Greece (2015) (poster presentation)
- C12. “*PS foams at high pressure drop rates*”, D. Tammaro, **M.G. Pastore Carbone**, E. Di Maio, S. Iannace, Times of Polymers and Composites 2014, Ischia, Italy (2014) (poster presentation)
- C11. “*Anomalous swelling of molten PCL/ scCO<sub>2</sub> solutions*”, **M.G. Pastore Carbone**, D. Tammaro, A. De Maio, E. Di Maio, R. Hankel, A. Braeuer, G. Mensitieri, Times of Polymers and Composites 2014, Ischia, Italy (2014) (poster presentation)
- C10. “*Probing mass transport and molecular interaction in PCL/CO<sub>2</sub> solutions by using Raman line imaging*”, **M.G. Pastore Carbone**, P. Musto, E. Di Maio, O.S. Knauer, A. Brauer and G. Mensitieri, 3rd International Symposium on Frontiers in Polymer Science, Sitges, Spain (21/23 May 2013) (poster presentation, best poster awarded).

- C9. “*On the influence of tensile-torsion coupling in the mechanical behaviour of rubber/cord composites*”, G. Perrella, A. Cutolo, L. Esposito, S. Cotugno, **M.G. Pastore Carbone**, G. Mensitieri and M. Fraldi, Conference on rubber reinforcement and property modification by fillers, fibres & textiles, 18/19 December 2012, London (poster presentation)
- C8. “*Simultaneous Measurement of Solubility, Diffusivity, Interfacial Tension and Specific Volume of Molten Polymer/Gas Mixtures: Experimental Data and Theoretical Analysis*”, E. Di Maio, **M. G. Pastore Carbone**, S. Iannace, G. Mensitieri, PBS'11 Bayeruth, Germany, L-13 (2011) (oral presentation)
- C7. “*Simultaneous measurement of solubility, diffusivity, interfacial tension and specific volume of molten PCL/CO<sub>2</sub> solutions*”, **M. G. Pastore Carbone**, E. Di Maio, G. Mensitieri, S. Iannace, 13th European Meeting on Supercritical Fluids, The Hague, Netherlands (2011) (poster presentation)
- C6. “*CO<sub>2</sub> as a blowing agents for PCL: thermodynamic and mass transport properties of molten polymer/gas solutions as measured by a newly developed experimental technique*”, **M. G. Pastore Carbone**, E. Di Maio, N. Perillo, S. Iannace, G. Mensitieri, Biofoams, Capri, Italy (2011) (oral presentation, presenter)
- C5. “*Modeling Cord-Rubber Composites for Tyre Applications*”, **M.G. Pastore Carbone**, A. Cutolo, G. Perrella, G. Mensitieri, M. Fraldi, S. Cotugno. Advances in Polymer based Materials and Related Technologies, Capri, Italy, (2011) (poster presentation)
- C4. “*Solubility, diffusivity, interfacial tension and specific volume of molten PCL/gas mixtures: experimental data and theoretical analysis*”, **M. G. Pastore Carbone**, E. Di Maio, M. G. Pastore Carbone, G. Scherillo, L. Sanguigno, S. Iannace, G. Mensitieri, Advances in Polymer based Materials and Related Technologies, Capri, Italy, (2011) (oral presentation)
- C3. “*Solubility, Diffusivity, Interfacial Tension and Specific Volume of PCL/CO<sub>2</sub> Solutions*”, **M. G. Pastore Carbone**, E. Di Maio, S. Iannace, G. Mensitieri, PPS 27, Morocco (2011) (oral presentation)
- C2. “*Simultaneous Measure of Surface Tension, Solubility, Diffusivity and Specific Volume of Polymer/Gas Solutions*”, **M. G. Pastore Carbone**, E. Di Maio, S. Iannace, G. Mensitieri, Times of Polymers and Composites 2010, Ischia, Italy (2010) (oral presentation, presenter)
- C1. “*Gas sorption and pVT properties of PES nanocomposites*”, **M.G. Pastore Carbone**, A. Catapano, M.L. Fariello, M. Aurilia, L. Sorrentino, E. Di Maio, S. Iannace, G. Mensitieri, INSTM Conference, Tirrenia, Italy (2009) (poster presentation)

## ΑΠΗΧΗΣΗ ΔΗΜΟΣΙΕΥΜΕΝΟΥ ΕΡΓΟΥ

Δημοσιεύσεις σε διεθνή περιοδικά με κριτές: = 29

Εργασίες που έχουν υποβληθεί για δημοσίευση σε διεθνή περιοδικά με κριτές: 2

Κεφάλαια σε ξένους συλλογικούς τόμους (referred) = 3

Μέσο Impact factor των επιστημονικών περιοδικών (2023) = 7.47

Μέγιστο IF = 40.523

	GOOGLE SCHOLAR		SCOPUS	
	<i>All</i>	<i>Since 2018</i>	<i>All</i>	<i>Since 2018</i>
<b>CITATIONS</b>	538	392	451	322
<b>H-INDEX</b>	15	14	14	7
<b>I10-INDEX</b>	18	15	17	7

Πατρα, 31/07/2023



In compliance with the EU Legislative Decree no. 196 dated 30/06/2003, I hereby authorize the recipient of this document to use and process my personal details for the purpose of recruiting and selecting staff and I confirm to be informed of my rights in accordance to art. 7 of the above mentioned decree.