

Personal data

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Education

- 1981-1985 **Masters of Science**, *University of Bucharest*, Roumanie.
Department des Mathématiques (Mathematics and Mechanics section)
- 1990-1994 **Ph.D. Engineering Science**, *Franche-Comté University*, Besançon, France.
Applied Mechanics Laboratory
- 2004 **Habilitation à diriger des recherches**, *Ecole Centrale de Lyon*, Ecully, France.
Laboratoire of Tribology and Systems Dynamics

Professional experience

- 1986-1988 **Mathematics teacher** - "J. Haltrich" High-School, Sighisoara, Romania
- 1988-1990 **Research Scientist** - Institut des Mathématiques de l'Académie des Sciences, Bucharest, Romania
- 1994-1995 **Assistant Professor (ATER)** - Ecole Nationale d'Ingénieurs de Belfort, Belfort, France
- 1995-2010 **Associate Professor (LTDS)**, Ecole Centrale de Lyon, Ecully, France
- since 2010 **Associate Professor at the Mechanics of Solids Department** and member of the **Lyon Institute of Nanotechnology**, Ecole Centrale de Lyon, Ecully, France

Responsibilities

- 2000-2007 Lab. activities in *Mechanics of Solids* at Ecole Centrale de Lyon
- 2003-2009 Head of the *Mechanics of Solids* teaching group at Ecole Centrale de Lyon
- 2003-2009 Head of the research group *Mechanics of Solids and Geomaterials* (LTDS)
- 2006-2009 Head of the *Mechanics/Energy* Teaching Unit at ECL
- 2014-2017 Scientific Seminar Coordinator at the Lyon Institute of Nanotechnology
- 2017-2019 Co-leader of the research group *Heteroepitaxy and Nanostructures* at Lyon Institute of Nanotechnology
- 2019-2021 Head of the *Mechanics of Solids* teaching group at Ecole Centrale de Lyon
- since 2019 Head of the *Mechanics of Solids and Structures* Teaching Unit at Ecole Centrale de Lyon

Fields of interest

- Linear and nonlinear elasticity
- Homogenization for discrete and continuum media
- Non-local elasticity and continuum approximation of discrete models
- Modeling and simulation of critical phenomena
- Phase transitions, fracture and localization
- Sharp interface theory and phase field model regularization
- Configurational forces at structured and/or non-structured interfaces
- Thermo-mechanics of immaterial interfaces (structured or not)
- Physics and modeling of nanowires growth
- Mechanics of self-organization (Origami) in ultra-thin films

Scientific supervision and editorial activity

- **7 Ph. D. Theses.**
- **2 Master Sci. Projects.**
- **Peer-review activity** for : Journal of Elasticity, Continuum Mechanics and Thermodynamics, Int. J. of Solids and Structures, Mathematics and Mechanics of Solids, Int. J. Engng. Sci., Int. J. Fracture, Int. J. Sound and Vibrations, Acta Geotechnica, Meccanica, etc.
- **Editorial Board Member** for Archive of Applied Mechanics (Springer).

Recent Scientific Projects

- ANR **SPAME** (2009) - *Porous Silicon with variable lattice parameter for application in epitaxy* ; scientific coordinator for LTDS.
- Projet PEPS **AUORE** (2014) - *Self-organization Through Stress Relaxation* ; scientific coordinator of the project.
- Projet PEPS **NanoPhase** (2015/2016) - *Nanowire growth simulation using multi-phase field model* ; INL scientific coordinator.
- ANR **PHOLDING** (2017) - *Folding Photonic Crystals : Semiconductors Origami* ; scientific coordinator for the Heteroepitaxy and Nanostructures group at INL.

Teaching experience

- **Lectures and tutorials** : Elasticity, Strength of materials, Inelastic behavior of materials, Elastoplasticity, Homogenization, Mechanics and thermodynamics of continua, Partial differential equations, Random vibrations, Continuum models for phase transitions, Solid State Physics, Signal treatment, Finite Elements.
- **Lab** : Elasticity, Strength of materials, Inelastic behavior of materials.

Journal papers

1. Design of pre-stressed plate-stripe to cover non-developable shells (with I.R. Ionescu), *European Journal of Mechanics - A/Solids*, **95** (104609), 2022.
2. Wetting of Ga droplets in SiO₂/Si cavities : appication to self-assisted GaAs nanowire growth (with L. Bailly-Salins, M. Vettori, T. Dursap, Ph. Regreny, G. Patriarche, M. Gendry), *arXiv preprint* 2205.10035, 2022.
3. Hexagonal Ge Grown by Molecular Beam Epitaxy on Self-Assisted GaAs Nanowires (with I. Dudko, T. Dursap, A.D. Lamirand, C. Botella, Ph. Regreny, S. Brottet, M. Bugnet, S. Walia, N. Chauvin, J. Penuelas), *Crystal Growth and Design* **22**(1), 32-36, 2021.
4. Wurtzite phase control for self-assisted GaAs nanowires grown by molecular beam epitaxy (with T. Dursap, M. Vettori, C. Botella, Ph. Regreny, N. Blanchard, M. Gendry, N. Chauvin, M. Bugnet, J. Penuelas), *Nanotechnology* **32**(15), 155602, 2021.
5. Tubular optical microcavities based on rolled-up photonic crystals (with R. Briche, A. Benamrouche, P. Cremillieu, Ph. Regreny, J.L. Leclercq, X. Letartre, S. Callard), *APL Photonics*, **5**(10), 106106, 2020.
6. Shell design from planar pre-stressed structures, *Mathematics and Mechanics of Solids* (with I.R. Ionescu), **25**(6), 1247-1266, 2020.
7. Crystal phase engineering of self-catalyzed GaAs nanowires using a RHEED diagram (with T. Dursap, M. Vettori, C. Botella, Ph. Regreny, G. Patriarche, M. Gendry, J. Penuelas), *Nanoscale Advances*, **2**(5), 2127-2134, 2020.
8. Impact of the Ga flux incidence angle on the growth kinetics of self-assisted GaAs nanowires on Si (111) (with M. Vettori, X. Guan, Ph. Regreny, J. Penuelas, M. Gendry), *Nanoscale Advances*, **1**(11), 4433-4441, 2019.
9. Porous Silicon as Soft Material in Low-Frequency MEMS (MicroElectro-Mechanical Systems) Resonators (with C. Malhaire, V. Lysenko, A. Sabac), *World Journal of Mecanics*, **8**(11), 431, 2018.
10. Fabrication of self-rolling geodesic objects and photonic crystal tubes, *Nanotechnology*, **29** (28), 285301, 2018.
11. Multiphase mean curvature flows with high mobility contrasts : a phase-field approach, with applications to nanowires (with E. Bretin, J. Penuelas, S. Masnou), *arxiv preprint* 1711.04035, *Journal of Computational Physics*, **365**, 324-349, 2018
12. A metric-based approach to multiphase mean curvature flows with mobilities, *Geometric Flows* (with E. Bretin, J. Penuelas, S. Masnou), **3**(1), 97-113, 2018.
13. Exact continuum interpolation of the linear-chain with hyper-pre-stress *Int. J. Fracture*, 2016 237-244, 2016.
14. On the propagation waves in the theory of thermoelasticity with microtemperatures (with S. Chirita) *Mech. Res. Comm.*, **75**, 1-12, 2016.
15. Texture of Ge on SrTiO₃ (001) substrates : Evidence for in-plane axiotaxy *Surface Science* (with J Penuelas, B Gobaut, G Saint-Girons), **644**, 13-17, 2016.
16. Surface-wave problem in a thermoviscoelastic porous half-space *Wave Motion* (with S. Chirita), **54**, 100-114, 2015.
17. Interface accommodation mechanism for weakly interacting systems, *Appl. Phys. Lett.* (with B. Gobaut, J. Penuelas, G. Grenet, V. Favre-Nicolin, N. Blanc, G. Renaud, G. Saint-Girons), **103** 021602, 2013.

18. Spherical curves design for micro-origami using intrinsic stress relaxation, *Appl. Phys. Lett.* (with C. Chevalier, G. Grenet, Ph. Regreny, X. Letartre, J.L. Leclercq), 102, 123111, 2013.
19. Continuum strain gradient elasticity from discrete valence force field model for diamond-like crystals, *Int. J. Fracture*, 174, 95-102, 2012, reprinted in *Micromechanics of Defects in Solids* (ed. P. Ariza), Springer Verlag, 2012.
20. Hyper-pre-stress vs. strain-gradient for surface relaxation in diamond like structures, *J. Mech. Phys. Solids*, 60, 623-642, 2011.
21. Analysis of structure and strain at the meso-scale in 2D granular materials (with N.-S. Nguyen, H. Magoaric, B. Cambou), *International Journal of Solids and Structures*, 46, 3257-3271, 2009.
22. Modeling macroscopic elasticity of porous silicon, *Physica Status Solidi* (avec H. Magoaric), 6, 1680-1684, 2009.
23. Strong ellipticity for tetragonal system in linearly elastic solids (avec S. Chirita) *International Journal of Solids and Structures*, 45, 4850-4859, 2008.
24. Nonlocal orientational distribution of contact forces in granular samples containing elongated particles (avec H. Magoaric, B. Cambou), *Acta Geotechnica*, 3, 49-60, 2008.
25. On the Strong Ellipticity of the Anisotropic Linearly Elastic Materials (avec S. Chirita, M. Ciarletta), *Journal of Elasticity*, 87 1-27, 2007.
26. Generalized Stefan models accounting for a discontinuous temperature field, *Continuum Mechanics and Thermodynamics*, 16, 427-440, 2004.
27. Vertical Correlations in Superlattices using the Grinfeld Method (avec G. Grenet), *International Journal of Solids and Structures*, 40, 4895-4910, 2003.
28. Thermoelastic Driving Forces on Singular Surfaces (avec C. Dascalu), *Mechanics Research Communications*, 29, 507-512, 2002.
29. The Asaro-Tiller-Grinfeld Instability Revisited, *International Journal of Solids and Structures*, 38, 4671-4684, 2001.
30. Unimodular matrices whose entries are squares of those of a unimodular matrix, *Rev. Roumaine Math. Pures et Appliquées* (with A. Zaharescu, V. Vajaitu), 46, 419-430, 2001.
31. Spatial Decay and Growth Properties for Incremental Thermoelasticity (avec S. Chirita) *Zeitschrift für angewandte Mathematik und Physik ZAMP*, 51, 39-60, 2000.
32. A Note on Hadamard - von Mises Ideally Plastic Materials in Simple Shear, *Roumanian Journal of Pure and Applied Mathematics*, 45, 235-240, 2000.
33. Design Isotropic Materials using Anisotropic Components, *International Journal of Engineering Science*, 36, 545-554, 1998.
34. Anisotropic Polynomial Constitutive Equations for Electro-elastic Crystals (avec M. Tarantino), *Zeitschrift für angewandte Mathematik und Physik ZAMP*, 48, 857-873, 1997.
35. The Number of Elastic Moduli for Anisotropic Polynomial Constitutive Equations, *Mechanics Research Communications*, 24, 289-301, 1997.
36. Electro-elastic Interactions and Second Order Anisotropic Constitutive Equations (avec M. Tarantino), *Meccanica*, 31, 657-664, 1996.
37. Constraint Groups (avec M. Vianello et P. Podio-Guidugli), *Journal of Elasticity*, 37, 1995.
38. On the Differentiability of Local Representations of Isotropic Constraints (avec M. Vianello et P. Podio-Guidugli), *Bulletin of the Technical University of Istanbul*, 47, 13-23, 1994.
39. Bifurcation in the Traction Problem for a Transversely Isotropic Material, *Math. Proc. of the Cambridge Phil. Soc.*, 110, 385-394, 1991.

40. Material Symmetry in Deformed Configurations, *International Journal of Engineering Science*, 28, 367-374, 1990.
41. Material Symmetry and Propagation of Acceleration Waves, *Bulletin Mathématique de la Soc. Sci. Math. Roumaine*, 33, 99-104, 1989.
42. Material Symmetry and Restrictions on Constitutive Functions, *Studii si Cercetari de Matematica*, 41, 15-21, 1989.

Chapters

1. (Chapitre) Covering a surface with pre-stressed ribbons : from theory to nano-structures fabrication in *Theoretical Analyses, Computations, and Experiments of Multiscale Materials*, (ed. I. Giorgio, L. Placidi, E. Barchiesi, B.E. Abali, H. Altenbach), in Advanced Structural Materials Series, Springer Verlag, 2022.
2. (Chapitre) Generalized Thermo-elastodynamic Stefan Models, in *Encyclopedia of Thermal Stresses* (ed. Hetnarski, R.), Springer Verlag, 2014.
3. (Ouvrage collectif) Les techniques de changement d'échelle dans les matériaux granulaires (avec B. Cambou) chap. 3 dans *Matériaux granulaires*, (eds. B. Cambou, M. Jean, F. Radjai), Hermes, 2012.
4. (Chapitre) Engineering Pseudo-substrates with Porous Silicon Technology (with N.P. Blanchard, A. Boucherif, Ph. Regreny, H. Magoariec, J. Penuelas, V. Lysenko, J.M. Bluet, O.Marty, G. Guillot, G. Grenet), in *Semiconductors-on-Insulated Materials for Nanoelectronics*(ed. A. Nazarov), Springer, 2011.
5. (Chapitre) Elasticity : microscopic bases of macroscopic constitutive relations, in *Mechanics of Nano-Objects - Spring School MECANO*) (eds. O. Thomas, A. Ponchet, S. Forest), Presses des Mines, 2009.
6. (Ouvrage collectif) Multi-scale Techniques for Granular Materials (with B. Cambou) in *Micromechanics of Granular Materials*, Wiley, 2009.
7. (Chapitre) A short review of linear elasticity, in *Mechanics of Nano-Objects - Spring School MECANO*) (eds. O. Thomas, A. Ponchet, S. Forest), Presses des Mines, 2009.

Proceedings

1. Stress-driven Kirigami : From Planar Shapes to 3D Objects, in *Mechanics and Physics of Solids at Micro- and Nano-Scales*, (ed. I.R. Ionescu, S. Queyreau, C.R. Picu, O.U. Salman), Wiley, 2019.
2. Self-assembly micro-origami photon cages as hollow micro-resonators (with C. Chevalier, R. Artinyan, P. Regreny, G. Grenet, S. Callard, P. Rojo-Romeo, X. Letartre, J.-L. Leclercq, *Integrated Photonics : Materials, Devices, and Applications III*, Int. Soc. for Optics and Photonics, 2015.
3. 3D optical micro-resonators by curving nano-structures using intrinsic stress (with C. Sieutat, C. Chevalier, G. Grenet, P. Regreny, P. Victorovitch, X. Letartre, J.L. Leclercq, *SPIE Photonics Europe*, SPIE, 2012.
4. Monolithic integration of Ge on SrTiO₃ : mismatch accommodation for very heterogeneous epitaxial systems, *European Materials Research Society Meeting, E-MRS Spring 2012 Symposium M - More than Moore*.
5. Macroscopic elasticity of porous silicon ; bulk and surface effects (with H. Magoariec), *Progress in the Theory and Numerics of Configurational Mechanics*, Springer 2009.

6. Strain-structure relationship at meso-scale for 2d granular materials, (with N.S. Nguyen, H. Magoaric) *Powders and Grains, 2009*, AIP Publishing.
7. Discrete Homogenization and Macroscopic Elasticity of Porous Silicon (with H. Magoaric), *Porous Silicon Science and Technology - 08 Sa Coma*, Espagne, pp 267-268, 2008.
8. Generalized Stefan Models, Proceedings of the EUROMECH Colloquium 445, *Mechanics of Material Forces*, (eds. P. Steinmann, G.A. Maugin), Kaiserslautern, Germany, 2003 ; *Advances in Mechanics and Mathematics* (eds. R. Odgen, D. Gao).
9. Feasibility of strain relaxed InAsP and InGaAs compliant substrates (avec Kostrzewa, M., Grenet, G., Regreny, P., Leclercq, J.L., Mokni, N., Sidoroff, F., Jalaguier, E., Perreau, P., Moriceau, H., Hollinger, G.) in International Conference on Indium Phosphide and Related Materials (IPRM-2003), Santa Barbara, pp 325-328, 2003.
10. A One-Dimensional Viscoelastic Model for Lateral Relaxation in Thin Films (avec N. Mokni ; F. Sidoroff), Proc. of the 11th International Workshop on *Computational Mechanics of Materials*, Freiberg, 2001 (eds. S. Schmauder, M. Kuna), pp 56-60.
11. Vertical Correlation in Multilayered Nanostructures (with G. Grenet), Proc. of the 5th Int. Seminar on *Geometry, Continua and Microstructure*, Bucarest, 2001 (ed. S. Cleja-Tigoiu), pp 105-114.
12. Second Gradient vs. Surface Energy in the Asaro-Tiller-grinfeld Instability (with F. Sidoroff), J. de Physique IV, Proc. of the 2nd European Mechanics of Materials Conference on *Mechanics of Materials with Intrinsic Length Scale*, Magdeburg, Germany, 1998.
13. On the Behaviour of some Thermo-Elasto-Plastic Models in Finite Strains (with. F. Sidoroff) in Micro and Macrostructural Aspect of Thermo-plasticity (IUTAM Symposium), Bochum, 1997 (eds. O.T. Bruhns, E. Stein), Kluwer.
14. Equilibrium and Stability for Two Classes of Materials With Elastic Range in Simple Shear Deformation Processes, Proc. of the Symposium on *Material Instabilities : Theory and Applications* (eds. R.C. Batra, H.M. Zbib), ASME Winter Annual Meeting Chicago, 1994 ; ASME Publications, AMD Vol 138.

