

Dr. Konstantinos Danas

Curriculum Vitae

ELyTMax, MaSC building, room #503
Tohoku University, 2-1-1 Katahira, Aobaku,
Sendai, 980-8577, Japan

Work Tel: +81-22-217-6609
Email : konstantinos.danas@polytechnique.edu
Web : <http://www.kostasdanas.com>

▪ PERSONAL INFO

Date of Birth: March 1st, 1981
Place of Birth: Kozani, Greece
Citizenship: Greek, French
Marital Status: Married, 2 children

▪ ACADEMIC POSITIONS

- 2023-2024: Visiting Professor and Director of Research, CNRS, ELyTMax, Tohoku University, Sendai.
- 2022-2023: Director of Research (Directeur de Recherche), CNRS, Laboratoire de Mécanique des Solides (LMS), Ecole Polytechnique, Palaiseau, France.
- 2016-present: Professor (Professeur Chargé des Cours), Ecole Polytechnique, Palaiseau, France.
- 2009-2022: Tenured Research Scientist (Chargé de Recherche), CNRS, Laboratoire de Mécanique des Solides (LMS), Ecole Polytechnique, Palaiseau, France.
- Feb-Mar 2012: Visiting Professor, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, U.S.A.
- Oct-Dec 2009: Visiting Research Scholar, Department of Engineering, University of Cambridge, Centre for Micromechanics, Cambridge, U.K.
- 2008-2009: Postdoctoral Research Associate, Department of Engineering, University of Cambridge, Centre for Micromechanics, Cambridge, U.K.

▪ EDUCATION

- 2016: **HDR (Habilitation à Diriger des Recherches)**
Dissertation: *Soft and Metallic Microstructured Solids: Theory, Modeling and Experiments.*
University of Pierre and Marie Curie (Paris VI), Paris, France
- 2003-2008: **PhD in Mechanical Engineering and Applied Mechanics**
Dissertation: *Porous materials with evolving microstructure: constitutive modeling, numerical implementation and applications.*
École Polytechnique, Palaiseau, France.
University of Pennsylvania, Philadelphia, PA, U.S.A.
- 2003-2004: **Master of Science in Mechanical Engineering and Applied Mechanics**
Thesis: *Macroscopic properties and evolution of microstructure in porous plastic materials.*
University of Pennsylvania, Philadelphia, PA, U.S.A., GPA: 3.97/4.00.

1998-2003: **Diploma in Mechanical Engineering**
University of Thessaly, Greece, graduation ranked 1st student – GPA: 8.87/10
(5 years program, equivalent to Master's Degree in Greece)

▪ **ACADEMIC HONORS AND AWARDS**

2022: ERC Proof-of-Concept Grant, (18 month) research program to bring the study of MREs towards a promising application (150k€).

2019: Jean Mandel Prize awarded bi-annually for excellence in research in mechanics to young scientists (below 40) working in France.

2017: Médaille de Bronze du CNRS, INSIS (Bronze Medal of CNRS, Institute of Engineering Sciences).

2014: European Research Council (ERC) Starting Grant Award, Horizon 2020 program to conduct a five-year research project (2015-2020) on smart magneto-active materials Funding (1.5M€).

2012: Award by Comité National Français de Mécanique to attend European Solid Mechanics Conference, Graz, Austria, 2012.

2009: Ranked 1st at the CNRS, Section 9, Chargé de Recherche competition 2009, France. Offered a CR2/CNRS Research position at LMS, École Polytechnique, Palaiseau, France.

2008: “Jeune post doc” by École Polytechnique for a period of three months.

2007: Student Competition Finalist, 44th Annual Technical Meeting, Society of Engineering Science, Texas A&M, 2007 with the paper “Homogenization-based constitutive models for porous media with evolving microstructure.”

2005: The scholarship for Hellenes of the Alexander S. Onassis Public Benefit Foundation as a supplement to fulfill my PhD studies at École Polytechnique.

2004: The “Gaspard Monge” fellowship of École Polytechnique to carry out a PhD at the Laboratoire des Mécanique des Solides of École Polytechnique for a period of three years.

2003: Offered the Dean's Fellowship from Brown University and Princeton University, Accepted the Research Fellowship from University of Pennsylvania.

1998-2003: Greek National Scholarship Foundation for excellence in undergraduate studies (given only to the highest rank student).

2000-2003: Technical Chamber of Greece scholarship (given only to top five ranked students of the entire Polytechnique School in University of Thessaly).

▪ **RESEARCH GRANTS (RG) & INDUSTRIAL CONTRACTS (IC)**

- **(RG)** “Haptic sensing skin for biomedical applications with soft magnetorheological Elastomers”, PI: Kostas Danas, ERC* Proof-of-Concept Grant Award, (ERC-PoC---), Period: October 2022 - March 2024.
- **(RG)** “Data-driven investigation of three-dimensional instabilities in magneto-active thin films heterogeneously patterned by design”, co-PI: Kostas Danas with Laurence Bodelot, ANR-DFG (Germany) PRCI, 2022-2025.
- **(IC)** “Porous films for biomedical applications”, PI: Kostas Danas, LVMH, Orleans, France, Period: September-November, 2021.

- **(RG)** “Active Magnetorheological Elastomers: from Hierarchical Composite Materials to Tailored Instabilities”, PI: Kostas Danas, ERC* Starting Grant Award, Acronym: MAGNETO (ERC-StG-636903), Period: April 2015 - March 2020.
- **(IC)** “Nanofilms of oxidized PDMS in syringes”, PI: Kostas Danas, Becton & Dickinson (BD), Grenoble, France, Period: January-December, 2020.
- **(IC)** “Virtual microstructures and homogenization for porous geomaterials”, PI: Kostas Danas, TOTAL, France, Period: January, 2014-present (renewed until end of 2020).
- **(RG)** “Influence of Casting Defects in the low cycle fatigue of lost foam casting aluminum alloys”, PI: Eric Charckaluk, Co-PI for LMS: Kostas Danas, ANR** Collaborative Grant, Acronym: INDIANA (ANR-12-RMNP-0011), Period: January 2013 - December 2016.
- **(IC)** “Advanced homogenization models for porous materials and ductile fracture”, PI: Kostas Danas, Nippon Steel & Sumitomo Metal Corporation, Period: January, 2013-December, 2015.
- **(RG)** “Ductile fracture at low stress triaxialities”, PI: Dirk Mohr, One of 3 Co-PIs: Kostas Danas, ANR Collaborative Grant, Acronym: LOTERIE (ANR-11-BS09-0008), Period: January 2012 - December 2014.

*ERC: European Research Council

**ANR: Agence Nationale de la Recherche

■ TEACHING EXPERIENCE

- 2020 – present: **“Introduction to Fracture Mechanics”**, Undergraduate Course, Ecole Polytechnique (50 hours per year), Responsable du cours.
- 2017 – present: **“Continuum Mechanics II”**, Undergraduate Course, Ecole Polytechnique (32 hours per year).
- 2016 – present: **“Continuum Mechanics I”**, Undergraduate Course, Ecole Polytechnique (32 hours per year).
- 2016 – present: **“Elasticity and Fracture”**, Master Course, M4S, Ecole Polytechnique (12 hours per year).
- 2010 – 2017: **“Numerical Methods”**, Master Course, Master Magis, Ecole Polytechnique (30 hours per year).
- 2013 – 2017: **“Project in the Mechanics of Structures and Fluids”**, Undergraduate Level, Ecole Polytechnique (30 hours per year).
- 2010: Supervision for **“Continuum Mechanics”**, Undergraduate Course, L2, Ecole Polytechnique.
- 2009: Teaching Assistant for **“Finite Element Methods”**, Fall Semester, Undergraduate Lab Course, L3, University of Cambridge.
- 2006-2008: Teaching Assistant for **“Mechanics of Solids”**, **“Vibrations”**, **“Foundations of Engineering Mathematics II”**, **“Fluid Mechanics”**, University of Pennsylvania.

Other short teaching activities

- Theoretical, numerical and experimental investigations of active magneto- and electro-elastic materials (4.5 hours), COMMAS Summer School, University of Stuttgart, Germany, 2015

▪ PUBLICATIONS

Publications in Refereed journals

1. Hooshmand-Ahoor, Z., Luo, H., **Danas, K.** (2024). M-Voronoi and other random open and closed-cell elasto-plastic cellular materials: Geometry generation and numerical study at small and large strains, *Int. J. Solids Struct.*, 290, 112680.
2. Xenos, S., Aravas, N., **Danas, K.**, (2024). A homogenization-based model of the Gurson type for porous metals comprising randomly oriented spheroidal voids, *Eur. J. Mech. / A Solids*, 105, 105238.
3. Luo, H., Hooshmand-Ahoor, Z., **Danas, K.**, Diani, J., (2023). Numerical estimation via remeshing and analytical modeling of nonlinear elastic composites comprising a large volume fraction of randomly distributed spherical particles or voids, *Eur. J. Mech. / A Solids*, 101, 105076.
4. Moreno-Mateos, M.A., **Danas, K.**, Garcia-Gonzalez, D. (2023). Influence of magnetic boundary conditions on the quantitative modelling of magnetorheological elastomers, *Mech. Materials*, 184, 104742.
5. Chang, X., Hallais, S., **Danas, K.**, Roux, S. (2023). PeakForce AFM Analysis Enhanced with Model Reduction Techniques, *Sensors*, 23, 4730.
6. Chang, X., Hallais, S., **Danas, K.**, Roux, S., (2023). Peakforce AFM analysis enhanced with model reduction techniques, *Sensors*, 23, 4730.
7. Lucarini, S., Moreno-Mateos, M.A., **Danas, K.**, Garcia-Gonzalez, D. (2022). Insights into the viscohyperelastic response of soft magnetorheological elastomers: Competition of macrostructural versus microstructural players, *Int. J. Solids Struct.*, 256, 111981.
8. Hooshmand-Ahoor, Z., Tarantino, M. G., **Danas K.** (2022). Mechanically-grown morphogenesis of Voronoi-type materials: Computer design, 3D-printing and experiments, *Mechanics of Materials* (173), 104432.
9. da Costa Linn L. B., **Danas K.**, Bodelot L. (2022). Towards 4D Printing of Very Soft Heterogeneous Magnetoactive Layers for Morphing Surface Applications via Liquid Additive Manufacturing, *Polymers*, 14, 1684.
10. Mukherjee, D., **Danas K.** (2022). A unified dual modeling framework for soft and hard magnetorheological elastomers, *Int. J. Solids Struct.*, in press.
11. Rambašek, M., Mukherjee, D., **Danas K.** (2022). A computational framework for magnetically hard and soft viscoelastic magnetorheological elastomers, *Comp. Meth. App. Mech. Eng.*, 391, 114500.
12. Zerhouni, O., Brisard, S., **Danas K.** (2021). Quantifying the effect of two-point correlations on the effective elasticity of specific classes of random porous materials with and without connectivity, *Int. J. Eng. Science*, 166, 103520.
13. Chang, X., Halais, S., Roux, S., **Danas, K.** (2021). Model reduction techniques for quantitative nano-mechanical AFM moded, *Meas. Sci. Technol.*, 32, 075406.
14. Dorn, C., Bodelot, L., **Danas, K.**, (2021). Experiments and numerical implementation of a boundary value problem involving a magnetorheological elastomer layer subjected to a non-uniform magnetic field, *J. Appl. Mech.*, 88 (7), 071004.
15. Mukherjee, D., Rambašek, M., **Danas, K.**, (2021). An explicit dissipative model for isotropic dissipative hard magnetorheological elastomers, *J. Mech. Phys. Solids*, 151, 104361.
16. Rambašek, M., **Danas, K.** (2021). Bifurcation of magnetorheological film–substrate elastomers subjected to biaxial pre-compression and transverse magnetic fields, *Int. J. Non-Linear Mechanics*, 128, 103608.
17. Mukherjee, D., Bodelot, L., **Danas, K.**, (2020). Microstructurally-guided explicit continuum models for isotropic magnetorheological elastomers with iron particles, *Int. J. Non-Linear Mechanics*, 120, 103380.
18. Lefèvre V., **Danas K.**, Lopez-Pamies O. (2020). Two families of explicit models constructed from a homogenization solution for the magnetoelastic response of MREs containing iron and ferrofluid particles, *Int. J. Non-Linear Mechanics*, 119, 103362.

19. Psarra, E., Bodelot, L., **Danas, K.**, (2019). Wrinkling to crinkling transitions and curvature localization in a magnetoelastic film bonded to a non-magnetic substrate, *J. Mech. Phys. Solids*, 133, 103734.
20. Tarantino, M.G., Zerhouni, O., **Danas, K.** (2019). Random 3D-printed isotropic composites with high volume fraction of pore-like polydisperse inclusions and near-optimal elastic stiffness, *Acta Materialia*, 175, 331-340.
21. M.G. Tarantino, **K. Danas** (2019). Programmable higher-order Euler buckling modes in hierarchical beams, *Int. J. Solids Structures*, 167, 170-183.
22. D. Mukherjee, **K. Danas** (2019). An evolving switching surface model for ferromagnetic hysteresis, *J. App. Phys.*, 125, 033902.
23. Spyrou L., Brisard S., **Danas K.** (2019). Multiscale modeling of skeletal muscle tissues based on analytical and numerical homogenization, *J. Mech. Behavior Biomed. Mater.*, 92, 97-117.
24. **K. Danas**, D. Mukherjee, K. Haldar, N. Triantafyllidis (2019). Bifurcation analysis of twisted liquid crystal bilayers, *J. Mech. Phys. Solids*, 123, 61-79.
25. S. Kumar, **K. Danas**, D. Kochmann (2019). Enhanced local maximum-entropy approximation for stable meshfree simulations, *Comp. Meth. App. Mech. Eng.* 344, 856-886.
26. O. Zerhouni, M.G. Tarantino, **K. Danas** (2019). Numerically-aided 3D printed random isotropic porous materials approaching the Hashin-Shtrikman bounds, *Composites B* 156, 344-354.
27. K. Anoukou, R. Brenner, F. Hong, M. Pellerin, **K. Danas** (2018). Random distribution of polydisperse ellipsoidal inclusions and homogenization estimates for porous elastic materials, *Computers & Structures* 210, 87-101.
28. E. Psarra, L. Bodelot, **K. Danas** (2017). Two-field surface pattern control via marginally stable magnetorheological elastomers, *Soft Matter*, 13 (37), 6576-6584.
29. V. Lefèvre, **K. Danas**, O. Lopez-Pamies (2017). A general result for the magnetoelastic response of isotropic suspensions of iron and ferrofluid particles in rubber, with applications to spherical and cylindrical specimens, *J. Mech. Phys. Solids*, 107, 343-364.
30. L. Cheng, **K. Danas**, A. Constantinescu, D. Kondo (2017). A homogenization model for porous ductile solids under cyclic loads comprising a matrix with isotropic and linear kinematic hardening, *Int. J. Solids Struct.*, 121, 174-190.
31. **K. Danas** (2017). Effective response of classical, auxetic and chiral magnetoelastic materials by use of a new variational principle, *J. Mech. Phys. Solids*, 105, 25-53.
32. E. Bele, A. Goel, E.G. Pickering, G. Borstnar, O.L. Katsamenis, F. Pierron, **K. Danas**, V.S. Deshpande (2017). Deformation mechanisms of idealised cermets under multi-axial loading, *J. Mech. Phys. Solids*, 102, 80-100.
33. Spyrou L., Agoras M., **Danas K.** (2017). A homogenization model of the Voigt type for skeletal muscle, *J. Theor. Biology*, 414, 50-61.
34. Sfyris G., **Danas K.**, Wen G., Triantafyllidis N. (2016). Freedericksz instability for the twisted nematic device: A three-dimensional analysis, *Phys. Rev. E*, 94, 012704.
35. Papadioti I., **Danas K.**, Aravas N. (2016). A methodology for the estimation of the effective yield function of isotropic composites, *Int. J. Solids Structures*, 87, 120-138.
36. Mbiakop A., **Danas K.**, Constantinescu A. (2016). A homogenization-based yield criterion for a plastic Tresca material with ellipsoidal voids, IUTAM Paris, *Int. J. Fracture*, 1-17.
37. Bodelot L., Pössinger T., **Danas K.**, Triantafyllidis N., Bolzmacher C. (2016). Magnetorheological elastomers: experimental and modeling aspects, *Mech. Comp. Multi-funct. Mat.*, 7, 251-256.
38. Mbiakop A., Constantinescu A., **Danas K.**, (2015). An analytical model for porous single crystals with ellipsoidal voids, *J. Mech. Phys. Solids*, 84, 436-467.
39. Mbiakop A., Constantinescu A., **Danas K.**, (2015). A model for porous single crystals with cylindrical voids of elliptical cross-section, *Int. J. Solids Structures*, 64-65, 100-119.
40. Cao T.-S., Maziere M., **Danas K.**, Besson J., (2015). A model for ductile damage prediction at low stress triaxialities incorporating void shape change and void rotation, *Int. J. Solids Structures*, 63, 240-263.
41. Mbiakop A., Constantinescu A., **Danas K.**, (2015). On void shape effects of periodic elastoplastic materials subjected to cyclic loading, *Eur. J. Mechanics A/Solids*, 49, 481-499.

42. **Danas K.**, Triantafyllidis N., (2014). Instability of a magnetoelastic layer resting on a non-magnetic substrate, *J. Mech. Phys. Solids*, 69, 67-83.
43. **Danas K.**, Deshpande V.S., (2013). Plane-strain discrete dislocation plasticity with climb-assisted glide motion of dislocations, *Model. Simul. Mater. Sci. Engin.*, 21, 045008.
44. Lopez-Pamies O., Goudarzi T., **Danas K.**, (2013). The nonlinear elastic response of suspensions of rigid inclusions in rubber: II — A simple explicit approximation for finite-concentration suspensions, *J. Mech. Phys. Solids*, 61, 19-37.
45. **Danas K.**, Deshpande V.S., Fleck N.A., (2012). Size effects in the conical indentation of an elasto-plastic solid, *J. Mech. Phys. Solids*, 60, 1605-1625.
46. **Danas K.**, Ponte Castañeda P., (2012). Influence of the Lode parameter and the stress triaxiality on the failure of elasto-plastic porous materials, *Int. J. Solids Structures*, 49, 1325-1342.
47. **Danas K.**, Ponte Castañeda P., (2012). Response to the comments of Hutchinson and Tvergaard, *Int. J. Solids Structures*, 49, 3486.
48. **Danas K.**, Aravas N., (2012). Numerical modeling of elasto-plastic porous materials with void shape effects at finite deformations, *Composites: Part B*, 43, 2544-2559.
49. **Danas K.**, Kankanala S.V., Triantafyllidis N., (2012). Experiments and modeling of iron-particle-filled magnetorheological elastomers, *J. Mech. Phys. Solids*, 60, 120-138.
50. **Danas K.**, Deshpande V.S., Fleck N.A., (2010). Compliant interfaces: a mechanism for relaxation of dislocation pile-ups in a sheared single crystal, *Int. J. Plasticity*, 26, 1792-1805.
51. **Danas K.**, Ponte Castañeda P. (2009). A finite-strain model for viscoplastic anisotropic porous media: I – Theory, *Eur. J. Mechanics A/Solids*, 28, 387-401.
52. **Danas K.**, Ponte Castañeda P. (2009). A finite-strain model for viscoplastic anisotropic porous media: II – Applications, *Eur. J. Mechanics A/Solids*, 28, 402-416.
53. **Danas K.**, Idiart M. I., Ponte Castañeda P. (2008). A homogenization-based constitutive model for isotropic viscoplastic porous media, *Int. J. of Solids and Structures*, 45, 3392-3409.
54. **Danas K.**, Idiart M. I., Ponte Castañeda P. (2008). A homogenization-based constitutive model for two-dimensional viscoplastic porous media, Special Edition for H.D. Bui on Duality, inverse problems and nonlinear problems in solid mechanics, edited by J.B. Leblond and X. Markenscoff, *C.R. Mécanique* 336, 79 – 90.
55. Idiart M. I., **Danas K.**, Ponte Castañeda P. (2006). Second-order estimates for nonlinear composites and application to isotropic constituents, *C.R. Mécanique* 334, 575 – 581.

Publications in Conference Proceedings

1. O. Zerhouni, M.-G. Tarantino, **K. Danas**, F. Hong (2018). *Influence of the internal geometry on the elastic properties of materials using 3D printing of computer-generated random microstructures*. SEG Technical Program Expanded Abstracts 2018: pp. 3713-3718.
2. **Danas K.**, (2015). *A variational principle for numerical homogenization of periodic magnetoelastic composites*, CFM, Lyon, France.
3. Pössinger T., Bodelot L., Bolzmacher C., **Danas K.**, Triantafyllidis N., (2015). *Experimental Characterization, Modeling and Simulation of Magneto-Rheological Elastomers*, 9th European Solid Mechanics Conference, ESMC15, Leganés-Madrid, Spain.
4. Pössinger T., Bolzmacher C., Bodelot L., **Danas K.**, Triantafyllidis N., (2014). *Magneto-mechanical characterization of magnetorheological elastomers*, 16th International Conference on Experimental Mechanics, ICEM16, Cambridge, UK.
5. Mbiakop A., Carpiuc A., Constantinescu A., **Danas K.**, (2013). *Cyclic behavior of elasto-plastic porous materials subjected to triaxial loading conditions*, CSMA, Giens, France.
6. Triantafyllidis N., **Danas K.**, (2012). *Magnetorheological Elastomers*, MecaMat, Aussois, France.
7. **Danas K.**, Kankanala S.V., Triantafyllidis N. (2011). *Magnetorheological Elastomers: Experiments and Modeling*, CSMA, Giens, France.
8. **Danas K.**, Ponte Castañeda P. (2011). *Failure of elasto-plastic porous materials subjected to triaxial loading conditions*, CSMA, Giens, France.
9. **Danas K.**, Idiart M.I., Ponte Castañeda P. (2007). *Homogenization-based constitutive models for two-dimensional viscoplastic porous media with evolving microstructure*, Jeulin,

D. and Forest, S., (Eds.). In: Continuum Models and Discrete Systems (CMDS 11). Mines-Paris Tech, Paris, 143-148.

10. **Danas K.**, Ponte Castañeda P. (2005). *Porous power-law composites: Yield surfaces and evolution of microstructure*, Mecamat, Aussois, France.

Patents

- Possinger T, Bodelot L., **Danas K.**, Triantafyllidis N., Bolzmacher C. (2015). Test specimen for a magnetorheological elastomeric material, French Patent No: 15 59468, Issued: 5th October 2015

Industrial Codes

- Industrial Code for Virtual Microstructures creation for the modeling of the effective properties of rocks comprising arbitrary ellipsoidal microstructures. Code created for TOTAL, France.

■ PLENARY & INVITED LECTURES

1. **(Invited speaker)** Recent advances in the study of MREs and their instabilities, IUTAM – SMM, 2023, Ningbo, China.
2. **(Invited speaker)** Soft and hard magnetorheological elastomers, MecaMat Meeting, Aussois, 2023.
3. **(Keynote talk)** Recent advances on the study of Magneto-rheological elastomers, ELyTMaX Workshop between INSA Lyon, Ecole Centrale Lyon and University of Tohoku (2022).
4. **(Invited lecture)** Magneto-active soft materials and structures, together with Prof. P. Reis, EPFL, EuroTech Seminars series (2022).
5. **(Invited speaker)** A unified homogenization-guided modeling approach for soft and hard magnetorheological elastomers, Aussois, 2021 (COVID, online talk).
6. **(Invited speaker)** The realm of magnetorheological elastomers: experiments, theory and instabilities, APS March Meeting, Denver, CO, 2020 (COVID, uploaded talk).
7. **(Keynote talk)** Modeling of magnetorheological elastomers: from material to device, MSE Congress, Germany 2020 (COVID, online talk).
8. **(Invited talk)** Experiments, modeling and instabilities of magnetorheological elastomers, Symposium to Honor Prof. Lalit Anand for the Prager Medal, SES, Madrid, Spain, 2018.
9. **(Invited talk)** Microstructured magnetorheological elastomers: numerical modeling, experiments and tailored instabilities, Symposium in Honor of the 60th birthday of Prof. N.A. Fleck, ESMC, Bologna, Italy 2018.
10. **(Invited talk)** Micromechanical modeling of porosity growth and ratcheting under cyclic loading and 3D printing, IUTAM, Copenhagen, Denmark, 2018.
11. **(Invited talk)** Recent Advances in Mathematics and Mechanics of Materials, Workshop, Rome, Italy, 2017.
12. **(Invited talk)** An analytical model for porous single crystals with ellipsoidal voids, ICTAM, Montreal, Canada, 2016.
13. **(Invited talk)** A class of analytical models for porous single crystals with ellipsoidal voids, GAMM Workshop on Microstructures, Paris, France, 2016.
14. **(Invited talk)** Recent advances in experiments and modeling of magnetorheological elastomers, GDR MEPHY Workshop, Agay, France, 2015.
15. **(Invited Lectures)** Theoretical, numerical and experimental investigations of active magneto- and electro- elastic materials, COMMAS Summer School, University of Stuttgart, Germany, 2015.
16. **(Invited lecture)** Modeling of porous materials consisting of isotropic and anisotropic matrix and implications on deformation localization, IUTAM Symposium: Ductile Fracture and Localization, Paris, France, 2015.
17. **(Invited lecture)** Magnetorheological elastomers: from micro-deformation mechanisms to macroscopic instabilities and applications, IUTAM Symposium, Paris, France, 2014.

18. **(Invited lecture)** Recent advances in the modeling of electro- and magneto-active materials, IUTAM Symposium, Evanston, IL, U.S.A, 2014.
19. **(Invited lecture)** Elasto-plastic porous materials: Nonlinear homogenization and numerical implementation under various loading conditions, GAMM meeting, Erlangen-Nuremberg, Germany, 2014.
20. **(Plenary Lecture)** Influence of the Lode parameter and the stress triaxiality on the localization of elasto-plastic porous materials, IDDRG, Zurich, Switzerland, 2013.
21. **(Invited lecture)** Deformation mechanisms in iron-particle magnetorheological elastomers, EUROMECH 550, Poitiers, France, 2013.
22. **(Invited Lecture)** together with Nick Triantafyllidis) Magnetorheological Elastomers, MecaMat, Aussois, France, 2012.
23. **(Keynote Lecture)** Failure of elasto-plastic porous materials due to void shape effects and void growth, Congres Francais de Mecanique, Besancon, France, 2011.

■ INVITED SEMINARS

1. Magneto-rheological elastomers and instabilities: theory, numerical aspects and experiments, 2022, Johns Hopkins University, MD, USA.
2. Magnetorheological elastomers and instabilities: theory, experimental aspects and numerical modeling, 2021, Magdeburg Universität, Germany (online).
3. Recent developments in soft and hard magnetorheological elastomers, 2021, LMA, Marseille, France.
4. Recent developments in soft and hard magnetorheological elastomers, 2020, LMT, ENS Paris-Saclay, France.
5. Recent developments on the study of magnetorheological elastomers, 2020, University of Colorado Boulder, CO, USA.
6. From Architected Mechanical and Magnetoelastic Polymers to Hierarchical Instabilities (2019), General Seminar, Institut d'Alembert, Sorbonne University (Paris VI), Paris, France.
7. Microstructured Magnetorheological Elastomers and Instabilities (2019), Applied Mechanics Seminar, Harvard University, Cambridge, MA, U.S.A.
8. Microstructured Magnetorheological Elastomers and Instabilities (2019), Engineering Seminar, Brown University, Providence, RI, U.S.A.
9. Microstructured Magnetorheological Elastomers and Instabilities (2019), IMDEA Materials, Madrid, Spain.
10. Tailoring Instabilities in Microstructured MREs: Experiments, Numerical Analysis and Theory (2018), LSPM, University Paris 13, Paris, France.
11. Tailoring Instabilities in Microstructured MREs: Experiments, Numerical Analysis and Theory (2018), GDR Polymers, Mines ParisTech, Paris, France.
12. Tailoring Instabilities in Microstructured MREs: Experiments, Numerical Analysis and Theory (2017), Department of Aerospace Engineering and Engineering Mechanics, Austin, TX, USA.
13. Magneto-Rheological elastomers and elasto-plastic materials: from micro-deformation mechanisms to instabilities (2016), IMDEA Materials, Madrid, Spain.
14. Magneto-Rheological elastomers: from micro-deformation mechanisms to macroscopic instabilities and applications (2015), Civil and Environmental Engineering Department, Georgia Tech, U.S.A
15. Magneto-Rheological elastomers: from micro-deformation mechanisms to macroscopic instabilities and applications (2015), Center for Micromechanics, Engineering Department, Cambridge University, U.K.
16. Magneto-Rheological elastomers: from micro-deformation mechanisms to macroscopic instabilities and applications (2015), Soft Matter Group, Department of Physics, Leiden University, Netherlands.
17. Micro-deformation mechanisms of particle-filled magnetorheological elastomers: experiments, theory and numerics (2013), MCE, California Institute of Technology, U.S.A.

18. Particle impregnated magnetorheological elastomers: experiments, theory and numerics (2012), MSME, Université Paris-Est, Marne La Vallée, France.
19. Particle impregnated magnetorheological elastomers: experiments, theory and numerics (2012), Aerospace Engineering and Mechanics, University of Minnesota, Minneapolis, MN, U.S.A.
20. Modelling size effects and dislocation climb in single crystals with discrete dislocation dynamics and strain gradient plasticity theories (2010), State University of New York, Stony Brook, U.S.A.
21. Discrete Dislocation Dynamics and Strain Gradient formulations: a way to model size effects in plasticity (2010), University of Pierre et Marie Curie (Paris VI), Paris, France.
22. Discrete Dislocation Dynamics and Strain Gradient formulations: a way to model size effects in plasticity (2010), LMS Graduate Seminar, Ecole Polytechnique, Palaiseau, France.
23. Size effects in plasticity: Discrete Dislocation Dynamics and Strain Gradient Plasticity formulations (2009), University of Cambridge, Cambridge, U.K.
24. Size effects in plasticity: Discrete Dislocation Dynamics and Strain Gradient Plasticity formulations (2009), University of Oxford, Oxford, U.K.
25. Porous materials with evolving microstructure: A homogenization approach, EPFL Lausanne, 2008, Switzerland.
26. Homogenization-based constitutive models for porous media with evolving microstructure, Departmental MEAM Seminar, University of Pennsylvania, 2007.

▪ CONFERENCE & WORKSHOP PRESENTATIONS

1. Coupled magneto-mechanical response of NdFeB particle-filled viscoelastic elastomers, ASME, Salt Lake City, UT, USA 2019.
2. Wrinkling to crinkling transition and curvature localization in a magnetoelastic film-substrate system, ASME, Salt Lake City, UT, USA 2019.
3. 3D-printed isotropic porous materials almost attaining the Hashin-Shtrikman bounds, ASME, Salt Lake City, UT, USA 2019.
4. Effective response of classical, auxetic and chiral magnetoelastic materials, ECCM, Glasgow, Scotland, 2018.
5. Numerically-aided 3D printed materials almost attaining the Hashin-Shtrikman bounds, ECCM, Glasgow, Scotland, 2018.
6. An analytical model of elasto-plastic porous materials for cyclic loading with isotropic and kinematic hardening, ECCM, Glasgow, Scotland, 2018.
7. Recent advances in MREs and harnessing instabilities in film/substrate systems, EMMC, Nantes, France, 2018.
8. Surface patterning and auxetic metamaterial response of magnetorheological elastomers, APS March Meeting, Los Angeles, CA, USA, 2018
9. Effective response of classical, auxetic and chiral magnetoelastic materials, ASME, Tampa, FL, USA, 2017.
10. Programmable Pattern Formation via Euler Buckling of Hierarchical beams. ASME, Tampa, FL, USA, 2017.
11. A homogenization model for the cyclic response of porous materials with isotropic and linear kinematic hardening, IWCMM 27, Louvain, Belgium, 2017.
12. Wrinkling instability in film-substrate magnetorheological elastomers under combined magnetomechanical loading, EMI, Metz, France, 2016.
13. On instabilities of active magnetorheological elastomers, ASME, Houston, USA, 2015.
14. On variational formulations for periodic magneto-rheological elastomers, ESMC, Madrid, Spain, 2015.
15. Void shape effects and porosity ratcheting of elasto-plastic materials subjected to cyclic loadings, CFRAC, Cachan, France, 2015.
16. On variational formulations for periodic magneto-rheological elastomers, PACAM XV, Urbana—Champaign, Illinois, U.S.A, 2015.

17. Active magnetorheological elastomers: numerical simulations and instabilities, ASME, Montreal, Canada, 2014.
18. Magnetorheological elastomers: experiments and modeling, World Congress on Computational Mechanics, Barcelona, Spain, 2014.
19. Numerical modeling of elasto-plastic porous materials with void shape effects at finite deformations, European Congress on Fracture, Trondheim, Norway, 2014.
20. On the stability of MRE layers resting on soft substrates, ASME, San Diego, U.S.A., 2013.
21. A numerical study on magnetorheological elastomers, CSMA, Giens, France, 2013.
22. Experiments and modeling of MREs with particle chain microstructures, ICTAM, Beijing, China, 2012.
23. A study on ductile fracture using nonlinear homogenization models for porous materials, ESMC, Graz, Austria, 2012.
24. Deformation mechanisms in iron-particle magnetorheological elastomers, CIMTEC, Montecatini-Terme, Italy, 2012.
25. Experiments and Modeling of transversely isotropic MREs, SES, Evanston, U.S.A., 2011.
26. Experimental and Theoretical Investigation of MREs, CFM, Besancon, France, 2011.
27. Failure of elasto-plastic porous materials subjected to triaxial loading conditions, CSMA, Giens, France, 2011.
28. Magnetorheological Elastomers: Experiments and Modeling, CSMA, Giens, France, 2011.
29. Localization analysis of porous metals via homogenization models incorporating microstructure evolution, US National Congress of Theoretical and Applied Mechanics, Penn State University, 2010 & ASME Fall Conference, Vancouver, Canada, 2010.
30. Micro-indentation of elasto-viscoplastic solids, US National Congress of Theoretical and Applied Mechanics, Penn State University, U.S.A., 2010.
31. Modelling dislocation climb with a novel discrete dislocation dynamics framework, ECCM, Paris, 2010.
32. The role of surface coatings in size effects: Discrete dislocations vs strain-gradient crystal plasticity, ECMS, 2009, Lisbon, Portugal.
33. Homogenization-based constitutive models for porous media with evolving microstructure, Student Competition Finalist, 44th Annual Technical Meeting, Society of Engineering Science, Texas A&M, 2007.
34. Isotropic viscoplastic porous composites, International Conference on Thermo-Mechanical modeling of Solids, LMS, École Polytechnique, France, 2007.

▪ SUPERVISION PHD THESIS, MASTER AND INTERNSHIPS

Current PhD candidates

2023-2026(exp): Vignesh SELVAM (ANR PRCI France-Germany)

Title: Controlling pattern formation via magnetic field at the surface of magneto-active elastomer structures

Co-supervision with Laurence BODELOT

2021-2025(exp): Zehui LIN (China Scholarship Council)

Title: 3D-printing, experiments and modeling of soft magnetorheological elastomers for soft robotic applications

Co-supervision with Laurence BODELOT

2020-2024(exp): Sokratis XENOS

Title: *Porous materials: Constitutive modeling and Computational issues*

Co-supervision with Nikolaos ARAVAS (University of Thessaly, Greece)

Co-tutelle between Ecole Polytechnique and University of Thessaly

Graduated PhD students

- 2019-2023: Zahra AHOOR HOOSHMAND
Title: *Computer-aided generation, 3D-printing and experimental study of porous and composite materials.*
Co-supervision with Gabriella TARANTINO (U. Paris-Saclay)
- 2017-2020: Dipayan MUKHERJEE
Title: *Theoretical and numerical modeling of magnetorheological elastomers comprising magnetically soft and hard particles.*
Co-supervision with Laurence BODELOT (LMS)
- 2016-2019: Othmane ZERHOUNI
Title: *Microstructured Solids: from imaging to virtual microstructures at several scales.* Co-supervision with Sébastien BRISARD (Ecole des Ponts)
- 2015-2018: Erato PSARRA
Title: *Instabilities in magnetoelastic solids: experiments, theory and numerics.*
Co-supervision with Laurence BODELOT (LMS)
- 2015-2018: Jean-Pierre VOROPAIEF
Title: *Magnetorheological elastomers: a study of the deformation mechanisms due to microstructural and viscous aspects.*
Co-supervision with Laurence BODELOT (LMS), Nick TRIANTAFYLIDIS (LMS)
- 2012-2015: Armel Brice MBIKOP NGASSA (defended September 15th, 2015)
Title: *Nonlinear homogenization in creeping solids: modeling, numerical implementation and applications to fatigue and fracture.*
Co-supervision with Andrei CONSTANTINESCU
- 2012-2015: Tobias POSSINGER (defended June 22nd, 2015)
Title: *Experimental characterization and modeling of magnetorheological elastomers for haptic applications.*
Co-supervision with Laurence BODELOT (LMS), Christian BOLZMACHER (CEA), Nick TRIANTAFYLIDIS (LMS)

Other Graduated PhD students

- 2016-2019: Siddhant KUMAR (CALTECH, CA, U.S.A.)
Title: *Microstructured Solids: from imaging to virtual microstructures at several scales.*
Main advisor: Dennis KOCHMANN (ETH Zurich, Switzerland)
- 2013-2017: Victor LEFÈVRE
Title: *Dielectric elastomer composites: analytical and numerical non-convex homogenization methods and applications.*
Main advisor: Oscar LOPEZ-PAMIES
(University of Illinois, Urbana-Champaign, USA)

Post-Doctoral students

- 2023-2024: Zahra AHOOR HOOSHMAND, ERC PoC project.
- 2021-2022: Xiaoming LUO, Chair ARKEMA (with Julie DIANI)
- 2020-2021: Xuyang CHANG, BD project
- 2020-2021: Othmane ZHEROUNI, TOTAL project
- 2019-pres: Matthias RAMBAUSEK, ERC Starting Grant.

2018-pres: Vivekanand DABADE, ERC Starting Grant.
 2016-2018: Gabriella TARANTINO, ERC Starting Grant.
 2016-2017: Krishnendu HALDAR, ERC Starting Grant.
 2015-2016: Long CHENG, ANR Project INDiANA.
 2014-2015: Anoukou KOKOU, Project with TOTAL.
 2013-2014: Trong-Son CAO, ANR Project LOTERIE in collaboration with J. BESSON, Mines ParisTech.

Master students

2018-2019: Zahra AHOOR HOOSMAND, 6 month internship, Master M4S.
 2016-2017: Siddhant KUMAR, 6 month internship, Master M4S.
 2015-2016: Othmane ZERHOUNI, Master Project and 4 month internship, Master MAGIS.
 2015-2016: Tu LE, Master Project and 4 month internship, Master MAGIS.
 2014-2015: Erato PSARRA, Master Project and 4 month internship, Master MAGIS.
 2011-2012: Andreea CARPIUC, Master Project and 4 month internship, Master MAGIS.
 2011-2012: Chetra MANG, Master Project and 4 month internship, Master MAGIS.

Undergraduate Internship students

2020: François-Marie Ecomard, 3rd year internship, Ecole Polytechnique.
 2019: Thomas Le Meur, 3rd year internship, Ecole Polytechnique.
 2013-2014: Anna BAUER, 3rd year, 4 month internship, Ecole Polytechnique.
 2013-2014: Aryan SAURAV, 3rd year, 8 month internship, Ecole Polytechnique.
 2012-2013: Thomas CARLIOZ, 3rd year, 4 month internship, Ecole Polytechnique.
 2011: Satyajit DAS, 3 month undergraduate internship via INDIA - FRANCE agreement.

▪ **PROFESSIONAL SERVICES**

Associate Editor:

- European Journal of Mechanics A/Solids

Editorial Board Member:

- International Journal of Solids and Structures

International Journal Referee:

Journal of the Mechanics and Physics of Solids; International Journal of Solids and Structures; European Journal of Mechanics A/Solids; Soft Matter, Journal of Elasticity; International Journal of Nonlinear Mechanics; International Journal for Numerical Methods in Engineering; Journal of Applied Mechanics; Mechanics of Materials; Engineering Fracture Mechanics; Journal of Composite Materials; Mechanics Research Communications; Computational Material Sciences; Journal of Mechanics and Materials and Structures; Extreme Mechanics Letters; Modeling and Simulation in Material Science and Engineering; Smart Materials and Structures

Referee for Funding Agencies:

European Research Council (ERC), French National Research Agency (ANR), US-Israel Binational Science Foundation, Netherlands Research Center High-Tech Materials, ETH Zurich Switzerland

External Member/Reviewer of HDR Committees:

2023 (reviewer): Léo MORIN, Sorbonne Université, Paris, France.

External Member/Reviewer of Thesis Committees:

- 2023 (reviewer): Arefeh ABBASI, EPFL, Lausanne, Switzerland.
Thesis Advisor: Pedro REIS
- 2023 (member): Miguel Àngel MORENO MATEOS, University Carlos III, Madrid, Spain.
Thesis Advisors: Daniel GARCIA GONZALEZ
- 2022 (member): Julien TAURINES, LMPS, Université Paris-Saclay, France.
Thesis Advisors: Boris KOLEV, Oliver HUBERT, Rodrigue DESMORAT
- 2022 (reviewer): Achraf OUADDI, LMPS, Université Paris-Saclay, France.
Thesis Advisors: Oliver HUBERT
- 2022 (member): Semen EFREMOV, INRIA, Université de Lorraine, France.
Thesis Advisors: Jonas MARTINEZ, Sylvain LEFEBVRE
- 2022 (reviewer): Chrysoula CHATZIGEORGIOU, LEM3, Metz, France.
Thesis Advisors: Fodil MERAGHNI, Yves CHEMINSKY
- 2021 (reviewer): Kou DU, U. Lorraine, France.
Thesis Advisors: Long CHENG, Albert GIROUD
- 2021 (member): Nicole TUENI, Ecole Polytechnique, France.
Thesis Advisors: Martin GENET, Jean-Marc ALLAIN
- 2021 (reviewer): Svejna HERMANN, U. Bourgogne France-Compté, France.
Thesis Advisors: G. CHEVALLIER, J.-F MANCEAU, P. BUTAUD
- 2020 (member): Jianchang ZHU, ENSAM, France.
Thesis Advisors: Farid ABED-MERAÏM, Mohamed BEN BETTAÏEB
- 2019 (reviewer): Matthias RAMBAUSEK, University of Stuttgart, Germany.
Thesis Advisor: Marc-Andre Keip
- 2019 (reviewer): Emmanuel SIÉFERT, ESPCI, Sorbonne Université, Paris, France.
Thesis Advisor: Dennis Kochmann (minor participation as co-advisor)
- 2019 (member): Siddhant KUMAR, CALTECH, CA, USA
Thesis Advisor: Dennis Kochmann (minor participation as co-advisor)
- 2019 (member): Foucault de Francqueville, LMS, Ecole Polytechnique, Palaiseau, France.
Thesis Advisor: Julie DIANI, Pierre GILORMINI
- 2018 (reviewer): Louis JOËSSEL, LMA, Marseille, France.
Thesis Advisor: Mihail GARAJEU, Pierre-Guy VINCENT, Martin IDIART
- 2018 (reviewer): Minh Tan NGUYEN, Université Paris-Est, Marne-la-Vallée, France.
Thesis Advisor: Vincent MONCHIET, Quy Dong TO
- 2018 (reviewer): Marieme Imene EL GHEZAL, UC Louvain, Belgium.
Thesis Advisor: Issam DOGHRI
- 2017 (reviewer): Joseph PAUX, Uni. Pierre and Marie Curie (Paris VI), France.
Thesis Advisors: Renald BRENNER, Djimedo KONDO
- 2017 (member): Chao LING, Mines ParisTech, France.
Thesis Advisors: Samuel FOREST and Jacques BESSON
- 2016 (member): Ioanna PAPADIOTI, Uni. Thessaly, Greece.
Thesis Advisor: Nicolaos ARAVAS
- 2016 (reviewer): Walid HAMOUCHE, Uni. Pierre and Marie Curie (Paris VI), France.
Thesis Advisors: Angela VINCENTI, Corrado MAURINI
- 2016 (reviewer): Noy COHEN, Ben Gurion University, Israel.
Thesis Advisor: Gal DEBOTTON
- 2015 (member): Fang YAO, Ecole Polytechnique, France.
Thesis Advisor: Patrick LE TALLEC
- 2012 (reviewer): Milad MALEKI, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland.
Thesis Advisor: John BOTSIS

Committees & Administrative Responsibilities

- 2022-2026: Director of GDR MePhy (Mechanics and Physics Research Group)
- 2022-present: Correspondent for European and International matters, LMS
- 2020-present: LMS Direction Committee

2020-present: In charge of the Multidisciplinary Pole at LMS, Ecole Polytechnique
 2020-2021: Recruitment Committee for Assistant Professor, University of Pierre and Marie Curie.
 2017-present: INSIS CNRS Aid committee for ERC starting grant oral interviews
 2012-present: Researcher in charge of LMS-CMAP Cluster, Ecole Polytechnique.
 2014-2016: Member of the Department of Mechanics Committee, Ecole Polytechnique.
 2014: Recruitment Committee for Assistant Professor, University of Pierre and Marie Curie.
 2011-2012: Construction of Web Page of LMS, Ecole Polytechnique (together with J.-M. Allain).
 2005-2006: Co-organizer of the « Graduate Research Seminar » at LMS, Ecole Polytechnique.

Symposium/Workshop/School Organizer

2022: CISM International School on Electro- and magneto-mechanics. Co-organized with Oscar Lopez-Pamies (U. of Illinois at Urbana-Champaign, IL, USA).
 2020: EMMC 17, The mechanics of porous materials, Madrid, Spain. Co-organized with Eric Maire (INSA Lyon, France) (cancelled due to COVID).
 2020: CompSafe 2020, Kobe Japan. Frontiers of nonlinear, impact and instability analysis of solids and structures. Co-organized with Dai Okumura et al. (Nagoya University, Japan).
 2016-present: Mechanics and Physics (GDR MEPHY) Research Group, Paris, Co-organized with Benoit Roman (ESPCI, Paris), Anne Tanguy (INSA Lyon), Julien Scheibert (Ecole Centrale Lyon), Philippe Claudin (ESPCI Paris).
 2018-2020: Instabilities in solids and structures, ASME 2018, Pittsburg, PA, USA. Co-organized with Stavros Gaitanaros (John Hopkins University, MD, USA), Ryan Elliott (U. of Minnesota, Minneapolis, MN, USA).
 2018: Mechanics and physics of soft materials, SES 2018, Madrid, Spain. Co-organized with Oscar Lopez-Pamies (U. of Illinois at Urbana-Champaign, IL, USA).
 2018: Homogenization Strategies for Multiphase and Active Materials, European Solid Mechanics Conference (ESMC), Bologna, Italy, Co-organized with Issam Doghri (UCL, Belgium), Nick Triantafyllidis (Ecole Polytechnique, France) and Pedro Ponte Castañeda (U. Pennsylvania, PA, USA).
 2018: Modeling of active magneto and electromechanical materials, European Conference on Computational Mechanics, Galskow, UK, Co-organized with Marc-Andre Keip (U. Stuttgart, Germany) and Dennis Kochmann (ETH, Zurich, Switzerland).
 2017: Programmable Materials, Mechanics and Physics (GDR MEPHY) workshop, ESPCI, Paris, Co-organized with Benoit Roman (ESPCI, France).
 2015: "Plasticity", XV Pan-American Congress of Applied Mechanics, Co-organized with Dennis Kochmann (Caltech, USA).

■ **PROFESSIONAL AFFILIATIONS**

- Association Française de Mécanique (AFM)
- Fédération Francilienne de Mécanique (F2M)
- American Society of Mechanical Engineers (ASME)
- American Physics Society (APS)

- Association of Greek Engineers (TEE)

- **LANGUAGES**

Fluent in English, French and Greek (native)