Matthieu Gresil, Ph.D.

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EDUCATION

2009 **Ph.D. of Physics "Electronic, Electro-technic and Automatism" with high honours and congratulations of the committee.**
Title of PhD: "*Study of a structural health monitoring associated with electromagnetic shielding for composite materials*"
Ecole Normale Supérieure (ENS) of Cachan, Paris, France.

2006 **Master's degree of Physics "Matter and Material" with honours.**
University of Nantes, France.

2004 **Bachelor degree of Physics "Material Science".**
University of Nantes, France.

MAJOR RESEARCH INTERESTS

Material Science

Composite materials; Structural health monitoring; Advanced multi-functional composite materials; nano-composites; finite element method; Electromagnetic shielding;

WORK EXPERIENCE

2014 - present **Lecturer in composite materials, nondestructive evaluation and structural health monitoring**
School of Materials and Aerospace Research Institute, University of Manchester, Manchester, UK

2010 - 2014 **Postdoctoral Research Associate**
Laboratory for Active Material and Smart Structures (LAMSS), Department of Mechanical Engineering, University of South Carolina, USA.

Undergraduate and Ph.D. student supervision, participating in writing of contracts funding proposals (co-PI for three projects: ONR, Boeing, and AFSOR), research on existing contracts and disseminating results, modeling of the mechanical behavior for composite material, multi-physics multi-scale modeling of piezoelectric materials and elastic wave by finite element method for structural health monitoring.

2006 – 2009 **Research Assistant**
Ph.D. CIFRE DCNS (French Navy) - In collaboration with the ESTACA (Aeronautic and Transport Engineering School) and CERPEM (Center of Studies and Research in Electromagnetic Compatibility).

Experience in manufacturing and analysing composite materials for maritime and aeronautic application, structural health monitoring, electromagnetic and elastic wave propagation using finite element for composite material, Experience in manufacturing a Radom for frigate in infusion under vacuum, electromagnetic shielding, signal processing, dispersion of carbon nanotube in matrix.

2005 - 2006 **Research Assistant Student**
Material Institute of Nantes (IMN), University of Nantes, France - In collaboration with the INRA of Nantes (Agronomy National Research Institute).

Experience in Bio-molecule (amylose and DNA) / Carbon nanotube complexes, Structural properties (AFM, STEM, and HRTEM), optical spectroscopy (optical absorption, FT-Raman).

2005 **Research Assistant Student**
Material Institute of Nantes (IMN)

Experience of solar cells based on organics materials.

TEACHING EXPERIENCE

2014 - present **Lecturer:**
1) Preliminary physics for first year students (20)
2) Viscoelasticity for three and four years students (150).
School of Material, University of Manchester, Manchester, UK

2011 - 2014 **Teaching Intervention**, EMCH 575: Adaptive Material Systems and Structures
University of South Carolina, Columbia, USA.

2007 – 2009 **Teaching assistant**, *Non-destructive Technique, Composite Material.*
ESTACA (Aeronautic and Transport Engineering School), Laval, France.

FUNDED RESEARCH PROJECTS

F10 "Composite Drive Shafts with Integrated Sensors", P. Potluri (PI), **M. Gresil (Co-PI)**, Birmingham City Council, £280,000, 2014-2016.

F9 "Monitoring of Composite Pipelines using Embedded Sensors", **M. Gresil (PI)**, BP, £180,000, 2014-2018

F8. "Structural Health Monitoring of Nuclear Spent Fuel Storage Facilities" L. Yu (PI), **M. Gresil (Co-PI)**, B. Lin (Co-PI), T. Knight (co-PI), A. Mendez-Torres (co-PI), Nuclear Energy University Programs, $738,618.00, 11/2013-10/2016

F7. "SHM Research for GE Applications – Phase I" V. Giurgiutiu (PI), **M. Gresil (Co-PI)**, L. Yu (Co-PI), J. Bao (Co-PI), B. Lin (Co-PI), General Electric Company, $50,000. 10/2013-09/2014

F6. "Ultrasonic NDE/SHM Equipment for Advanced Materials and Structures", V. Giurgiutiu (PI), L. Yu (Co-PI), **M. Gresil (Co-PI)**, J. Bao (Co-PI), B. Lin (Co-PI), Defense University Research Instrumentation Program (DURIP), GRANT11233483, PA-AFOSR-2013-0001, $500,000. 2013/2014.

F5. "Integrated Opto-Electronic Equipment for Autonomous Structural Health Monitoring Research", V. Giurgiutiu (PI), L. Yu (Co-PI), **M. Gresil (Co-PI)**, B. Lin (Co-PI), J. Bao (Co-PI), Office of Naval Research (ONR)/DOD, Award 15540-FQ05, $194,507. 2012/2013.

F4. "USC participation in the AUFOS NICOP project with Australia", V. Giurgiutiu (PI), **M. Gresil (Co-PI)** Office of Naval Research, $150,000, 10/2012—9/2015.

F3. "Multi-physics Response of Heterogeneously Conductive Materials for Aircraft Application", P.K. Majumdar (PI), K.L. Reifsnider (Co-Pi), V. Giurgiutiu (Co-PI), **M. Gresil (Co-PI)**, Boeing, $ 340,665, 2011/2014.

F2. "Predictive Sensing for Space Applications", V. Giurgiutiu (PI), **M. Gresil (Co-PI)**, Air Force Office of Scientific Research, FA9550-11-1-0133, $575,000, 7/2011—6/2015.

F1. "Predictive Modeling of Structural Sensing for Navy Applications", V. Giurgiutiu (PI), **M. Gresil (Co-PI)**, Office of Naval Research, N00014-11-1-0271, $449,888, 11/2010—12/2013.

Ph.D. COMMITTEE

- Catalin Roman: Ph.D. student, University of South Carolina, SC, USA, Ph.D. defense in January 2013. Title of the thesis: "Structural Health Monitoring of Composite Laminates using Piezoelectric and Fiber Optics Sensors".

- Yanfeng Shen: Ph.D. student, University of South Carolina, SC, USA, Ph.D. defense in June 2014. Title of the thesis: "Structural Health Monitoring using Linear and Nonlinear Ultrasonic Guided Waves".

- Ayman Kamal AbdeElRahman: Ph.D. student, University of South Carolina, SC, USA, Ph.D. defense in July 2014.
  Title of the thesis: "Ultrasonics Transduction in Metallic and Composite Structures for Structural Health Monitoring using Piezoelectric Wafer Active Sensors and Shear Horizontal piezoelectric sensors".

SOCIETY MEMBERSHIP

- British Institute of Nondestructive Techniques (BINDT), 2014-present
- American Institute of Aeronautics and Astronautics (AIAA), 2012-present
- American Society of Mechanical Engineers (ASME), 2011-present

CONFERENCE SESSION CHAIR/Co-CHAIR

- ASME 2012 Pressure Vessels & Piping Division Conference, July 15-19,2012, Toronto, Canada
- ASME 2011 Conference on Smart Materials Adaptive Structures & Intelligent Systems, Scottsdale, Arizona, USA.

JOURNAL REVIEWER

- The Aeronautical Journal, 2014- present
- Mathematical Problems in Engineering, 2013-present
- Smart Material and Structures , 2013- present
- Structural Health Monitoring International Journal, 2012-present
- IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2011-present
- Sensors & Actuators: A. Physical, 2011-present

SPECIAL SKILLS

Languages	• French – Native • English – Fluent
Computer skills	• FEM: ABAQUS with Python script, ANSYS multi-physics, Comsol. • CATIA • Process: MATLAB (Signal processing, Wavelet, Data acquisition), C++

PATENT – INVENTION DISCLOSURE

2. Giurgiutiu, V.; **Gresil, M**.; Bin, L.; Mendez-Torres, A.; (2013) "Low cost multi-mode structural health monitor with radiation sensing functionality", USC invention disclosure, USC#1057

1. Giurgiutiu, V.; **Gresil, M.**; Catalin, R.; (2013) "Acousto-Ultrasonic Sensor", US Patent 20,130,129,275, 2013.

JOURNAL PUBLICATIONS

J16. Costa, L.; **Gresil, M**.; Frazao, O.; "Simultaneous measurement of physical parameters using FBGs embedded in unidirectional and bidirectional composite materials", Smart Materials and Structures, Vol. 25(1), 2016.

J15. Sanchez, D.M.; **Gresil, M**.; Soutis, C.; "Distributed internal strain measurement during composite manufacturing using optical fibre sensors", Composites Science and Technology, Vol. 120, 2015, DOI: doi:10.1016/j.compscitech.2015.09.023

J14. Pullicino, E.; Soutis, C.; **Gresil, M**.; "Gambling with graphene…Will it pay off?", JEC Composites Magazine 52(99), September 2015.

J13. Lin, B.; **Gresil, M.**; Cuc, A.; Giurgiutiu, V.; "Predictive modeling of piezoelectric wafer active sensors for structural health monitoring", Ferroelectrics, 470:1, 168-182, (2014).

J12. **Gresil, M.**; Giurgiutiu, V.; "Prediction of attenuated guided waves propagation in carbon fiber composites using Rayleigh damping model", Journal of Intelligent Material Systems and Structures, first published on September 8, 2014 doi:10.1177/1045389X14549870.

J11. Guo, S.; **Gresil, M.**; Sutton, M.A; Deng, X.; Reifsnider, K.M.; Majumdar, P.; "Fiber nonlinear predictive model for combined bending-compression loading of an orthogonal plane weave composite laminate structure", *Journal of Composite Materials*, December 6, doi:10.1177/0021998313512347, 2013.

J10. **Gresil, M.**; Giurgiutiu, V.; "Guided wave propagation in composite laminate material using piezoelectric wafer active sensor", *Royal Society Aeronautical Journal*, Vol. 117, No. 1196, pp 971-995, 2013.

J9. **Gresil, M.**; Yu, L.; Shen, Y.; Giurgiutiu, V.; "Predictive model of fatigue crack detection in thick bridge steel structures with piezoelectric wafer active sensors", *Smart Structures and Systems International Journal*, Vol.12 No.2, 2013.

J8. **Gresil, M.**; Giurgiutiu, V.; "Time-domain hybrid global-local prediction of guided waves interaction with damage", *Key Engineering Materials*, Vol. 558, pp 116-127, 2013.

J7. **Gresil, M.**; Giurgiutiu, V.; "Time-domain hybrid global-local concept for guided-wave propagation with piezoelectric wafer active sensor", *Journal of Intelligent Material Systems and Structures*, May 2, 2013.

J6. Guo, S M; Sutton, M A; Majumdar, P; Reifsnider, K M; Yu, L; **Gresil, M.**; "Development and application of an experimental system for the study of thin composites undergoing large deformations in combined

bending-compression loading", *Journal of Composite Materials*, April 11, 2013.

J5. **Gresil, M.**; Yu, L.; Giurgiutiu, V.; Sutton, M.; "Predictive modeling of electromechanical impedance spectroscopy for composite materials", *Structural Health Monitoring International Journal*, doi: 10.1177/1475921712451954, 2012.

J4. Pollock, P.; Yu, L.; Sutton, M A.; Guo, S.; Majumdar, P.; **Gresil, M.**; "Full-Field Measurements for Determining Orthotropic Elastic Parameters of Woven Glass-Epoxy Composites Using Off-Axis Tensile Specimens", *Experimental Techniques*, doi: 10.1111/j.1747-1567.2012.00824.x, 2012.

J3. Giurgiutiu, V.; **Gresil, M.**; Lin, B.; Cuc, A.; Shen, Y.; Roman, C.; "Predictive modeling of piezoelectric wafer active sensors interaction with high-frequency structural waves and vibration", *Acta Mechanica*, doi: 10.1007/s00707-012-0633-0, 2012.

J2. Bonnet, P.; **Gresil, M.**; Bizot, H.; Riou, I.; Bertoncini, P.; Buleon, A.; Chauvet, O.; "Single walled nanotubes/Amylose/SDBS complex", *Journal of Nanoparticle Research*, vol.12, p.545-550, 2010.

J1. Bertoncini, P.; **Gresil, M.**; Lardoux, J.; Riou, I.; Chauvet, O.; "Morphology of DNA/Single walled nanotubes complexes", *Dig. J. of Nanomaterial and Biostructure*, Vol. 2, No. 4, p. 293-297, 2007.

CONFERENCE PUBLICATIONS

C39. **Gresil, M.;** "Technique validation for structural health monitoring", Workshop on NDT/SHM, Bristol, UK, February 2016.

C38. **Gresil, M**.; "Distributed internal strain measurement during composite manufacturing using optical fibre sensors", Institution of Mechanical Engineers, London, UK, February 2016.

C37. **Gresil, M**.; Saleh, M.; Arshad, M.; Soutis, C.; "Acoustic Emission of 3D Angle Interlock Glass Fibre Composites", 10th International Workshop on Structural Health Monitoring. Stanford, USA, 2015.

C36. **Gresil, M.**; Muller, A.; Soutis, C.; "Acousto-Ultrasonic Structural Health Monitoring of Aerospace Composite Materials", 6th Conference on Emerging Technologies in Non-Destructive Testing, Brussels, Belgium, 2015

C35. Yang, C.; Aneke, A.; **Gresil, M.**; Oyadiji, S.O.; "Applications of thermography and ultrasonics for detection of debonding in carbon fibre reinforced composite panels", 5th International Workshop on Aerostructures, Manchester, UK, 2015.

C34. Martínez-Sánchez, D.; **Gresil, M.**; Soutis, C.; "Monitoring manufacturing of composites using embedded distributed optical fibre sensors", 10th International Workshop on Structural Health Monitoring. Stanford, USA, 2015.

C33. Ali, S.; Fernando, A.; Potluri, P.; **Gresil, M**.; "Multifunctional Weft-knitted Flexible Composite Structures", 15th AUTEX World Textile Conference, Bucharest, Romania, 2015.

C32. Revol, V.; Stadelmann, T.; Kitsianos, K.; Sauer, M-O.; Koulalis, I.; Chemana, R.; **Gresil, M.**; Tretout, H.; Kanderakis, G.; Madrigal, A-M.; "Non-destructive evaluation, inspection and testing of primary aeronautical composite structures using phase contrast X-Ray imaging", 5th International Workshop on Aerostructures, Manchester, UK, 2015.

C31. **Gresil, M.**; Soutis, C.; Giurgiutiu, V.; "Ultrasonic Structural Health Monitoring – An overview", 53rd Annual Conference of the British Institute for Non-Destructive Testing, NDT-0087-2014. (Keynote).

C30. Leonard, F.; Stein J.; **Gresil, M**.; Soutis, C.; "X-Ray computed tomography of composites", 53rd Annual Conference of the British Institute for Non-Destructive Testing, NDT-0086-2014.

C29. **Gresil, M.**; Yu, L.; Giurgiutiu, V.; "Predictive model validation of guided wave interaction with notch using scanning vibrometer measurements", ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems, vol. 7643, Newport, Rhode Island, USA, September 2014 (Presentation only).

C28. **Gresil, M.**; Giurgiutiu, V.; "Electromechanical impedance spectroscopy and guided waves propagation modelling on composite materials", European Workshop on Structural Health Monitoring, Nantes, France, July 2014.

C27. Lin, B.; **Gresil, M.**; Yu. L.; Mendez-Torres, A.E.; Giurgiutiu, V.; "Analytical model of nuclear environmental effects with piezoelectric wafer active sensors", ASME 2014 Pressure Vessels & Piping

Conference, Anaheim, California, USA, July 2014.

C26. Lin, B.; **Gresil, M.**; Giurgiutiu, V.; Knight, T.; Mendez-Torres, A.E.; Yu, L.; "Nuclear Environmental effects on piezoelectric wafer active sensors based acousto-ultrasonic sensing system", 2014 International Congress on Advances in Nuclear Power Plants, Charlotte, USA, April 2014.

C25. **Gresil, M.**; Giurgiutiu, V.; "Prediction of attenuated guided wave propagation in carbon fiber composites", The 19th International Conference on Composite Materials,81737, Montreal, Canada, July 2013.

C24. Kamal A.; **Gresil, M.**; Giurgiutiu, V.; "Shear horizontal guided waves in laminated composites plates using SH-PWAS", NDT of composites, Seattle, WA, 13-14 May 2013.

C23. Kamal A.; **Gresil, M.**; Giurgiutiu, V.; "Comparative Study of Several Methods for the Calculation of Ultrasonic Guided Waves in Composites", 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Boston, USA, April 2013.

C22. **Gresil, M.**; Giurgiutiu, V.; "Guided wave propagation in carbon composite laminate using piezoelectric wafer active sensors", SPIE 8695-77, San Diego, USA, March 2013.

C21. **Gresil, M.**; Giurgiutiu, V.; "Time-domain hybrid global-local prediction of guided waves", Asia-Pacific Workshop on Structural Health Monitoring, Melbourne, Australia, December 2012.

C20. Mendez-Torres, A.; Lin, B.; **Gresil, M.**; Giurgiutiu, V.; "Structural health monitoring with piezoelectric wafer active sensors exposed to irradiation effects", ANS Winter Meeting and Nuclear Technology Expo, San Diego, California, USA, November 2012.

C19. Zhao, L.; Yu, L.; **Gresil, M.**; Sutton, M.; Guo, S.; "Electromechanical impedance modeling for structural health monitoring", ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems, vol. 8094, Stone Mountain, Georgia, USA, September 2012.

C18. Lin, B.; **Gresil, M.**; Mendez-Torres, A.E.; Giurgiutiu, V.; "Structural health monitoring with piezoelectric wafer active sensors exposed to irradiation effects", ASME 2012 Pressure Vessels & Piping Conference, Toronto, Canada, July 2012.

C17. **Gresil, M.**; Giurgiutiu, V.; "Guidelines for using the finite element method for simulation of guided lamb waves propagation", European Workshop on Structural Health Monitoring, Germany, Dresden, June 2012.

C16. **Gresil, M.**; Shen, Y.; Giurgiutiu, V.; "Predictive simulation of structural sensing", The American Institute of Aeronautics and Astronautics, 53rd Structures, Structural Dynamics, and Materials Conferences, Honolulu, Hawaii, April 2012.

C15. **Gresil, M.**; Yu, L.; Sutton, M.A.; Guo, S.; Pollock, P.; "Predictive modeling of composite material degradation using piezoelectric wafer sensors electromechanical impedance spectroscopy", SPIE 8347-27, San Diego, USA, March 2012.

C14. Yu, L.; **Gresil, M.**; Pollock, P.; Sutton, M.A.; "Progressive damage detection/diagnosis on composite using electromechanical impedance spectroscopy", ASME International Mechanical Engineering Congress, IMECE 2011, vol. 63914, Denver, Colorado, USA, November 2011.

C13. **Gresil, M.**; Lin, B.; Shen, Y.; Giurgiutiu, V.; "Predictive modeling of space structures for SHM with PWAS transducers", ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems, vol. 5190, Phoenix, USA, September 2011.

C12. **Gresil, M.**; Shen, Y.; Giurgiutiu, V.; "Predictive modeling of ultrasonics SHM with PWAS transducers", 8th International Workshop on Structural Health Monitoring, Stanford, USA, September 2011.

C11. **Gresil, M.**; Shen, Y.; Giurgiutiu, V.; "Benchmark Problems for Predictive FEM simulation of 1-D and 2-D guided waves for SHM with Piezoelectric Wafer Active Sensors", Review of Progress in Quantitative Non-destructive Evaluation QNDE 2011, July 17-22, 2011, University of Vermont, Burlington, Vt, USA.

C10. **Gresil, M.**; Yu, L.; Giurgiutiu, V.; Sutton, M.; "Finite element modeling of electromechanical impedance spectroscopy for damage detection in composite materials", 16th International Conference on Composite Structures, ICCS16, Porto, Portugal, June 2011.

C9. **Gresil, M.**; Yu, L.; Giurgiutiu, V.; "Fatigue crack detection in thick steel structures with piezoelectric wafer active sensors", SPIE 7983 vol.101, San Diego, USA, March 2011.

C8. **Gresil, M.**; Parneix, P.; "High electromagnetic shielding effectiveness of hybrid glass/carbon composite laminate", 20th Intern. Symposium on Electromagnetic Compatibility, Wroclaw, Poland, September 2010.

C7. **Gresil, M.**; Parneix, P.; Lemistre, M.; Walrick, J-C.; Placko, D.; "Lamb wave propagation in a hybrid Glass/Carbon composite laminate for electromagnetic shielding", 7th International Workshop on Structural Health Monitoring, Stanford USA, 2009.

C6. Walrick, J-C.; **Gresil, M.**; Parneix, P.; "Strength mechanical influence of electromagnetic shield function embedded in laminated glass composite", 16th National days on the composites, Toulouse France, June 2009.

C5. **Gresil, M.**; Parneix, P.; Lemistre, M.; Placko, D.; "Effect of the insertion of an electromagnetic shielding on the propagation of Lamb wave in GFRP", 16th National days on the composites, Toulouse, France, 2009.

C4. **Gresil, M.**; Parneix, P.; "Mechanical effect and shielding effectiveness of the insertion of metallic screen in glass and carbon composite" 13th European Conf. on Composite materials, Stockholm Sweden, 2008.

C3. **Gresil, M.**; Parneix, P.; "Shielding effectiveness by metallic screen insertion in glass and carbon composite materials", CEM08, 14th International Symposium on Electromagnetic Compatibility, Paris France, 2008.

C2. Bertoncini, P.; **Gresil, M.**; Bonnet, P.; Chauvet, O.; "AFM imaging and force spectroscopy: tools for studying plant and surface and characterizing carbon nanotubes/Bio-molecules hybrids", AFM Bio Med Conference Barcelona, 2007.

C1. Bonnet, P.; Chauvet, O.; Bertoncini, P.; **Gresil, M.**; "Elaboration and characterization of amylose / SWNT complexes", International Conference on Science and Technology of Synthetic metals. Dublin 2006.