

## Prof. Carlo SANTULLI

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### EDUCATION

**PhD** in *Materials Science and Engineering* - University of Liverpool, 2000.  
**Laurea (MSc)** in *Chemical Engineering* - Università "La Sapienza"- Roma, 1991.  
**Laurea (MA)** in *Arts (Modern History)* - Università "La Sapienza"- Roma, 2001.  
**MSc** in *Environmental Decision Making (EDM)* - Open University, 2004  
**BSc** (Open) in *Science* (courses in Natural Science and Environment), Open University, 2008

### EMPLOYMENT HISTORY

<b>9-2006-present</b>	Associate professor	Università La Sapienza – Roma Seconda Università di Napoli (from 2008)
<b>11/2001-8/2006</b>	Senior research fellow	University of Reading
<b>11/99- 10/2001</b>	Research associate	University of Nottingham
<b>10/98 –10/99</b>	Research assistant	University of Liverpool
<b>8/96-9/98</b>	Researcher	Joint Research Centre- Ispra
<b>1/96-7/96</b>	Researcher	K.U. Leuven & Ecole des Mines -St. Etienne
<b>1/94-12/95</b>	Research grant holder	Joint Research Centre- Ispra
<b>9/88-12/93</b>	Research assistant	Università La Sapienza – Roma

### RESEARCH INTERESTS

Moving from a background in composite materials and non-destructive testing, I gradually become more involved with sustainability aspects of materials and developed extensive research in plant fibres application for structural materials, in biomimetics and bio-inspired design. In particular, I may divide my research interests so far into:

- Biomimetic, biological and cellulosic materials; natural fibre composites; use of agro-waste in materials
- Mechanical and impact performance, composites and adhesive joints manufacturing
- Non-destructive control (acoustic emission, thermal methods, vibrations and ultrasonics)
- Smart materials (shape memory alloys, polymer gels, biological nanosensors)

### LANGUAGES

Italian (mothertongue), excellent English and French, good German and Spanish

### PUBLICATIONS

1 book, 63 journal papers, 4 invited chapters and 58 conference papers.

Co-supervisor for 29 final year and master projects, consultant for other 7 projects.

Referee for *Composites Science and Technology*, *Journal of Materials Science*, *Composites Part A and Part B*, *Journal of Composite Materials*, *Journal of Adhesion Science and Engineering*, *Journal of Food Engineering*, *Canadian Journal of Physics*, *Indian Journal of Mechanical Sciences*, *Express Polymer Letters*, *Journal of Cleaner Production*, *Journal of Applied Polymer Science*, *Indian Journal of Earth Science*, *Wood Science and Technology*, *Arabian Journal of Science and Technology*, *Malaysian Polymer Journal*, *Journal of American Oil Chemists*, *Advanced Biomaterials*, *Material Science and Engineering A*, *Journal of Aerospace Engineering*, *Polymer Degradation and Stabilization*, *Journal of Materials Engineering and Performance*, *International Journal of Engineering, Science and Technology*, *Bioresources*, *Construction and Building Materials*, *Journal of Polymers and the Environment*.

Biography in "Who's Who in Science and Engineering" and "Who's Who in the World" (from 2003)

Editorial Board member: *International Journal of Polymers and Technologies* and *E-Journal of Non-Destructive Testing* Professionally qualified as chemical engineer in Italy (1992)

Level 3 qualified in Acoustic Emission (non-destructive testing)

Co-editor of "Progetto Babele" ([www.progettobabele.it](http://www.progettobabele.it)) from 2002.

1. Prof. G. Jeronimidis University of Reading Department of Engineering Whiteknights Reading RG6 2AY Tel: +44-118-9318582 Fax: +44-118-9313327 <a href="mailto:g.jeronimidis@rdg.ac.uk">g.jeronimidis@rdg.ac.uk</a>	2. Prof. W. J. Cantwell University of Liverpool Materials Science Brownlow Hill Liverpool L69 3GH Tel.: +44-151-7945370 Fax: +44-151-7944675 <a href="mailto:w.cantwell@liv.ac.uk">w.cantwell@liv.ac.uk</a>	3. Prof. C.D. Rudd University of Nottingham School of Mechanical, Materials, Manufacturing Engineering and Management University Park Nottingham NG7 2RD Tel.: +44-115-9513770 Fax: +44-115-9313800 <a href="mailto:christopher.rudd@nottingham.ac.uk">christopher.rudd@nottingham.ac.uk</a>
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## **RESEARCH EXPERIENCE**

### **9/2006-present Università di Roma- La Sapienza**

In Rome I am working as an associate professor, lecturing on materials in different courses, for an average time of 12 hours a week, and being involved in research with two different Depts. of the University (Electrical Engineering and Materials Engineering). I am co-supervising a number of MEng and MSc students, and have a wide range of collaborations with a number of universities. In addition, since year 2008-09, I am contract professor of “Materials for design” and since year 2009-10 of “Mechanics for industrial design” in Seconda Università di Napoli (SUN)

#### **Research:**

- Biomimetics and sustainable materials; bio-inspired design
- Plant fibre (flax, jute, hemp, phormium, celery, kenaf, okra, oil palm) and mineral fibre (basalt) composites and their hybrids with glass fibres: production, morphological, mechanical, thermal characterisation and electromagnetic characterisation
- Mechanical characterisation (impact, post-impact, indentation) and non-destructive testing of composites (acoustic emission, IR thermography) and metal hydrides

### **11/2001- 8/2006 University of Reading**

In Reading my tasks included: carrying out research in different projects and disseminating the results of research through publications, presentations, conferences; demonstrating to final year students; marking and co-supervising undergrad Part 3 projects and lecturing (materials science and biomimetics).

#### **Research:**

- Air flow and frequency excitation response of mechanoreceptors on cricket cerci
- Impact properties and damage characterisation of flax fibre reinforced composites and glass/flax hybrid laminates
- Non-destructive quality control study on vegetable tissues (apples, avocados, mangoes, potatoes, tomatoes) for damage and over-ripeness control by signal analysis.
- Reconstruction of middle ear ossicular chain using Laser vibrometry (Guys & St. Thomas Hospital)
- Coupling between polyelectrolyte gels and polypropylene fibre braided structures, to reproduce worm's skin function in function of the creation of variable stiffness actuators
- Electro-active polymers for applications in artificial muscles (study for European Space Agency)
- Study of balsawood and composite materials properties using IR thermography

### **11/99 - 10/2001 University of Nottingham**

My work in Nottingham was aimed at investigating design, analysis and impact absorbing characteristics of automotive thermoplastic composites (GMT, Twintex), in particular the relation between moulding process and impact performance on automotive composite materials. I participated to the design and contributed to impact modelling of side impact beams, moulded then under my supervision by Symalit and Polynorm.

#### **Research:**

- Influence of compression moulding conditions on microstructure, void content, impact and mechanical performance of commingled thermoplastic composites
- Impact damage characterisation through the infrared thermography technique
- Hole-in plate simulation of tensile behaviour of Twintex using ABAQUS
- Moulding and testing of demonstrator components for automotive applications

### **10/98 –10/99 University of Liverpool**

The main objective of my research project was the assessment of suitability of plant fibre composite (jute/polyester) for large volume applications, both in isolation and as a hybrid with E-glass fibre reinforced laminates.

My work involved comparing post-impact performance of jute fibre reinforced composites with E-glass fibre reinforced composites and experimental modelling of impact damage.

A consequent aim was developing a global method for the evaluation of impact damage on woven composites, involving the combined application of different monitoring techniques (acoustic emission, thermoelastic stress analysis and optical microscopy). The project was self-funded and self-designed over material supplied by Sistema Compositi.

#### **Research:**

- Post-impact residual properties and microscopic characterisation of impact and indentation damage of jute fibre woven composites compared with different E-glass fibre woven composites
- Impact damage assessment on composites using acoustic emission and thermal imaging (SPATE, Deltatherm)

### 8/96-9/98 Joint Research Centre- Ispra

In this period I was supervisor of a non-destructive testing laboratory. My activity included: research on materials characterisation, mainly on polymeric and metal matrix composites and shape memory alloys, using adiabatic thermal and acoustic emission; collaborations with other labs; preparation of research networks and research projects development.

I also carried out initial work on my PhD project involving impact characterisation on jute fibre and glass fibre woven composites by acoustic emission (AE) and partly sponsored by VALLEN GmbH, AE systems manufacturer.

#### **Research:**

- Thermal and acoustic emission for mechanical characterisation of shape memory alloys (Ni-Ti)
- Development and testing on a fibre optics acoustic emission sensor
- Application of acousto-ultrasonics and acoustic emission on glass/polyester bonded joints, including signal classification using neural networks
- Thermal damage analysis and acoustic emission localisation on honeycomb panels
- Real-time monitoring of tensile tests on carbon/epoxy laminates using acoustic emission and thermal emission, including measurement of yielding point of FRPC composites
- AE monitoring and SEM characterisation of normal and off-axis compression tests on titanium dental implants

### 1/96-7/96 K.U. Leuven & Ecole des Mines -St. Etienne

Acquaintance and experimentation of new applications of non-destructive techniques (acoustic emission, IR thermography, edge replication, C-scan, X-rays) to characterise fatigue damage on carbon/epoxy composites.

#### **Research:**

- Detection of initiation and progression of delamination during fatigue tests on quasi-isotropic carbon-epoxy laminates using the infrared thermography technique
- Monitoring of damage initiation and progression on impacted quasi-isotropic carbon-epoxy plates following compression tests through infrared thermography
- Fatigue monitoring on carbon/epoxy composites by acoustic emission, C-Scan and replicas
- Technical study and in-service monitoring of acoustic emission systems (work for the European Commission) with the aim to compare their reliability and performance

### 1/94-12/95 Joint Research Centre- Ispra

I was involved in a number of research projects on the use of non-destructive techniques for materials (mainly adhesive joints and metal matrix composites) characterisation.

#### **Research:**

- Experimental modelling of the cure process of Al/Al bonded joints by acoustic emission and ultrasonics and verified through shear lap tests (in collaboration with ALENIA)
- Mechanical behaviour of metal matrix composites (Al/Al<sub>2</sub>O<sub>3</sub>) tensile and fatigue tests monitored by acoustic emission and SEM fractographs
- Pattern recognition on acousto-ultrasonic waveforms on steel bonded joints through neural networks (in collaboration with Centro Ricerche FIAT)
- Acoustic emission evaluation of temperature effects on thin ceramic (TiN, CN) layers for cutting materials (WC-Co) layers applied by PVD (pressure vapour deposition)
- Residual fatigue performance on carbon-epoxy unidirectional (90°) specimens by acoustic emission

### 9/88-12/93 Università La Sapienza – Roma

My research work involved experimentation in laboratory and on field with use of non-destructive techniques (acoustic emission, ultrasonics, thermography, image analysis) in support of mechanical and impact tests, and included a six-months stage in a composite materials industry (Sistema Compositi) to be trained about composite manufacturing (RTM, filament winding, pre-preg) and composite structures design (classical laminate theory)

#### **Research:**

- Impact damage and post-impact characterisation of stitched Kevlar/epoxy laminates by acoustic emission and image analysis
- VAMAS Round Robin on bending tests on yttria partially stabilised zirconia with acoustic emission energy measurements and crack localisation and SEM observations
- Group Bench Mark on acoustic emission on AE measurements during tensile tests on Carbon-BMI and Carbon/Epoxy, including measurement of Kaiser effect

- Acoustic emission and acoustoultrasonics during mechanical tests on welded composite joints
- Acoustic emission and thermography on compression tests of Al/Al perfect and defected honeycomb panels
- Atmospheric degradation monitoring by acoustic emission of two monumental statues in the Fontana di Trevi complex
- Quality evaluation on filament wound Kevlar-epoxy pressure vessels during hydraulic tests by acoustic emission and strain gauge measurements (MEng project)

### LABORATORY ACTIVITIES AND TECHNIQUES

Mechanical testing (tensile, fatigue, bending, interlaminar strength, compression, impact)  
 Composites manufacturing (hand lay-up, filament winding, RTM, compression and injection moulding, extrusion)  
 Polymeric gels characterisation (swelling rate, mechanical characterisation)  
 Adhesive joints: surface preparation to adhesion, cure cycling procedures and guidelines  
 Damage characterisation methods on composites (dye-penetrant enhanced radiography, edge replication technique)  
 Design of composite structures with finite elements software (ABAQUS, MARC)  
 Thermal monitoring techniques (transient and passive thermography, adiabatic thermal emission, thermoelastic stress measurement) with analysis and treatment of images  
 Thermal characterisation of natural fibres (FTIR, TGA, DSC, DMA)  
 Traditional and quantitative acoustic emission (signal analysis and treatment, pattern recognition with neural network, acousto-ultrasonics) and ultrasonic C-Scan  
 Vibration measurements and LASER vibrometry  
 Optical and scanning electron microscopy

### COLLABORATIONS WITH INDUSTRIES

Composite manufacturing industries (Symalit, Polynorm, Vetrotex, Parkhill Textiles, Security Composites, Sistema Compositi, NPSP, CB Compositi), plant fibres producers (Saneco, Ceres, Fidia)  
 End-users: aeronautical (Aermacchi, Alenia, SIAI Marchetti), automotive (Centro Ricerche FIAT, Ford), chemical (Acciaierie Bosco), electrical (Nexans) and food industries (Unilever)  
 Non-destructive testing systems manufacturers (Vallen, Physical Acoustic Corporation, Lambda Photometrics)

### COLLABORATIONS WITH UNIVERSITIES

UK (University of Liverpool, University of Reading, University of Portsmouth), Italy (Politecnico di Milano, Politecnico delle Marche, Università di Perugia, Università di Bologna, Università dell'Aquila), Malaysia (USM), Bangladesh (Islamic University), India (Mahatma Gandhi University), Canada (Laval University)

### RESEARCH FUNDING

Preparation of a number of research projects (literature search, sourcing and keeping contacts with industries, structuring the project in tasks), including:

Place and year	Subject	Funding body
Rome 2011	Biocomposites for aeronautical interior components using hemp	EC – FP7
Perugia 2010	Composite materials including local agrowaste (flax fibres, wheat bran)	Italian Govt. (FIRB)
Napoli 2009	Bio-inspired design and material from renewable sources: sustainable innovation at the service of Made in Italy	Italian Govt. (FIRB)
Reading 2003-05	Quality control via vibration tests on vegetable tissue	EPSRC
Reading 2003	Impact characterisation of plant fibre composites	EPSRC/BBSRC
Nottingham 2001	Pedestrian safety	EPSRC
Ispra 1996-7	Acoustic emission applications on composites	Industry
Rome 1992-3	Metal matrix composites for transport applications	EC-DGXII
Rome 1992	Non-destructive testing on polymer composites	EC-DGXII
Rome 1990	Performance of ceramics (Round Robin)	Italian Govt.

## LECTURING EXPERIENCE

For year 2008-09 and 2009-10 I have been contract professor of “The quality of materials for design” (30 hours course) and for year 2009-10 of “Mechanics for industrial design” (30 hours course) in Seconda Università di Napoli (SUN).

Moreover, I have lectured a number of modules for different courses:

Title of module	Course	University and years	Hours/year	Total hours
Technical issues and standards for concrete	Materials control and standards	Sapienza 2009-10	26	26
Hybridisation and manufacturing techniques in composite materials	Composites science and technology	Sapienza 2009-10	4	4
Use of biopolymers as biomaterials	Biomaterials	Sapienza 2009-10	4	4
Biomimetic scaffolds	Biomaterials	Sapienza 2008-09 and 2009-10	2	4
Biodegradable polymers	Polymers science and technology	Sapienza 2007-08 and 2008-09	4	8
Non destructive control of electrical systems	High voltage techniques	Sapienza 2007-08, 2008-09, 2009-10 and 2010-11	6	24
Use of silk as suture material and future developments	Biomaterials	Sapienza 2007-08, 2008-09 and 2009-10	2	6
Polymers durability	Materials durability	Sapienza 2006-07, 2007-08, 2008-09, 2009-10 and 2010-11	10	50
Plant fibre composites	Composites science and technology	Sapienza 2006-07, 2007-08, 2008-09 and 2009-10	4	16
Superconductivity and superconductive materials	High voltage techniques	Sapienza 2006-07	4	4
Superconductive and photovoltaic materials	Electrotechnics	Sapienza 2006-07	4	4
Electrical and magnetic materials	Electrotechnics	Sapienza 2006-07	6	6
Polymer actuators	MSc in biomimetics	Reading 2004-05	4	4
Introduction to materials science	Foundation year	Reading 2003-04	12	12
Non destructive control of composite materials	Composites science and technology	Sapienza 1996-97	2	2

## CO-SUPERVISION OF PROJECTS

Year	Project	University	Title
2009-10	BSc	SUN	Use of auxetic materials in seat design
2009-10	BSc	SUN	Development of ceramics from lava waste materials
2009-10	BSc	SUN	Bio-inspired canvas structure in hemp concrete
2009-10	BSc	Sapienza	Use of natural fibre in boat hulls production
2009-10	BSc	SUN	Lighting systems inspired to diatoms
2009-10	BSc	SUN	Bio-inspiration from fish on wind turbines
2009-10	BSc	SUN	Products in lava-derived ceramics
2009-10	MEng	Sapienza	Sustainable composites and panels using phormium fibres
2009-10	BSc	SUN	Jewel design from materials of marine origin
2009-10	BSc	SUN	Bio-inspired projects on a sustainable use of water
2009-10	BSc	SUN	Photo-luminescent disappearing wall
2009-10	BSc	SUN	Bio-inspired system as a support for fungal growth
2008-09	BSc	Sapienza	Acoustic emission study of the behaviour of nickel – lanthanum solid solutions for hydrogen storage
2008-09	BSc	SUN	Objects for transport applications inspired to diatoms
2008-09	BSc	SUN	Objects for energy generation inspired to diatoms
2008-09	BSc	SUN	Bio-inspired lunchbox
2008-09	BSc	SUN	Strategies and parasitic design for energetic autonomy
2008-09	BSc	SUN	Biomimetic junctions inspired to diatoms
2008-09	BSc	SUN	Bio-inspired jewels with shape memory alloys
2007-08	MEng	Sapienza	Phormium fibre reinforced composites

2007-08	BSc	SUN	Multifunctional tool for child disability
2007-08	BSc	SUN	Products and services for international co-operation
2006-07	BSc	SUN	Development of bio-inspired furniture concepts
2002-03	Erasmus	Reading Uni.	Impact performance of decorticated flax fibre composites and flax/E-glass fibre hybrids
2000-01	BSc	Nottingham Uni.	Compression moulding and mechanical performance of GMT/Twintex hybrids
2000-01	BSc	Nottingham Uni.	Analysis of impact damage on thermoplastic composites using thermal imaging
1999-00	Erasmus	Nottingham Uni.	Moulding optimisation of commingled E-glass polypropylene composites
1999-00	Erasmus	Nottingham Uni.	Relation between internal void content and impact energy absorption in commingled thermoplastic composites
1995-96	MEng	Politecnico di Milano	Polymerisation control on Al/Al joints by acoustic emission

## CONSULTANCY ON RESEARCH PROJECTS

Year	Project	University	Subject
2008-09	BSc	SUN	Autonomous watering system for domestic plants
2007-08	BSc	SUN	Lunch box for organic food with designed temporal cycles
1996-97	MEng	Sapienza	Single fibre fragmentation tests monitored by acoustic emission
1993-94	PhD	Sapienza	Mechanical performance of metal matrix composites produced by squeeze casting
1992-93	MEng	Sapienza	Acoustic emission monitoring of tensile tests on Al/Al <sub>2</sub> O <sub>3</sub> composites
1992-93	MEng	Sapienza	Acoustic emission and Weibull distribution of mechanical results during flexural tests on zirconia partially stabilised with yttria
1991-92	MEng	Sapienza	Post-impact damage monitoring on Kevlar/epoxy stitched composites by acoustic emission and image analysis

## OTHER TEACHING

I was also lecturer in Italian technical high school (Age 15-18), as detailed below:

Year	Taught subject	School
1997-98	Mathematics	IPSIA-Busto & IPSIA- Gallarate
1993-94	Applied mechanics	ITIS "Marconi" Civitavecchia
1993-94	Thermal machines	IPSIA "Calamatta" Civitavecchia
1992-93	Mechanical technology	IPSIA "Minniti"-Guidonia
1992-93	Chemistry	IPSIA "Parodi Delfino" – Colferro
1991-92	Industrial chemistry and chemical plants	IPSIA "Minniti"-Guidonia
1988-89	Mathematics and physics	Liceo Linguistico Paolo VI- Roma

Since 1982 private tutor of maths, physics, chemistry, Latin, French and English (~ 6000 hours total)

## DEMONSTRATING

Year	University	Subjects
2005-06	Reading	Vibration projects
2004-05	Reading	Vibration projects
2002-03	Reading	Impact testing on composites
2000-01	Nottingham	Composites moulding, void content measurements, impact testing and IR thermography
1999-00	Nottingham	Composites moulding, void content measurements, impact testing and IR thermography
1998-99	Liverpool	Thermoelastic techniques
1997-98	Roma – Sapienza	Acoustic emission and IR thermography
1992-93	Roma – Sapienza	Acoustic emission testing
1991-92	Roma – Sapienza	Acoustic emission testing
1990-91	Roma – Sapienza	Acoustic emission testing

## PRESENTATIONS (conferences and seminars)

Member of the organising committee, invited speaker and chairman at 10<sup>th</sup> Colloque Cercle Etudes des Métaux (Saint Etienne 16-17 November 1995), 5<sup>th</sup> Course on "Smart Materials and Nanotechnologies" (Jesi, 26-29 August 2003), 6<sup>th</sup> Course on "Biomaterials, Tissue Engineering and Biomimetics" (Jesi, 31 August-3 September 2004), 2<sup>nd</sup> (Rome April 2009) and 3<sup>rd</sup> (Rome October 2011) Conference on Natural Fibre Composites.

Member of the organising committee EvoEnvironment 2009 (Tubingen April 2009) and Design in Mostra (Napoli June 2007, June 2009 and June 2010)

Month	Venue	Title
5-2011	Università di Perugia (Terni)	Plant fibre composites for impact-resistant applications
5-2011	Terni & Narni	Differentiated waste collection for children (Triplaerre e i colori)
3-2011	Napoli (Città della Scienza)	Natural strategies and bio-inspiration
3-2011	Carsulæ (Terni)	International Year of Forests and the fourth "R": repair (Triplaerre batte quattro)
3-2011	Terni (Centro Guglielmi)	Recycle and other R
2-2011	Terni (Centro Guglielmi)	Assembly/disassembly
2-2011	Terni (Centro Guglielmi)	Global production/local effect
1-2011	Terni (Centro Guglielmi)	Environmental and social sustainability
12-2010	Università di Bologna	Fibreglass degradation for presence of water or UV irradiation
6-2010	Napoli (Mostra d'Oltremare)	Biomimetic use and image of natural fibres and products
5-2010	Mestre (Centro Civico)	Natural fibres and sustainable materials
3-2010	Università dell'Aquila	Application of ligno-cellulosic fibres for manufacturing sustainable composites
2-2010	Terni (primary schools)	Biodiversity and biopolymers for children (Triplaerre, polymers and nature)
2-2010	Terni (GATR) (2 seminars)	Natural fibres for sustainable structures and materials Bio-inspired design of materials and structures
2-2010	Siracusa	Biomimetics between technology and architecture. When humans copy from nature
10-2009	Rome (Italian NDT Conference)	Indentation of hemp/PP laminates by acoustic emission Fractal profile of impact-damaged areas in woven GRP
7-2009	Università di Bologna	Falling weight impact hysteresis curves from natural fibre composites
6-2009	Portsmouth Uni.	Activities on natural fibre composites
4-2009	Rome (Natural Fibres Conference) (2 papers)	Effect of fibre architecture on impact properties of hemp/epoxy composites Lady's fingers fibres for composites
From 2-2009	Terni (primary schools) Venezia (primary schools)	Natural fibres for children
11-2008	SDRC (Inverness)	Biomimetic design for local issues
9-2008	EWGAE (Krakow)	Acoustic emission monitoring of plant fibre composites)
6-2008	ECCM13 (Stockholm)	Characterization of indentation damage on carbon/epoxy laminates by means of acoustic emission
2-2008	Marcianise (SUN) seminar	LCA, plant fibres, and natural design
12-2007	Senigallia	"Da D'Annunzio a Pirandello" by Mario Puccini
10-2007	Roma (Natural Fibres Conference) (2 papers)	Impact damage characterisation in flax/epoxy laminates Celery fibre/epoxy composites
10-2007	Milano (Italian NDT Conf.)	Detection of buried objects by IR thermography
7-2007	Brunel University (ICEM8 Conference)	E-glass/jute hybrid composites and their linearity of behaviour
6-2007	Napoli (Advanced Design)	Indications from natural design
6-2007	Roma - La Sapienza	Laser vibrometry for non-destructive testing of materials
5-2007	Roma - La Sapienza	Materials for superconductive applications
3-2007	Roma - La Sapienza	Materials for superconductivity
2-2007	Marcianise (SUN) seminar	Plant fibres for sustainable materials
2-2007	Liverpool Uni.	Selecting plant fibres for the reinforcement of impact-resistant composites
9-2006	Stratford on Avon (BINDT)	Void measurement on balsawood using IR thermography
6-2006	Ancona (AIVELA Conf.)	Laser vibrometry study of airflow sensors in crickets
2-2006	Birmingham NEC (IPOT 06)	Laser vibrometry study of airflow sensors in crickets

12-2005	London (ASAB Meeting)	Vibration of filiform hairs in house crickets ( <i>Acheta Domesticus</i> ) in response to induced airflow
11-2005	Marcianise (SUN) seminar	Biomimetic materials design
10-2005	Milano (Italian NDT Conf.)	Vibration damage assessment on fruits
9-2004	Torquay (BINDT)	Vibration damage assessment on fruits
8-2004	Jesi (Materials Science summer school) (2 lectures)	Insect nanosensors as smart biomaterials Middle ear Laser Doppler vibrometry
2-2004	Birmingham (Laser vibrometry workshop)	Laser vibrometry non-destructive testing of vegetal tissue
1-2004	Reading Uni.	Laser vibrometry non-destructive testing of vegetal tissue
9-2003	Worcester (BINDT)	Vibration tests for non-destructive control in apples and avocados
8-2003	Jesi (Materials Science summer school) (3 lectures)	Smart materials from nature: a biomimetic approach Smart gel actuators Microstructure and properties of natural fibre composites
4-2003	Reading Uni.	Impact properties of flax-epoxy laminates
4-2003	Ravenna (Italian NDT Conf.)	Evaluation using IR thermography of post-impact damage in composites and automotive components
3-2003	Reading Uni.	Coupling of gel and braided structures for smart actuators development
2-2003	Reading Uni.	Development of smart actuators from gel-in-braid structures
1-2003	Dante Alighieri Nottingham	Pius IX and the railways in Rome (1846-1870)
12-2002	Albuquerque (1 <sup>st</sup> Biomimetic Conference)	Development of smart actuators using <i>n</i> -isopropylacrylamide gels
9-2002	Reading Uni. (Biomimetics 7)	N-isopropylacrylamide gels for the creation of smart actuators
3-2002	Oxford Uni. (4 <sup>th</sup> MCM conference)	Void content measurements in thermoplastic composite materials through image analysis from optical micrographs
1-2002	OU – Milton Keynes	Natural fibre reinforced composites: state of the art
9-2001	NNC – Knutsford	Thermoelastic stress analysis for impact damage assessment on jute fibre reinforced laminates
6-2001	Fiera di Rimini (EUROMAT Conf.)	Relation between moulding conditions and mechanical and impact properties in commingled E-glass/polypropylene composites
2-2001	Nottingham Uni. (seminar)	Some proposals to set a check-list for an Environmentally Friendly Christian
12-2000	Ford Auto – Dunton (ACP 2000 conference)	Impact properties of thermoplastic laminates for automotive applications
10-2000	Rome EUR (World NDT Conf.)	Characterisation of the damage area in glass fibre reinforced composites using AE planar localisation
9-2000	Rutherford Appleton Lab. – Didcot (seminar)	Thermoelastic investigation on impact damaged woven GRP composites
9-1999	Sheffield Uni. (seminar)	Thermoelastic stress measurements on impacted glass mat/polyester woven composites
5-1999	Liverpool Uni. (seminar)	Impact damage evaluation in glass and jute fibre woven composites using acoustic and thermoelastic techniques
5-1998	Vienna (European AE conf.) (2 papers)	A study of the reliability of neural network approach to manage acousto-ultrasonics results on bonded joints. Thermal damage analysis by combined thermographic inspection and AE localisation on honeycomb panels
9-1997	Padova (Italian NDT conf.)	Acoustic emission during post-impact tensile tests of woven composite laminates
9-1997	Nevers (EUROMECH 358)	Reliability of glass fibre-epoxy adhesive joints under repeated loading cycles through acoustic emission and acousto-ultrasonic technique
11-1996	Saint Etienne (Colloque CEM)	Thermal fatigue on ceramic coated cutting tips by acoustic emission
6-1996	Università di Parma (IGF conference)	Effect of transverse fatigue loading on the stiffness reduction of carbon reinforced composites
2-1996	K.U. Leuven (seminar)	Impact damage evaluation on kevlar/epoxy stitched composites using image analysis and acoustic emission monitoring during compression after impact (CAI) tests
11-1995	Saint Etienne (Colloque CEM)	Correlation between fracture mechanics and acoustic emission detected during bending tests on ceramic materials by means of statistical methods

11-1995	Università di Trento (seminar)	Unrecoverable crack propagation on ceramic materials during bending tests observed by acoustic emission monitoring compared with fractography
10-1995	Torino – Lingotto (Italian NDT conf.)	Structural significance of AE events distribution during tensile tests monitoring on composites
7-1995	Sundsvall (AECM5 conference)	AE monitoring during cure cycle of metal/metal (2024 T3 alloy) adhesive joint for quality assessment
7-1995	Università di Brescia (IGF conference)	Damage evaluation on metal matrix composites by acoustic emission monitoring
11-1994	CISE-Segrate (AE workshop)	Evaluation of the resistance of composite structures by acoustic emission
6-1994	Politecnico di Torino (IGF conference) (2 papers)	Bending mode fracture study with acoustic emission on yttria partially stabilised zirconia Analysis of scattering from a theoretical model in fracture mode of MMCs

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