

# CURRICULUM VITAE

FORMATO EUROPEO/EUROPEAN FORMAT



## INFORMAZIONI PERSONALI/ PERSONAL INFORMATION

Nome, Cognome/Name, Surname

Luca, Valentini

Indirizzo/Address

Working address: Strada di Pentima 4, 05100 Terni - Italy

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Sito web/Website

**<http://www.unipg.it/materials>**

Nazionalità/Nationality

**Italy**

Luogo e data di nascita/ Place and  
Date of birth

**Città di Castello (Perugia – Italy)**

**18/06/1970**

## ESPERIENZA PROFESSIONALE /WORK EXPERIENCE

In ordine di data /Dates (from – to)

*Career at University of Perugia and roles in the organization Career advancement at University of Perugia (last 10 years)*

[Iniziare con le più recenti ed elencare separatamente ciascun incarico ricoperto/ Add separate entries for each relevant post occupied, starting with the most recent. ]

- 2018 National qualification for Full Professor in SC 09/D1 – Materials Science and Technology.
- 2015-present Permanent Academic Staff as Associate Professor at the Civil and Environmental Engineering Department of the University of Perugia
- 2006-2015 Permanent Academic Staff as Confirmed Assistant Professor at the Civil and Environmental Engineering Department of the University of Perugia

- 2005-2006 Researcher of the National Consortium of Materials Science and Technology (INSTM).
- 2003 – 2005 Post-doctoral Fellow
- 2002 – 2003 Post-doctoral Fellow

*Teaching activities at undergraduate - Teaching history*

- 2019-2020 Chair of the course of Applied Mechanics at University of Perugia (6 credits).
- 2019-2020 Chair of the course of Materials Science and Technology at University of Perugia (5 credits).
- 2016-2020 Chair of the course of Laboratory of Materials at University of Perugia (4 credits).
- 2009-2012 Chair of the course of Nanostructured Materials at University of Perugia (6 credits).
- 2007 - 2009 Chair of the courses of Polymer Science and Technology and of Nanostructured Materials at University of Perugia (6 credits).
- 2005-2006 Lectureship in Polymer Technology I and II at University of Perugia;
- 2004-2005 Lectureship in Polymer Technology at University of Perugia;
- 2004-2005 Lectureship for the European Master in Nanotechnologies of Polymer Materials at University of Perugia;
- 2003-2004 Lectureship in "Surface treatments" for the Academic Master
- At the University of Perugia;
- 2003-2004 Lectureship in Polymer Technology I and II at University of Perugia;
- 2002-2003 Lectureship in Polymer Technology I and II at University of Perugia

*Lectures to PhD School*

- Lecture to Summer School "NEW TRENDS IN PLASTICS ENGINEENG" - 9-11 Luglio 2013 INSA School Balignat - France.
- Lecture to 18a AIMAT School Advances in Materials Sciences and Technologies, Ischia 11 - 15 July 2012 "Flexible Photovoltaic Textiles for Smart Applications".
- Lecture to Second Young Polymer Scientists Conference and Sixth Short Course on Nanostructured Polymer Materials: from Chemistry to Applications TERNI – ITALY April 13-15, 2008.

Nome e indirizzo del datore di lavoro  
/ Name and address of employer  
Tipo o settore di attività / Type of

University of Perugia, Piazza Università 1, 06123 Perugia - Italy

Education. Scientific area: Materials Science, Polymer Science and Technology

business or sector  
Funzione o posto occupato /  
Occupation or position held  
Principali mansioni e responsabilità /  
Main activities and responsibilities

Associate Professor

Research and development

## ISTRUZIONE E FORMAZIONE / EDUCATION AND TRAINING

In ordine di data /Dates (from – to)

[Iniziare con le più recenti ed  
elencare separatamente ciascun  
corso frequentato con successo/ Add  
separate entries for each relevant  
course you have completed, starting  
with the most recent. ]

Nome e tipo d'istituto di istruzione o  
formazione / Name and type of  
organisation providing education and  
training

Principali materie e competenze  
professionali apprese / Principal  
subjects occupational skills covered

- 2002 – PhD in Materials Science Engineering at University of Naples (Italy) with the thesis *“Role of dopants elements in the formation of carbon based thin films by plasma enhanced chemical vapour deposition”*.
- 1997 – M. Sc. in Physics.

Ph. D. in Materials Science and Technology at the University of Naples “Federico II”, Faculty of Engineering

M. Sc. in Physics at the University of Perugia, Faculty of Physics

### *Role in PhD Committee*

- 2019 University of Perugia "International Doctorate Program in Civil and Environmental Engineering" Academic year 2019/2020 - cycle: 35

- 2015-2018 University of Firenze "International Doctorate in Civil and Environmental Engineering" Academic year 2015 - Cycle: 31 - Duration: 3 years.

- 2014: University of Roma “La Sapienza” valuator of PhD in "Materials Science" Academic year 2014 - Cycle: 26 - Duration: 3 years.

- 2013: University of Perugia PhD in "Civil Engineering and Innovative Materials" Academic year 2013 - Cycle: XXIX - Duration: 3 years.

- 2009: University of Perugia PhD in “Nanotechnology” Academic year 2009 - Cycle: XXV - Duration: 3 years.

- 2008: University of Perugia PhD in "Nanotechnology" Academic year 2008 - Cycle: XXIV - Duration: 3 years.

### *Role in Committee for PhD defenses*

- January 2012 Reviewer for the Licentiate Thesis in Polymer Technology, KTH Chemical Science and Engineering, Stockholm, Sweden. Candidate Michaela Salajkova.
- July 2011 Reviewer for the PhD Thesis at Departamento Ciencia e Ingeniería de Materiales, ESCET, Universidad Rey Juan Carlos, Madrid, Spain. Candidate Ruben Chaos Moran.
- February 2011 PhD at Industrial Engineering, University of Perugia, Italy. Candidate Marta Cardinali.
- February 2010 PhD at Industrial Engineering, University of Perugia, Italy. Candidate Silvia Bittolo Bon.
- February 2009 PhD at Industrial Engineering, University of Perugia, Italy. Candidate Diego Bagnis.
- February 2008 PhD at Industrial Engineering, University of Perugia, Italy. Candidate Francesco Mengoni.

### *High level international Awards and invitation as a speaker to Conferences*

- 2019 Front cover of the journal IEEE Trans. on Computers, Packaging,

and Manufacturing Technol. for the article "3-D printing-based selective ink deposition techniques enabling complex antenna and RF structures for 5G applications up to 6 GHz", W. Su, R. Bahr, S. Bittolo Bon, F. Alimenti, P. Mezzanotte, L. Valentini, M. M. Tentzeris, L. Roselli 9 (2019) 1217.

- 2019 Invited speaker at Frontiers in Silk Sciences and Technologies – 12-15 June 2019 Trento - Italy.
- 2019 Invited speaker at "Sealing Material Development for Critical Industrial Applications Forum" 16th -17th May, 2019 Berlin, Germany.
- 2007 Invited speaker at INTERNATIONAL SYMPOSIUM: nanoscience and nanotechnology n&n2007 - 15-16 October 2007. "Nanotubes based composites".
- 2006 Invited speaker at 4th International Dielectric Society and 9th International Conference Dielectric and Related Phenomena 3-7 September 2006 Poznan, Poland. "Dielectric relaxation mechanism of single-walled carbon nanotubes epoxy composites".
- 2008 Invited speaker at European Materials Research Society 2008 Fall Meeting 15-19 September 2008 Warsaw, Poland. "Polymer nanocomposites from functionalized carbon nanotubes".
- 2008 Front cover of the journal Nanotechnology for the article "Realization of Porous Poly(methyl methacrylate) Films Filled with Electrodeposited Carbon Nanotubes", L. Valentini, S. Bittolo Bon, J. M. Kenny, Nanotechnology 19 (2008) 295301.
- 2011 Invited Speaker at the Multidisciplinary and Multisectorial European Workshop on Synthesis, Characterization and Technological Exploitation of Graphene - Gran Sasso National Laboratories Italy: "Incorporation of reduced graphene oxide sheets into organic media for the realization of conducting and photoresponsive nanocomposites".
- 2011 Invited Speaker at the II° International Workshop on characterization, properties and application of nanostructured ceramics, polymers and composites Belgrade Serbia: "Graphene Polymer Nanocomposites for Optoelectronic Applications".
- 2012 Invited Speaker at NanoBelgrade 2012, Belgrade Serbia: "Emerging methods for producing graphene based nanocomposites".
- 2013 Invited Speaker at the workshop "New trends in the research of carbon based nanomaterials", from the 22nd until the 23rd of April 2013, Bucharest - Romania.
- 2013 Front cover of the journal J. Polym. Science Part B: Polymer Physics for the article "Liquid Droplet Excitation of Freestanding Poly(methylmethacrylate)/Graphene Oxide Films for Mechanical Energy Harvesting" L. Valentini, S. Bittolo Bon, J. Kenny, J. Polym. Science Part B: Polymer Physics (2013).

*Role in Editorial board panels of peer reviewed international journals:*

- Associate Editor of nanocomposites topic of Nanomaterials and Nanotechnology Journal.
- Associate Editor of Polymer and Composite materials topic of Frontiers in Materials.
- Editorial Board of Nanomaterials.
- Editorial Board of C—Journal of Carbon Research.
- Editorial Board of Coatings.
- Editorial Board of Molecules.

- Editorial Board of Polymers.
- Co-guest editor with Prof. Pugno of the special issue "Mechanics, Electrical and Optical Properties of Nano-Thin Films" on Nanomaterials.
- Co-guest editor with Prof. Pugno of the "Focus Collection on Bionic Nanotechnology" on Nanotechnology journal.
- Co-Editor of the book "High Performance Elastomeric Materials Reinforced by Nano-Carbons: Multifunctional Properties and Industrial Applications" Elsevier Science & Technology Books.

## **ATTIVITA' DI RICERCA / RESEARCH ACTIVITIES**

### **Research interests**

Deposition-structure-properties of nanostructured polymer thin films and polymer nanocomposites with specific interest to:

- Functionalization of nanostructured carbons (i. e. carbon nanotubes, graphene) through end-group modification. Probing their structure-property relation on phase behaviours at interfaces (liquid-liquid interface, solid-liquid interface) under different conditions.
- Synthesis and characterization of graphene/polymer hybrids for stimuli-responsive devices.
- Preparation and characterization of organic-inorganic hybrids or polymer-nanoparticles complex for bio-inspired devices.
- Design of functional, complex polymer hybrids for achieving desired electrical, optical or mechanical properties.

### 1 – **Bio-inspired and bionic graphene based films:**

Development of smart technology based on bio-inspired films. The goal is to add functional properties to biomaterials. The research consists in the preparation and characterization of bio-inspired devices.

#### Bibliography

“Cellulose nanocrystal thin films as gate dielectric for flexible organic field-effect transistors” L. Valentini, S. Bittolo Bon, M. Cardinali, E. Fortunati, J. M. Kenny, *Materials Letters* 126 (2014) 55.

“Tough nanopaper structures based on cellulose nanofibers and carbon nanotubes” M. Salajkova, L. Valentini, Q. Zhou, L. Berglund, *Composites Science and Technology* 87 (2013) 103.

“Graphene based bionic composites with multifunctional and repairing properties” L. Valentini, S. Bittolo Bon, S. Signetti, N. M. Pugno, *ACS Applied Materials & Interfaces* (2016).

### 2 - **Application of graphene in polymer composite materials and their integration in devices for energy conversion:**

Combining the properties of graphene with polymers used as matrix, these systems may be used for the development of eco-compatible, eco-sustainable and low environmental impact devices.

#### Bibliography

“Multilayer Films Composed of Conductive Poly(3-hydroxybutyrate)/Carbon Nanotubes Bionanocomposites and a Photoresponsive Conducting Polymer” L. Valentini, P. Fabbri, M. Messori, M. degli Esposti, S. Bittolo Bon, *J. Polym. Science Part B: Polymer Physics* 52 (2014) 596.

“Flexible triboelectric generator and pressure sensor based on poly[(R)-3-hydroxybutyric acid] biopolymer” L. Valentini, M. Cardinali, J. M. Kenny, *J. Polym. Science Part B: Polymer Physics* 52 (2014) 859.

“Synergistic effect of graphite nanoplatelets and carbon black in multifunctional EPDM nanocomposites” L. Valentini, S. Bittolo Bon, M. A. Lopez-Manchado, R. Verdejo, L. Pappalardo, A. Bolognini, A. Alvino, S. Borsini, A. Berardo, N. M. Pugno, *Composites Science and Technology* (2016)

### 3 - **Development of different graphene functionalization strategies and relative characterization:**

The non-polar nature of graphene surface induces some serious problems concerning their dispersion treatment in liquid phase. Different approaches will be followed: (i) physisorption/chemisorption of specific compounds using green solvents or other similar compounds, (ii) introduction of groups obtaining surface multi-functionality, (iii) grafting of amine to oxidized graphene.

#### Bibliography

“Plasma Fluorination of Chemically Derived Graphene Sheets and Subsequent Modification With Butylamine” S. Bittolo Bon, L. Valentini, R. Verdejo, J. L. Garcia Fierro, L. Peponi, M. A. Lopez-Manchado, J. M. Kenny, *Chem. Mater.* 21 (2009) 3433.

“High Concentration Few-layer Graphene Sheets Obtained by Liquid Phase Exfoliation of Graphite in Ionic Liquid” D. Nuvoli, L. Valentini, V. Alzari, S. Scognamiglio, S. Bittolo Bon, M. Piccinini, J. Illescas, A. Mariani, *J. Mater. Chem.* 21 (2011) 3428.

Scopus

Sum of the Times Cited: 5987

H-index: 39

### Recent Papers on peer reviewed international journals

#### 2015

137. "Preparation of alginate/graphene oxide hybrid films and their integration in triboelectric generators" N. Rescignano, D. Puglia, M. Cardinali, J. Kenny, L. Valentini, *European Journal of Inorganic Chemistry* 7 (2015) 1192.

138. "Bio-inspired materials and graphene for electronic applications" L. Valentini, *Materials Letters* 148 (2015) 204.

139. "Electrical and morphological characterization of multiwalled carbon nanotubes functionalized via the Bingel reaction" D. V. Brković, M. L. Avramov Ivić, V. M. Rakić, L. Valentini, P. S. Uskoković, A. D. Marinković, *Journal of Physics and Chemistry of Solids* (in press).

140. "Fabrication of three-dimensional patterns of reduced graphene oxide through grid-assisted deposition" L. Valentini, *Materials Letters* 157 (2015) 265.

#### 2016

141. "Graphene based bionic composites with multifunctional and repairing properties" L. Valentini, S. Bittolo Bon, S. Signetti, N. M. Pugno, *ACS Applied Materials & Interfaces* 8 (2016) 7607.

142. "Synergistic effect of graphite nanoplatelets and carbon black in multifunctional EPDM nanocomposites" L. Valentini, S. Bittolo Bon, M. A. Lopez-Manchado, R. Verdejo, L. Pappalardo, A. Bolognini, A. Alvino, S. Borsini, A. Berardo, N. M. Pugno, *Comp. Sci. and Technol.* 128 (2016) 123.

144. "Fermentation based carbon nanotube bionic functional composites" L. Valentini, S. Bittolo Bon, S. Signetti, M. Tripathi, E. Iacob, N. M. Pugno, *Scientific Reports* 6 (2016) 27031.

145. "Microorganisms nutrition process as a general route for the preparation of bionic nanocomposites based on intractable polymers" L. Valentini, S. Bittolo Bon, N. M. Pugno, *ACS Applied Materials & Interfaces* (in press 2016).

146. "Severe graphene nanoplatelets aggregation as building block for the preparation of negative temperature coefficient and healable silicone rubber composites" L. Valentini, S. Bittolo Bon, N. M. Pugno, *Comp. Sci. and Technol.* 134 (2016) 125.

147. "Graphene and carbon nanotubes auxetic rubber bionic composites, with negative variation of the electrical resistance and comparison with their non-bionic counterparts" L. Valentini, S. Bittolo Bon, N. M. Pugno, *Adv. Funct. Mater.* 27 (2017) 1606526.

148. "Development of conductive paraffin/graphene films laminated on fluoroelastomers with high strain recovery and anti-corrosive properties" L. Valentini, S. Bittolo Bon, L. Mussolin, M. A. Lopez-Manchado, N. M. Pugno, *Composites Science and Technology* 149 (2017) 254.

#### 2018

149. "Silkworm silk fibers vs PEEK reinforced rubber luminescent strain gauge and stretchable composites" Luca Valentini, Silvia Bittolo Bon, Lorenzo Mussolin, Nicola Pugno, *Composites Science and Technology* 156 (2018) 254.

150. "Ice-regenerated flame retardant and robust film of Bombyx mori silk fibroin and POSS nano-cages" L. Valentini, S. Bittolo Bon, N.M. Pugno, *RSC Advances* 8 (2018) 9063.

151. "Nitrile butadiene rubber composites reinforced with reduced graphene oxide and carbon nanotubes show superior mechanical, electrical and icephobic properties" L. Valentini, S. Bittolo Bon, M. Hernández, M.A. Lopez-Manchado, N.M. Pugno,

Composites Science and Technology 166 (2018) 109.

152. "Combining living microorganisms with regenerated silk provides nanofibril based thin films with heat responsive wrinkled states for smart food packaging" L. Valentini, S. Bittolo Bon, N.M. Pugno, *Nanomaterials* 8 (2018) 518.

153. "Rubber nanocomposites for extreme environments: critics and counterintuitive solutions" L. Valentini, M. A. Lopez-Manchado, *Frontiers in Materials* 5 (2018) 49.

2019

154. "Synergistic icephobic behaviour of swollen nitrile butadiene rubber graphene and/or carbon nanotube composites" L. Valentini, S. Bittolo Bon, N.M. Pugno, M. Hernandez Santana, M.A. Lopez-Manchado, G. Giorgi, *Composites Part B: Engineering* 166 (2019) 352.

155. "Bionicomposites" N. M. Pugno, L. Valentini, *Nanoscale* 11 (2019) 3102.

156. "Regenerated silk and carbon nanotubes dough as masterbatch for high content filled nanocomposites" L. Valentini, S. Bittolo Bon, M. Tripathi, A. Dalton, N. Pugno, *Frontiers in Materials* 6 (2019) 60.

157. "3D-Printing-based Selective-Ink-Deposition Technique enabling Complex Antenna and RF Structures for 5G Applications up to 6 GHz" V. Palazzi, W. Su, R. Bahr, S. Bittolo-Bon, F. Alimenti, P. Mezzanotte, L. Valentini, M. M. Tentzeris, L. Roselli, *IEEE Transactions on Components, Packaging and Manufacturing Technology* (2019).

158. "The impact of shear and elongational forces on structural formation of polyacrylonitrile/carbon nanotubes composite fibers during wet spinning process" H. Mirbaha, P. Nourpanah, P. Scardi, M. D'Incau, G. Greco, L. Valentini, S. Bittolo Bon, S. Arbab, N. Pugno, *Materials* 12 (2019) 2797.

2020

159. "Plasticised regenerated silk/gold nanorods hybrids as sealant and bio-piezoelectric materials" S. Bittolo Bon, M. Rapi, R. Coletta, A. Morabito, L. Valentini, *Nanomaterials* 10 (2020) 179.

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