Dr Frédéric Dau
I2M laboratory (UMR 5295),
Dept. of Durability Materials Assemblies Structures
ENSAM Engineering school, France
Associate Professor Univ. Laval, Québec, Canada.
frederic.dau@ensam.eu / f.dau@i2m.u-bordeaux1.fr

Frederic Dau is graduated from ENS Cachan in France. He obtained successfully the so-called Agregation diploma (the main diploma from ENS Cachan, ranked 17th out of 76 successfull candidates on all France) allowing to teach in University and Engineering schools. At the same time, he also obtained his advanced studies degree in mechanical engineering (equivalent of today master of sciences) ending top of his class.
He received his PhD in 2004 from ENSAM Paris, France for his work on a new C1 shell finite element with double curvature based on a refined model for linear and nonlinear problems of structural composites. He has been recruited as associate professor in 2007 at ENSAM Bordeaux, France and promoted to the highest rank in this corps in 2012.
He holds now the position of head of research projects in his laboratory and is a very active member of various scientific councils and commitees. He remains also very involved in innovative education projects.

Main research topics

- Development and implementation of a C1 Shell Finite Element based on a refined model for linear and non linear composite structures
- Composites structures vulnerability against impact
- Variability and reliability approaches in composites
- Multi-scale approach by coupling Finite Element Method (FEM) and Discrete Element Method (DEM)
- Study of the damage propagation at micro-scale using a 3D Discrete Element Method

Main teaching topics

- Continuum mechanics
- Structural vibrations
- Structural analysis by FEM
- Composite materials

Academic appointments

- Associate professor at Laval University, Québec, Canada .

Scientific commitees and professional services

- Head of national, european and international research projects for the laboratory
- Member of the National Council of Universities in France
- Member of the director board of the French Composite Materials Association (AMAC) in charge of organizing technical and scientific days on composite (from 2 to 4 per year)

- Member of selection commitees recruiting research professor in french universities and engineering school
- Member of organizing and scientific commitees of national and international conferences
- Member of the institute advisory and innovations in technology training at ENSAM, France
- Member of central council at ENSAM Bordeaux, France

Recent publications in refereed journals

B.D. Le, F. Dau, J.L. Charles, I.Iordanoff Modeling damages and cracks growth in composite with a 3D discrete element method, Composite Part B, accepted in July 2015.

N. Guillaud, C. Froustey, F. Dau, P. Viot, Impact response of thick composite plates under uniaxial tensile preloading, Composite Structures, vol.121, No. 0, pp. 172-181, 2015 DOI http://dx.doi.org/10.1016/j.compstruct.2014.11.021.

M. Jebahi, F. Dau, JL. Charles, I. Iordanoff, Multiscale modeling of complex dynamic problems: An overview and recent developments, Archives of computational methods in engineering. DOI 10.1007/s11831-014-9136-6, 2014.

L. Maheo, F. Dau, D. André, J.L Charles, I. Iordanoff, A promising way to model cracks in composites using a Discrete Element Method, Composite Part B. http://dx.doi.org/10.1016/j.compositesb.2014.11.032, 2014.

Metoui S., Pruliere E., Ammar A., Dau F., Iordanoff I., The proper generalized decomposition for the simulation of delamination using cohesive zone model. International Journal for Numerical Methods in Engineering, Vol. 99, No. 13, pp. 1000-1022, 2014.

M. Jebahi, D. André, F. Dau, JL. Charles, I. Iordanoff « Simulation of Vickers indentation of silica glass », Journal of Non-Crystalline Solids, vol. 378, No. 0, pp. 15 - 24, 2013, DOI http://dx.doi.org/10.1016/j.jnoncrysol.2013.06.007, ISSN 0022-3093.

M. Jebahi JL. Charles F.Dau I. Iordanoff L. Illoul, A new 3D discrete/continuum coupling approach for dynamic simulation (DEM-CNEM), Computer Methods in Applied Mechanics and Engineering, vol. 255, 185–209, 2013, http://dx.doi.org/10.1016/j.cma.2012.11.021.

P. Pineau, F. Dau, Subsampling and homogenization to investigate variability of composite material mechanical properties, Computional Method in Applied Mechanics and Engineering (CMAME), vol. 241-244, 238–245, 2012, doi:10.1016/j.cma.2012.06.003.

Y. Duplessis-Kergomard, F. Dau, S. Heims, Choc mou basse énergie sur composite interlock 3X : approche expérimentale et numérique, Revue Matériaux & Techniques, vol. 100, numb. 6-7, 2012, DOI http://dx.doi.org/10.1051/mattech/2012021

Dau F., Guillaumat L., Cocheteux F., Chauvin T., Reliability approach on impacted composite material for railways, Revue des Composites & Matériaux Avancés, vol.22, n°1/2012.

P. Pineau F. Dau, Non periodic homogenization and subsampling on heterogeneous media applied to generate statistical distribution of composite elastic properties at micro and mesoscale, Revue des Composites & Matériaux Avancés, 2011.

Y. Duplessis-Kergomard, F. Dau & I. Iordanoff, Implementation of a Discrete Element Method for the space-time modeling of loading in the case of a soft shock: qualitative approach, International Journal of Computations and Modelling (IJCM), vol.1, no.2, 39-72, 2011.

Heimbs, S.; Van Den Broucke, B.; Duplessis Kergomard, Y.; Dau, F.; Malherbe, B., Rubber Impact on 3D Textile Composites, Applied Composite Materials, Vol. 19, No. 3-4, 2012, pp. 275-295.

F. Dau, F. Pablo et O. Polit, New reference solutions and parametric study for multilayered cylindrical shell, Int. Journal. of Research and Reviews Applied Sciences, vol 2, 2010.

N. Méalier, F. Dau, L. Guillaumat et P. Arnoux, Reliability approach for safe designing on a locking system, Probabilistic Engineering Mechanics, vol. 25, p.67-74, 2010.

F. Dau, O. Polit et M. Touratier , C^1 plate and shell finite elements for geometrically non linear analysis of multilayered structures, Computers and Structures (C&S), vol.84, p 1264-1274, 2010.

F. Dau, O. Polit et M. Touratier, An efficient C^1 finite element with continuity requierements for multilayered/sandwich shell structures, Computers and Structures (C&S), vol. 82, p.1889-1899, 2010.

Book chapter

Editions ISTE-Wiley (Hermes Science publishing)

Vol. 2 (*to be* published in 2015):

Title: *Discrete-continuum coupling method to simulate highly dynamic multi-scale problems: Simulation of Laser-induced damage in silica glass* to

Author(s): *Mohamed Jebahi, Frédéric Dau, Jean-Luc Charles, Ivan Iordanoff*

Recent publications in international conference proceedings

J. Girardot, F. Dau Modeling dry fabrics under impact with a 3D discrete element method, 20ème Int. Conf. on Comp. Mat. (ICCM20), Copenhague, Danemark, 19-24th July 2015.

M. Crozatier, L. Guillaumat, S. Terekhina, F. Dau, Influence de la courbure sur le comportement mécanique de composites stratifiés, Lyon, France, 29 Juin-1er Juillet 2015.

F. Dau, A promising way to model damage in composite material and dry fabrics using a Discrete Element Method, ASC-29/US-J 16/ASTM-D30 San Diego, US, 08-10 Sept. 2014.

G. Bresson, O. Caty, J. Merzeau, F.Dau, A. Ahmadi, G. Vignolles
Essais d'impact et propriétés thermiques résiduelles sur composites silice/phénolique, 13ème Congrès Français de Mécanique (CFM13) Bordeaux, France, 26-30 Août 2013.

M. Jebahi, JL. Charles, F. Dau, I. Iordanoff, Simulation du comportement de la silice sous indentation Vickers par la méthode des éléments discrets : densification et mécanismes de fissuration, 13ème Congrès Français de Mécanique (CFM13) Bordeaux, France, 26-30 Août 2013.

N. Guillaud, F. Dau, C. Froustey, P. Viot, JL. Lataillade
Réponses à l'impact de plaques composites épaisses préchargées en tension uniaxiale, 13ème Congrès Français de Mécanique (CFM13), Bordeaux, France, 26-30 Août 2013.

M. Jebahi, J.L. Charles, F. Dau, L. Illoul, and I. Iordanoff, Couplage approche discrète (DEM)/approche continue (CNEM) - Etude et choix des paramètres de couplage, 11ème Colloque National en Calcul des Structures (CSMA 2013), Giens, France, May 13-17, 2013.

M. Jebahi, F. Dau, J.L. Charles, and I. Iordanoff
Discrete-continuum coupling method for simulation of laser-induced damage in fused silica. Conferenre on Computational Methods for Coupled Problems in Science and Engineering (COUPLED 2013), Ibiza, Spain, June 17-19, 2013.

N.Guillaud, C.Froustey, F.Dau, P.Viot, Influence of tensile preloading on impact behavior of thick composite plates, 13th International Conference on Composite Structures (ICCS 13), Porto, Portugal, 17 - 21 Juin 2013.

F. Dau, L. Mahéo, Modélisation 3D d'un composite UD par la Méthode des Eléments Discrets 18ème Journées Nationales Composite (JNC18), Nantes, France, 12 - 14 Juin 2013.

M. Jebahi, J.L. Charles, F. Dau, L. Illoul, and I. Iordanoff, On the H1 discrete-continuum coupling based on the Arlequin method (DEM-CNEM), 6th European Congress on Computational Methods in Applied Siences and Engineering (ECCOMAS 2012), Vienna, Austria.

F. Dau, Marie-Laure Dano, Y. Duplessis Kergomard, Investigation of damage mechanisms in 3D interlock textile composites under low velocity impact, 15th European Conference on Composite Materials, Venise, Italie, 24-28 Juin 2012.

F. Dau, Y. Duplessis Kergomard, Damage mechanisms in interlock 3X woven composites under low velocity soft impact loading, 26th Annual Technical Conference/2nd Joint US-Canada Conference on Composites, Montréal (Quebec, Canada), 26-28 Septembre, 2011.

P. Pineau, F. Dau, Évaluation de la dispersion des propriétés mécaniques d'un matériau composite par sous-échantillonnage, 17ème Journées Nationales Composite (JNC17), Poitiers (France), 15-17 Juin, 2011.

F. Dau, Y. Duplessis Kergomard, S. Heimbs, Choc mou basse énergie sur composite interlock 3X : approche expérimentale et numérique, 17ème Journées Nationales Composite (JNC17), Poitiers (France), 15-17 Juin, 2011.

Dau F., Duplessis Kergomard Y., Damage mechanisms in interlock 3X impacted by a soft impactor , 1st Dymat student camp, Guétary (France), 5-7 Octobre.

Dau F., Duplessis Kergomard Y., Study on interlock 3X damage mechanisms under impact loading using a deformable impactor, 14th International Conference on Experimental Mechanics (ICEM14), Poitiers (France), 4-9 Juillet 2010.

Chermaneanu R., Dau F., Guillaumat L., Practical results for homogeneization of CMO based on hill lemma, 14th European Conference on Composite Materials (ECCM14), Budapest (Hongrie), 7-10 Juin 2010.

P. Pineau, F. Dau, Variable sampling homogenisation technique applied to a statistical analysis of variability transport in heterogeneous media : the mechanical behaviour of a ply in a laminate composite**,** 14th European Conference on Composite Materials (ECCM14), Budapest (Hongrie), 7-10 Juin 2010.

Y. Duplessis Kergomard, F. Dau, I. Iordanoff, Mise en oeuvre d'éléments discrets pour la modélisation spatio-temporelle du chargement dans le cas d'un choc mou**,** 1st International Conference IMPACT'2010 , Djerba (Tunisie), 22 - 24 mars 2010.