Giuseppe ROSI

Personal details

Nome Giuseppe ROSI

Date of birth born in Frascati (Italy) on October 2nd 1980

Citizenship Italian

Current position

Associate Professor (Maître de Conférences) , Laboratoire Modélisation et Simulation Multi Échelle, Université Paris-Est Créteil Val de Marne, UMR 8208 CNRS.

Addresses

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Scientific topics

- Non-destructive characterisation of materials
- Biomechanics
- Piezoelectric coupling
- Wave propagation in heterogeneous materials
- Bone/implant interface characterisation
- Generalised continua
- Porous media
- Ultrasounds

Positions

2020 **Accueil en delegation CNRS**, *Université Paris-Est Créteil Val de Marne.*

2013- **Associate professor (Maître de Conférences)**, *Université Paris-Est Créteil Val de Marne.*

2012-2013 **Post-Doc**, *Université Paris-Est Créteil Val de Marne.*
Caractérisation des tissus vivants

2012-2013 **Post-Doc**, *International Research Center on Mathematics and Mechanics of Complex System (M&MoCS), Università degli Studi dell'Aquila.*

2011-2012 **Post-Doc**, *Université du Sud Toulon Var.*

2010-2011 **Post-Doc**, *Università Roma Tre.*

Education

2006-2010 **PhD in mechanics :Université Pierre et Marie Curie (Paris 6), Spécialité Mécanique** (joint PhD with the University of Rome La Sapienza) Institut Jean Le Rond d'Alembert

Defense	March 9th 2010 in Paris; mention Très Honorable
Title	*Control of sound radiation and transmission by means of passive piezoelectric networks: modelling, optimisation and experimental implementation*

2006	**Master degree in electronic engineering** Università di Roma La Sapienza
Defense	July 9th 2006 à Rome; mention 110/110 cum laude
Topic	*Control of sound radiation and transmission by means of passive piezoelectric networks*
Supervisor	Francesco dell'Isola

Research projects as PI

Project Name	Multi-physics characterization and modeling of traumatic spinal cord injuries
Funding source	Programme Samuel de Champlain
Amount(in Euros)	20 000
Period	2022-2023
Role	co-PI

Project Name	HipImpact,Development and validation of an instrumented impact hammer for the estimation of the positioning of the femoral stem used in total hip replacement surgery
Funding source	PEPS CNRS
Amount(in Euros)	15 000
Period	2017
Role	PI

Research projects as partner responsible of work packages

Project Name	OrthoMat, Development of an instrumented hammer for the estimation of the stability of implants used in orthopedic surgery (ANR-21-CE17-0004)
Funding source	ANR-PRC
Amount(in Euros)	611 665
Period	2021-2025
Role	Scientific leader for MSME

Project Name	MAX-OASIS, Exotic architectured materials, waves, anisotropy, Instability. (ANR-19-CE08-0005-03)
Funding source	ANR-PRC
Amount(in Euros)	588 000
Period	2020-2024
Role	Scientific leader for WP1 :waves in architectured media

Experimental activities

Vibroacoustic measures

Ultrasound measures

Design of structures equipped with piezoelectric transducers for control and monitoring.

Teaching

Continuum mechanics, Elastic wave propagation, Processing of experimental data, Vibrations

Language skills

Italian **Native Speaker**
French **Bilingual**
English **Fluent**

Publications

- **46** Articles in international peer reviewed journals (**h-index 19**, source Scopus)
- **2** Book chapters
- **2** Patents

Publications list

Publications in international peer reviewed journals

[1] **G. Rosi**, J. Pouget, F. dell'Isola, *Control of sound radiation and transmission by a piezoelectric plate with a optimized resistive electrode*, **European Journal of Mechanics/A Solids**, (**2010**),29, pp. 859-870.

[2] **G. Rosi**, R. Paccapeli, F. Ollivier, J. Pouget, *Optimization of piezoelectric patches positioning for passive sound radiation control of plates*, **Journal of Vibration and Control**, (**2013**), 19 (5), pp. 658-673.

[3] A. Madeo, I. Djeran-Maigre, **G. Rosi**, C. Silvani, *The Effect of Fluid Streams in Porous Media on Acoustic Compression Wave Propagation, Transmission and Reflection*, **Continuum Mechanics and Thermodynamics**, (**2013**) 25 pp. 173-196.

[4] **G. Rosi**, I. Giorgio, V. Eremeyev, *Propagation of linear compression waves through plane interfacial layers and mass adsorption in second gradient fluids*, **Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)**, (**2013**) 93 (12) pp. 914-927.

[5] **G. Rosi**, A. Madeo, J. L. Guyader, *Switch between fast and slow Biot compression waves induced by "second gradient microstructure" at material discontinuity surfaces in porous media*, **International Journal of Solids and Structures**, (**2013**) 50 pp. 1721-1746.

[6] P. Neff, I-D Ghiba, A. Madeo, L. Placidi, **G. Rosi**, *A unifying perspective: the relaxed linear micromorphic continuum*, **Continuum Mechanics and Thermodynamics**, (**2013**) 26 (5) pp. 639-681.

[7] L. Placidi, **G. Rosi**,I. Giorgio, A. Madeo, *Reflection and transmission of plane waves at surfaces carrying material properties and embedded in second-gradient materials*, **Mathematics and Mechanics of Solids**, (**2014**) 19 (5) pp. 555-578.

[8] A. Madeo, **G. Rosi**,L. Placidi, *Towards the design of meta-materials with enhanced damage sensitivity: second gradient porous materials*, **Research in Nondestructive Evaluation**, (**2014**) 25(2) pp. 99-124.

[9] **G. Rosi**, V.-H. Nguyen, S. Naili, *Reflection of acoustic wave at the interface of a fluid-loaded dipolar gradient elastic half-space*, **Mechanics Research Communications**, (**2014**) 56 pp. 98-103.

[10] A. Madeo, P. Neff, I-D Ghiba, L. Placidi, **G. Rosi**, *Wave propagation in relaxed micromorphic continua: modelling metamaterials with frequency band-gaps.*, **Continuum Mechanics and Thermodynamics**, (**2014**) 26(5) 639-681

[11] N. Auffray, F. dell'Isola, V. Eremeyev, A. Madeo, **G. Rosi**, *Analytical continuum mechanics à la Hamilton-Piola: least action principle for second gradient continua and capillary fluids*, **Mathematics and Mechanics of Solids**, **2015**) 20(4) pp. 375-417.

[12] I-D Ghiba, P. Neff, A. Madeo, L. Placidi, **G. Rosi**, *The relaxed linear micromorphic continuum: existence, uniqueness and continuous dependence in dynamics.*, **Mathematics and Mechanics of Solids**, (**2015**) 20(10) 1171-1197

[13] F. D'Annibale, **G. Rosi**, and A. Luongo, *Linear stability of piezoelectric-controlled discrete mechanical systems under nonconservative positional forces*, **Meccanica**, (**2014**) 50(3) pp. 825-839.

[14] A. Madeo, P. Neff, I-D Ghiba, L. Placidi, **G. Rosi**, *Band gaps in the relaxed linear micromorphic continuum*, **ZAMM - Journal of Applied Mathematics and Mechanics**, (**2015**) 95(9) 880-887

[15] F. D'Annibale, **G. Rosi**, A. Luongo, *On the failure of the 'Similar Piezoelectric Control' in preventing loss of stability by nonconservative positional forces*, **ZAMP - Journal of Applied Mathematics and Physics** , (**2015**) 66(4) 1949-1968

[16] **G. Rosi**, V.-H. Nguyen, S. Naili, *Surface waves at the interface between an inviscid fluid and a dipolar gradient solid*, **Wave Motion**, (**2015**) 53 pp. 51-65.

[17] N. Auffray, J. Dirrenberger, **G. Rosi**, *A complete description of bi-dimensional anisotropic strain gradient elasticity*, **International Journal of Solids and Structures**, (**2015**) pp. 69 195-206.

[18] F. D'Annibale, **G. Rosi**, A. Luongo, *Piezoelectric control of Hopf bifurcations: A non-linear discrete case study*, **International Journal of Nonlinear Mechanics**, (**2016**) 80 pp. 160-169.

[19] **G. Rosi**, V.-H. Nguyen, S. Naili, *Numerical investigations of ultrasound wave propagating in long bones using a poroelastic model*, **Mathematics and Mechanics of Solids**, (**2016**), pp. 21(1) 119-133.

[20] V. A. Eremeyev, **G. Rosi**, and S. Naili, *Surface/interfacial anti-plane waves in solids with surface energy*, **Mechanics Research Communications**, (**2016**) 74 pp. 8-13.

[21] **G. Rosi**, N. Auffray,*Anisotropic and dispersive wave propagation within strain-gradient framework*, **Wave Motion**, (**2016**) 63 pp. 120-134.

[22] A. Madeo, P. Neff, I. D. Ghiba, and **G. Rosi**, *Reflection and transmission of elastic waves at interfaces embedded in non-local band-gap metamaterials: a comprehensive study via the relaxed micromorphic mode*, **Journal of the Mechanics and Physics of Solids**, (**2016**) 95 pp. 441-479.

[23] **G. Rosi**, L. Placidi, V.-H. Nguyen, and S. Naili, *Wave propagation across a finite heterogeneous interphase modeled as an interface with material properties*, **Mechanics Research Communications**, (**2017**) 84 pp. 43-48.

[24] **G. Rosi**, L. Placidi, and F. dell'Isola, *"Fast" and "slow" pressure waves electrically induced by nonlinear coupling in Biot-type porous medium saturated by a nematic liquid crystal*, **ZAMP - Journal of Applied Mathematics and Physics** , (**2017**) 68(3) pp. 51.

[25] V.-H. Nguyen, **G. Rosi**, S. Naili, A. Michel, M.-L. Raffa, R. Bosc, J.-P. Meningaud, C. Chappard, N. Takano, and G. Haïat, *Influence of anisotropic bone properties on the biomechanical behavior of the acetabular cup implant: a multiscale finite element study*, **Computational Methods in Biomechanics and Biomedical Engineering**, (**2017**) 20(12) pp. 1312-1325.

[26] **G. Rosi**, I. Scala, V.-H Nguyen and S. Naili, *Wave propagation in strain gradient poroelastic medium with microinertia: closed-form and finite element solutions*, **ZAMP - Journal of Applied Mathematics and Physics**, (**2017**) 68(3) pp. 58.

[27] A. Tijou, **G. Rosi**, P. Hernigou, C-H Flouzat-Lachaniette and G. Haiat, *Ex Vivo Evaluation of Cementless Acetabular Cup Stability Using Impact Analyses with a Hammer Instrumented with Strain Sensors*, **Sensors**, (**2018** 18(1)).

[28] I. Scala, **G. Rosi**, V.-H. Nguyen, R. Vayron, G. Haiat, S. Seuret, S. Jaffard, S. Naili , *Ultrasonic characterization and multiscale analysis for the evaluation of dental implant stability: A sensitivity study*, **Biomedical Signal Processing and Control**, (**2018**) .

[29] **G. Rosi**, L. Placidi and N. Auffray *On the validity range of strain-gradient elasticity: A mixed static-dynamic identification procedure*, **European Journal of Mechanics - A/Solids**, (**2018**) 69 pp. 179-191

[30] R. Bosc, A. Tijou, **G. Rosi**, V.-H. Nguyen, J.-P. Meningaud, P. Hernigou, C.-H. Flouzat-Lachaniette, G. Haiat *Influence of soft tissue in the assessment of the primary fixation of acetabular cup implants using impact analyses*, **Clinical biomechanics**, (**2018** 55 pp. 7-13

[31] V. A. Eremeyev, **G. Rosi**, and S. Naili, *Comparison of anti-plane surface waves in strain-gradient materials and materials with surface stresses*, **Mathematics and Mechanics of Solids**, (**2018**)

[32] A. Tijou, **G. Rosi**, R. Vayron, H.A. Lomami, P. Hernigou, C.-H. Flouzat-Lachaniette, G. Haïat, *Monitoring cementless femoral stem insertion by impact analyses: An in vitro study*, **Journal of the mechanical behavior of biomedical materials**, (**2018** 88 pp. 179-191)

[33] A. Dubory, **G. Rosi**,A. Tijou, H.A. Lomami,, C.-H. Flouzat-Lachaniette, G. Haïat,, *A cadaveric validation of a method based on impact analysis to monitor the femoral stem insertion*, **Journal of the mechanical behavior of biomedical materials**, (**2018** 88 pp. 179-191)

[34] I. Scala, **G. Rosi**,L. Placidi, V.-H. Nguyen, S. Naili , *Effects of the microstructure and density profiles on wave propagation across an interface with material properties*, **Continuum Mechanics and Thermodynamics**, (**2019**) .

[35] **G. Rosi** and N. Auffray *Continuum modelling of frequency dependent acoustic beam focusing and steering in hexagonal lattices*, **European Journal of Mechanics - A/Solids**, (**2019**)

[36] V. A. Eremeyev, **G. Rosi**, and S. Naili, *Surface/interfacial anti-plane waves in solids with surface energy*, **International Journal of Engineering Science**, (**2019**)

[37] A. Casalotti, F. D'Annibale, and **G. Rosi**, *Multi-scale design of an architected composite structure with optimized graded properties*, **Composite Structures**, (**2020**) Vol 252, https://doi.org/10.1016/j.compstruct.2020.112608

[37] A. Hubert, G. Rosi, R. Bosc, G. Haiat *Using an Impact Hammer to Estimate Elastic Modulus and Thickness of a Sample During an Osteotomy*, **Journal of Biomechanical Engineering**, (**2020**) Vol 142(7), https://doi.org/10.1115/1.4046200

[38] H. Albini Lomami, C. Damour, **G. Rosi**, A.-S. Poudrel, A. Dubory, C.-H. Flouzat-Lachaniette, G. Haiat *Ex vivo estimation of cementless femoral stem stability using an instrumented hammer*, **Clinical Biomechanics**, (**2020**) 76, https://doi.org/10.1016/j.clinbiomech.2020.105006

[39] **G. Rosi**, N. Auffray and C. Combescure, *On the failure of classic elasticity in predicting elasticwave propagation in gyroid lattices for very long wavelengths* , **Symmetry**, (**2020**)

[40] A. Aghaei, N. Bochud, **G. Rosi** and S. Naili, *Assessing the effective elastic properties of the tendon-to-bone insertion: A multiscale modeling approach*, **Biomechanics and Modeling in Mechanobiology**, (**2021**) Vol 20 (2), 433-44, https://doi.org/10.1016/j.jmps.2021.104380

[41] A. Aghaei, N. Bochud, **G. Rosi** and S. Naili, *Wave propagation across a functionally graded interphase between soft and hard solids: Insight from a dynamic surface elasticity model*, **Journal of the Mechanics and Physics of Solids**, (**2021**) Vol 151, https://doi.org/10.1007/s10237-020-01392-7

[42] L. Lamassoure, J. Giunta, **Giuseppe Rosi**, A.-S. Poudrel, R. Bosc and G. Haïat, *Using an impact hammer to perform biomechanical measurements during osteotomies: Study of an animal model*, **Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine**, (**2021**) Vol 235(7) 838-845, https://doi.org/10.1177/09544119211011824

[43] L. Lamassoure, J. Giunta, **G. Rosi**, A.-S. Poudrel, J.-P. Meningaud, R. Bosc and G. Haïat, *Anatomical subject validation of an instrumented hammer using machine learning for the classification of osteotomy fracture in rhinoplasty*, **Medical Engineering & Physics**, (**2021**) Vol 95 111-116, https://doi.org/10.1016/j.medengphy.2021.08.004

[44] J. Giunta, L. Lamassoure, L. Nokovitch, **G. Rosi**, A.-S. Poudrel, J.-P. Meningaud, G. Haïat and R. Bosc, *Validation of an Instrumented Hammer for Rhinoplasty Osteotomies: A Cadaveric Study*, **Facial Plastic Surgery & Aesthetic Medicine**, (**2021**), https://doi.org/10.1089/fpsam.2021.0107

[45] A.-S. Poudrel, **G. Rosi**, V.-H. Nguyen, G. Haïat, *Modal Analysis of the Ancillary During Femoral Stem Insertion: A Study on Bone Mimicking Phantoms*, **Annals of biomedical engineering**, (**2022**), https://doi.org/10.1007/s10439-021-02887-9

[46] A. Aghaei, N. Bochud, **G. Rosi**, Q. Grossman, D. Ruffoni, S Naili1, *Ultrasound characterization of bioinspired functionally gradedsoft-to-hard composites: Experiment and modeling*, **Journal of the Acoustical Society of America**, (**2022**), https://doi.org/10.1121/10.0009630

Book chapters

[B1] F. dell'Isola, N. Auffray, V. A. Eremeyev, A. Madeo, L. Placidi, **G. Rosi**, *Least Action Principle for Second Gradient Continua and Capillary Fluids: A Lagrangian Approach Following Piola's Point of View* in **The complete works of Gabrio Piola: Volume I**, Editors: F. dell'Isola, G. Maier, U. Perego, U. Andreaus, R. Esposito, S. Forest. (**2014**) Springer, **isbn:** 978-3-319-00263-7

[B2] L.Placidi, **G. Rosi** and E. Barchiesi, *Analytical Solutions of 2-dimensional Second Gradient Linear Elasticity for Continua with Cubic-D4 Microstructure*. in **New Achievements in Continuum Mechanics and Thermodynamics**. Editors: B. E. Abali, H. Altenbach, F. dell'Isola, V. A. Eremeyev, A Öchsner. (**2019**) Springer, **isbn:** 978-3-030-13307-8.

[B3] **G. Rosi**, *Waves and gneralized continua* in **Encyclopedia of Continuum Mechancs**, Editors: H.Altenbach A Öchsner. (**2019**) Springer, **isbn:** 978-3-662-53605-6

Patents

[P1] G.Rosi, G Haiat, A.Tijou Device for inserting a surgical implant (2017) (FR3071718A1, WO2019063675A1) https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2019063675

[P2] G.Rosi, G Haiat, A.Tijou Device for inserting a surgical implant (2017) (FR3071719A1, WO2019063673) https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2019063673