

Dr Antoine Le Duigou

Date of birth: 11/12/83 (age 37)

Married, two children

Institut de Recherche Dupuy de Lôme IRDL CNRS Joint Research Unit (UMR) 6027.
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Research Interests	Teaching
Biomimicry	Composite materials
Smart composites	Biomimicry
3D/4D printing	Eco-design and Life Cycle Analysis
Natural fibre composites	

RESEARCH ACTIVITIES

▪ **Prizes and Awards**

International award :

- Best young researcher : Society of Composite Material Young scientist award (ECCM) 2018
- Seal of Excellence, Marie Sklodowska Curie MSCA, 2017
- JEC/SAMPE Environmental Award 2009
- Selection for TSAI best paper, Conference on Composite Materials (ICCM) 2009

French award :

- Best young researcher : Daniel Valentin, French association of Composites Materials (AMAC) 2017
- 3rd prize for poster at National Conference on Composite Materials (2011)

▪ **Scientific production**

- **H_{index} = 26 (Scopus), 33 (Google); 2151 citations (Scopus), 3247 (Google)**
- 65 peer reviewed international articles
- 7 book chapters
- 40 international conferences
- 42 national conferences

PROFESSIONAL EXPERIENCE

2020-2024 Visiting Academic Senior Research Fellow within the Department of Aerospace Engineering to the University of Bristol

2019-2020 Invited associate professor in Tokyo University of Sciences

2018 Qualification for Full professor position

2017 Habilitation to supervise Reseaches (HDR in french) Université Bretagne Sud (UBS-France), IRDL CNRS FRE 3744 « *Composites materials and natural fibres : From reinforcement to hygromorph actuators* », Graduated with honors.

Reviewers : F Jacquemin (Univ Nantes), P Boisse (INSA Lyon) and L Orgeas (3SR Grenoble); Examiner : F Scarpa (Univ Bristol), P Fratzl (Max Planck Postdam), P Davies (Ifremer), J Breard (Univ Le Havre) and C Baley (UBS)

2011- Assistant Professor Université Bretagne Sud (UBS), IRDL CNRS UMR 6027,

2010-2011 Research Engineer Université Bretagne Sud (UBS), IRDL CNRS UMR 6027,

2007-2010 PhD Thesis in Material Science and Engineering- Université Bretagne Sud (UBS), IRDL CNRS UMR 6027 and Ifremer, “*Interfacial and aging of natural fibre biocomposite*”, *Graduated with honors*,

Reviewers : I Verpoest (KU Leuven), M Nardin (I2M Mulhouse), J Bred, P Davies and C Baley

▪ *Academic collaborations*

Pr F. Scarpa (University of Bristol, UK)
Dr R Matsuzaki (Tokyo University of Sciences JP)
Dr M Ueda (Nihon University JP)
Dr D Correa (Univ Waterloo Ca)
Pr J. Summerscales (University of Plymouth, UK)
Dr P. Davies (Ifremer- FR)
Pr F. Jacquemin (Univ Nantes FR)
Dr A Celino (Univ Nantes Fr)

Dr M Peron (Ungv Nantes Fr)
DR J. Beaugrand (INRA- FR)
Pr A. Bergeret (Mines Ales FR)
Dr PJ Liothier (Mines St Etienne)
Dr J Dirremberger (PIMM Paris Fr)
Dr U Lafont (ESA ESTEC)

SCIENTIFIC RESPONSABILITIES

Settling of research group : BIONICS-group

=> Biomimicry for Innovative Composites + Additive manufacturing

- 2 Associate-professors
- National and international collaborators (Japan, England, Canada, New Zealand...)
- 3 PhD students

Supervision of postgraduates

- 12 PhD students, 4 as director and 8 as co-director

2020-2023 Roxane Toumi : Biologically inspired autonomous solar tracker made with 4D printed shape-changing materials for lunar environment. Funds from ESA/IRT. Director.

2020-2023 Thomas Fruleux: Contribution to 4D printed adaptive biocomposite structures for marine applications. Funds from Isblue and French government. Director (50%) with P Sauleau (LBCM), M Castro (IRDL) and M Matsuzaki (TUS).

2020-2023 Charles De Kergariou, Hygromorph Materials for 4D Printing Shape Change and Environmental Sensing, funds from DSTL/DGA, Co-director with F Scarpa (Univ Bristol UK).

2019-2022 Qinyu Li, Hybrid shape memory polymer and hygromorph composite, Co direction avec F Scarpa (Univ Bristol UK) et J Leng (Harbin China).

2018-2021 Malik Spahic, Topological optimization of metamaterials for adaptive hydrofoil-Co-director (30%) with V Keryvin (IRDL) and N Di Cesare (IRDL).

2018-2020 Victor Popineau, “Internal stresses and marine aging of natural fibre composites” Director (50%) with C Baley (IRDL) and A Celino (GeM).

2017-2020 Guillaume Chabaud, “Development of long carbon and flax fibre composites for 3D and 4D printing: from structure to morphing”-Director (50%) with M Castro (IRDL); Defense done on 10/2020.

2017-2020 Victor Gager, “Development of ultra-light flax and oriented non-woven for automotive applications”, Industrial thesis with Ecotechnilin. Co-director (30%) with C Baley (IRDL) and A Bourmaud (IRDL); Defense forecast for 11/2020.

2016-2020: Samuel Requile, “Influence of retting on hemp fibres composites properties and durability” Co-director (30%) with C Baley (IRDL) and A Bourmaud (IRDL). Defense achieved on 06/17.

2014-2017: Justin Merotte, “Development of flax non-woven for automotive applications”: Industrial thesis with Ecotechnilin (automotive part supplier). Co-director (30%) with C Baley (IRDL) and A Bourmaud (IRDL), Defense achieved on 08/17.

2013-2016: Clément Gourier, “PA11/flax Biocomposites for automotive and aeronautical applications”: Co-director (30%), Co-director (30%) with C Baley (IRDL) and A Bourmaud (IRDL). Defense achieved on 09/16;

2011-2014: Morgane Deroiné, “Evaluation of durability of biopolymer (PLA and PHA) in marine environment”: Co-director, Defense achieved on 12/14.

- 3 Post-doctoral researchers

Marine Lan, 2015-2016 “Compressive properties of flax/PP biocomposites”

David Siniscalco, 2015-2016, “AFM cartography of flax fibre properties”

Frederic Vincent, 2012-2014, “Development of smart biocomposites”

- 2 Research Engineers

Nicolas Renouard 2016-2017 “Ecodesign of automotive parts”

Antoine Jouin, 2014-2016 “Development of large parts with thermoplastic biocomposites”

- 12 Master students since 2011

Supervision and involvement in international collaborative projects

-**2020-2023** European Space Agency (ESA) : AAP “Off earth manufacturing and Building” (90 k€)

-**2020-2021 F2RP project** : Développement de nouveaux biocomposites pour l’impression 3D/4D (SCION (NZ) IRDL (UBS) (3k€) .

-**2018-2022 FLOWER INTEREG** : *High performance biocomposites for industrial applications* (5 M€)

-**2018 Japan exploration:** *Multiresponsive bioinspired natural fiber actuators* (IRDL, Univ Tokyo), 2k€

-**2016 HYPHEN project MSCA H2020-** starting project S2PE funded by Bretagne region, *Hygromorph biocomposites* (IRDL, Univ Tokyo), (2k€)

-**2013-2015 MEET INTERREG** : *Development of natural fiber composites for transport application*, Collaborative project with Univ Bath, Exter and Univ Caen, (5M€)

Supervision and involvement in national collaborative projects

-**2019-2021 AAP CNRS MITI Biomimicry** : Pine cone for morphing structures, (26k€)-

-**2018-2021 BRUME** : *High performance biocomposite and durability in marine environment* (IRDL, Multiplast and GeM (Univ Nantes)), (120k€)

-**2017 BEGIN (CNRS)** : *Smart membranes for building applications*, (15k€)

-**2016-2019 RIGHTLAB** : *Opening novel market for hemp fibre in composites materials*, Collaborative project with FRD, La chanvrière de l’aube and INRA, (900k€)

- **2016 DURBHAN** : *Durability of Hygromorph biocomposites and natural actuators* (IRDL), (5k€)

- **2013-2017: FIABILIN**, *Development of biocomposites for automotive and aeronautics*. Collaborative project with Magna Steyr (automotives) and Zodiac Aerospace. (17M€)

- **2014-2016 COBIO**: *Development of large parts (>5m) with thermoplastic biocomposite for marine applications*. Collaborative project with Multiplast, (70k€)

- **2010-2015 FINATHER**: *Development of biocomposites for Rail, automotive*. Collaborative project with Alstom, Renfortech and Corima, (4M€)

- **2011-2012 AUTOFLAX**: *Development of biocomposites for automotive applications*. Collaborative project with Cooper standard, (80k€)

-**2007-2010 NAVECOMAT**: *Development of biocomposites for leisure boat applications*, Collaborative project with Althrom, Ifremer (2M€)

Conferences co-organization

- 2 international conferences (1200 and 120 participants):

o ECCM Nantes June 2020, organization of session on additive manufacturing

o MEET, Material for Energy Efficiency and transport (INTERREG project), 2013

- 6 national conferences on Composites, additive manufacturing and green composites (FabAddComp 2020, Ecomat 2018...)

- 3 workshops on green materials for marine applications and for building applications (Lorient)

Editorial responsibilities

- Member of editorial committee of *Materials, section advanced composites, MDPI, IF 3.05*
- Guest-associate Editor in *Frontiers in Robotics and AI : "4D Printing and Soft Robotics"* avec A Zolfagharian et M Bodaghi.
- Guest editor National journal of advanced materials and composites material (RCMA) dedicated to degradation of natural fibre composites.
- Guest-associate Editor in *Frontiers "Plant Movements: The Principles of Non-Muscular Deformations and Their Biomimetic Potential"*

Jury member

- Jury member of one Habilitation to supervise researches (Ana Villares INRAe 2021)
- Jury member of five thesis (KU Leuven (Belgium) 2020, Ecole des Mines Alès (France) 2017; University of La Rochelle (France), 2017; University of Queensland (Australia) 2016; University of Le Havre (France), 2015)
- Participating in two selection committees for Assistant-professor position in University of Nantes (France), 2014 and 2016

Scientific committee

- Scientific committee of ECCM 2020, FabAddComp 2020, and ECOMAT 2018, 2017, 2016:
- Scientific committee of French adhesion society (SFA)
- Scientific committee of national research group GDR 3MF : research group on fibrous materials mechanics and GDR PhyP research group on plant mechanics and bioinspiration

Reviewing in international journals and chairman

- Referee in international journals (NatureComm, Composite Sciences and Technology, Composite Part A, Composite Structure, Material & Design...)
- Chairman in national and international conferences (ECCM 2018, ICGC9, ICCM 2011...)

DISSEMINATION TO OPEN PUBLIC

- 2020 « Materials inspired by pine cone », French regional scientific journal Sciences Ouest January
- 2019 Video : Nature = Futur « Meteosensitive like pine cone », la belle société production, <https://www.youtube.com/channel/UCghmtdCHpMUYkVxg3nC9dlw>, ordered by French government
- 2019 Chapter n°15 in *Biomimétisme* de Jean-Philippe Camborde, éd. Quæ, 2019
- 2018 Publication in JEC Magazine for hygromorph biocomposites
- 2017 Invited by CEEBIOS (European center on biomimicry) for hygromorph biocomposites
- 2017 Selection of my work by **CNRS/RATP** for a poster campaign in Paris Montparnasse station: "bioinspired hygromorph biocomposites inspired by pine cone seeds dispersal"

TEACHING

- 2020 Director Master 1 EcoDesign of Polymer and Composites
- 2020 Creation of Teaching unit dealing with Additive manufacturing (Course, practical course and project)
- 2020 Creation of teaching unit dealing with Biomimicry (Course and project)
- 2020 Creation of interdisciplinary project : 3D printing of seawater plastic wastes.
- 2011-2016 Director of Professional Bachelor Eco-building and Ecomaterials
- 2011 Creation of practical course on composite materials
- 2011 Creation of teaching unit dealing with Eco-Design and life cycle analysis (Course, practical course and project)

- **Liste des articles internationaux à comité de relecture**

N°	Articles
1	C de Kergariou, A Le Duigou, V Gager, V Popineau, A Kervoelen, A Periman and F Scarpa; Measure of porosity in flax fibres reinforced polylactic acid biocomposites, <i>Comp Part A</i> 2020.
2	A Le Duigou, G Chabaud, R Matsuzaki and M Castro, Tailoring the mechanical properties of 3D printed continuous flax/PLA biocomposites by controlling the slicing parameters, <i>Comp Part B</i> , accepted
3	Z El Hachem, A le Duigou, A Celino, S Freour, Dimensional variation and evolution of mechanical properties of wet aged composites reinforced with flax fibers, <i>Journal of Composite Materials</i> , 2020
4	A Le Duigou, D Correa, M Ueda, R Matsuzaki and M castro, A review of 3D and 4D printing of natural fibre biocomposites, <i>Mater Design</i> , 2020, 194, 108901
5	Ueda M, Matsuzaki R and Le Duigou A, 3D Compaction Printing of a Continuous Carbon Fiber Reinforced Thermoplastic, <i>Comp part A</i> , 2020
6	V Gager, D Legland, A Bourmaud, A Le Duigou, F Pierre, K Behlouli and Christophe Baley, Oriented granulometry to quantify fibre orientation distributions in synthetic and plant fibre composite preforms, <i>Industrial Crops and Products</i> , 2020
7	M Péron, A Celino, F Jacquemin, A le Duigou, Hygroscopic stresses in asymmetric biocomposite laminates submitted to various relative humidity conditions, <i>Composites Part A</i> , 2020
8	A Bourmaud, J Merotte, D Siniscalco, M Le Gall, V Gager, A Le Duigou , F Pierre, K Belhouli, O Arnould, J Beaugrand et C Baley, Main criteria of sustainable natural fibre for efficient unidirectional biocomposites, <i>Comp Part A</i> , 2019
9	V Gager, A le Duigou A Bourmaud, F Pierre, K Behlouli et C baley, Understanding the effect of moisture variation on the hygromechanical properties of porosity-controlled nonwoven biocomposites? <i>Polymer testing</i> , 2019
10	S Requilé, A Le Duigou , A Bourmaud et C Baley, Interfacial properties of hemp fiber/epoxy system measured by microdroplet test: Effect of relative humidity, <i>Composites Sciences and technology</i> , 2019
11	A le Duigou , G Chabaud, F Scarpa et M Castro, Bioinspired electro-thermo-hygro reversible shape-changing composites by 4D printing, <i>Advanced Functional Material</i> , 2019, 29, 1903280
12	A Le Duigou , A Barbé, E Guillou and M Castro, 3D printing of continuous flax fibre reinforced flax fibre biocomposites for structural applications, <i>Material and design</i> , 2019,180, 107884
13	S Réquilé, C Goudenhooff, A Bourmaud, A Le Duigou , C Baley, Deeper insights into the moisture-induced hygroscopic and mechanical properties of hemp reinforced biocomposites, <i>Comp Part A</i> , 2019, accepted,
14	G Chabaud, M Castro, C Denoual and A Le Duigou , Hygromechanical properties of 3D printed continuous carbon and glass fibre reinforced polyamide composite for outdoor structural applications, <i>Additive manufacturing</i> , 2019
15	C Baley, M Gomina, J Breard, A Bourmaud, S Drapier, M Ferreira, A Le Duigou , PJ Liotier, P Ouagne, D Soulat and P Davies, Specific features of flax fibres used to manufacture composite materials, <i>International Journal of Material Forming</i> , 2018
16	Pierre-Jacques Liotier, MF Pucci, A Le Duigou , A Kervoelen, J Tirilló, F Sarasini, S Drapier, Role of interface formation versus fibres properties in the mechanical behaviour of bio-based composites manufactured by Liquid Composite Molding processes, <i>Composites Part B</i> , 163, 86-95, 2019
17	M Péron, A Céline, M Castro, F Jacquemin, A le Duigou , Study of hygroscopic stresses in asymmetric biocomposite laminates, <i>Composites Science and Technology</i> , 169, 7-15, 2019
18	A Le Duigou , V Keryvin, J Beaugrand, M Pernes, F Scarpa and M Castro, Humidity responsive actuation of bioinspired Hygromorph BioComposites (HBC) for adaptive structures, <i>Comp Part A</i> , 116, 36-45, 2019
19	C Baley, M Lan, A Bourmaud and A Le Duigou , Compressive and tensile behaviour of unidirectional composites reinforced by natural fibres: influence of fibres (flax and jute), matrix and fibre volume fraction, <i>Material Today comm</i> , 2018
20	S Requile, A Bourmaud, A Le Duigou and C Baley, Peeling experiments for hemp retting characterization targeting biocomposites, <i>Industrial Crops and Products</i> , 2018
21	D Siniscalco, O Arnould, A Bourmaud, A Le Duigou and C Baley, Monitoring temperature effects on flax cell-wall mechanical properties within a composite material using AFM, <i>Polymer testing</i> 2018
22	J. Merotte, A Le Duigou , A Bourmaud, K Behlouli, C Baley Flax and hemp nonwoven composites: the contribution of interfacial bond to tensile properties, <i>Polymer testing</i> , 2018, Accepted
23	S Réquilé, C Goudenhooff, A Bourmaud, A Le Duigou , C Baley, Exploring the link between the flexural behavior of hemp and flax stems and fiber stiffness, <i>Industrial Crops and Products</i> , 2018, accepted
24	A Le Duigou , S Requile, J Beaugrand, F Scarpa and M Castro: Natural fibres actuators for smart bio-inspired hygromorph biocomposites, <i>Smart Materials and Structures</i> , 2017 26, 125009
25	A Le Duigou , J Merotte, A Bourmaud, K Behouli, P Davies and C Baley, Hygroscopic expansion: a key point to describe natural fibre/polymer matrix interface bond strength, <i>Comp Sci and Technol</i> , 151, 2017, 228-233
26	A Le Duigou and M Castro, Hygromorph BioComposites : Effect of fibre content and interfacial strength on the actuation performances, <i>Industrial Crops and Products</i> , 99, 2017,142-149
27	O. Arnould, D. Siniscalco, A. Bourmaud, A Le Duigou and C Baley, Better insight into the nano-mechanical properties of flax fibre cell walls, <i>Industrial Crops and Products</i> , 97, 2017, 224-228
28	C Gourier, A Bourmaud, A Le Duigou , and C Baley, Influence of PA11 and PP thermoplastic polymers on recycling instability of unidirectional flax fibre reinforced biocomposites, <i>Polym Deg and Stab</i> , 136, 2017, 1-9
29	T. Lecompte, A. Le Duigou , Mechanics of straw bales for building applications, <i>Journal of Building Engineering</i> , 2017, 9, 84-90
30	C Baley, C Goudenhooff, A le Duigou , A Bourmaud, Is the low shear modulus of flax fibres an advantage for polymer reinforcement? <i>Material letters</i> , 185, 2016, 534-536
31	A Bourmaud, A Akesson, A le Duigou , M Skrivars, J Beaugrand, and C baley, Recycling of L-Poly-(lactide)-Poly-(butylene-succinate)-flax biocomposite, <i>Polymer Degradation and Stability</i> , 128, 2016, 77-88
32	J Merotte, A Le Duigou , A bourmaud, K Behlouli, C Baley Mechanical and acoustic behaviour of porosity controlled randomly dispersed flax/PP biocomposite, <i>Polymer testing</i> , 51, 2016, 174-180
33	A le Duigou , M Castro, R Bevan and N Martin, 3D printing of wood fibre biocomposites: from mechanical to actuation functionality, <i>Material and Design</i> , 96, 2016, 106-114
34	A Boumaud, A Le Duigou , C Gourier and C Baley, Influence of processing temperature on mechanical performance of unidirectional polyamide 11 - flax fibre composites, <i>Industrial Crops and Product</i> , 2016, 84, 151-165

35	A Le Duigou , A Bourmaud, C Gourier and C Baley, Multiscale shear properties of PA 11 flax biocomposite, Composites Part A, 85, 2016, 123-129
36	C Baley, M Lan, A Kervoelen, A Le Duigou , A Bourmaud, D Cartié, P Davies, Flax/PP manufactured by Automated Fibre Placement (AFP), Material & Design, 2016, 94, 207-213
37	A le Duigou , M Castro, Evaluation of force generation mechanisms in natural, passive hydraulic actuators, Scientific Report, 2016, 6, 18105
38	A Lefeuvre, A Le Duigou , A Boumaud, C Morvan and C Baley. Analysis of the role of the main constitutive polysaccharides of flax fibres in their mechanical behavior? Industrial Crops and products, 2015, 76, 1039-1048
39	M Deroiné, A Le Duigou , P Davies, G Cesar and S Bruzaud, Natural degradation and biodegradation of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) in liquid and solid marine environments. J of polymer and the environment, 2015, 23,4, 493-505
40	A le Duigou and M Castro, Moisture induced self-shaping flax Polypropylene biocomposite actuator, Industrial Crops and Products, 2015, 71, 1-6
41	A le Duigou , A Bourmaud, and C Baley, In-situ evaluation of flax fibre degradation after water aging, Industrial Crops and Products, 2015, 70, 204-210
42	T. Lecompte, A. Perrot, A. Subrianto, A. Le Duigou , G. Ausias, A novel pull-out device used to study the influence of pressure during processing of cement-based material reinforced with coir, Construction and Building Material, 2015, 78, 224-233,
43	A. Le Duigou , A Boumaud, P Davies and C Baley, Long term in natural seawater of flax/PLA biocomposites, Ocean engineering, 90, 140-148, 2014
44	M Deroiné, A Le Duigou , YM Corre, PY Le Gac, P Davies, G Cesar, S Bruzaud, Accelerated ageing and lifetime prediction of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) in distilled water, Polymer testing, 2014, 39, 70-78
45	A Le Duigou and C Baley. Coupled Micromechanical Analysis and Life Cycle Assessment as an Integrated Tool for Natural Fibre Composites Development, Journal of Cleaner Production. 2014, 83, 63-69
46	A Le Duigou , Y Grohens, C Baley, R Creachcadec, P Davies, L Sohier. A multi-scale study of the interface between natural fibres and a biopolymer, Composites Part A.65, 2014, 161-168
47	Le Duigou, A , Kervoelen A, Le Grand A, Nardin M and Baley C. Interfacial properties of flax fibre-epoxy resin systems : existence of a complex interphase, Composite Science and Technology, 2014, 100, 152-157
48	Gourier C, Le Duigou A , Bourmaud A, Baley C. Mechanical analysis of elementary flax fibre tensile properties after different thermal cycles, Comp Part A, 2014, 64, 159-166
49	Deroiné, M, Le Duigou A , Corre YM, Davies P, Cesar G, Bruzaud, S. Seawater accelerated ageing of poly(3-hydroxybutyrate-co-3-hydroxyvalerate), Polymer Degradation and stability, 2014, 105, 237-247
50	Deroiné, M, Le Duigou A , Corre YM, Davies P, Cesar G, Bruzaud, S. Accelerated ageing of polylactide in aqueous environments: Comparative study between distilled water and seawater, Polymer Degradation and stability, 2014, 39, 70-78
51	Coroller G, Lefeuvre A, Le Duigou A , Bourmaud A, Ausias G, Gaudry T, Baley C. Effect of flax fibres individualisation on tensile failure of flax/epoxy unidirectional composite, Composite Part A, 2013 Accepted
52	Le Duigou A , Davies P and C.Baley, Exploring durability of interfaces in flax fibre/epoxy micro-composites, Composite Part A, 2013, 48, 121-128
53	Baley C, Le Duigou A , Davies P, Bourmaud, A, Influence of drying on the mechanical behaviour of flax fibres and their unidirectional composites. Composite Part A , 2012, 43(8) 26-33
54	Le Duigou A , Bourmaud A, Balnois E, Davies P, Baley C. Improving the interfacial properties between flax fibres and PLLA by a water fibre treatment and drying cycle, Industrial Crop and Product, 2012, 39, 31-39
55	Le Duigou A , Davies P and C.Baley. Substitution of glass/polyester composites by Flax/PLLA biocomposites. Is it justified ? Journal of biobased material and bioenergy. 2011, 5, 466-482
56	Le Duigou A. , Deux JM, Davies P, Baley C. PLLA/flax mat/balsa bio-sandwich Environmental Impact and Simplified Life Cycle Analysis manufacture and mechanical properties. App Comp Mat. 2011, 1-16
57	Le Duigou A , Deux JM, Davies P et C.Baley. Protection of flax/PLLA biocomposites from seawater ageing by external layers of PLLA, International journal of Polymer Science, 2011, 1-9
58	Bourmaud A., Le Duigou A. , Baley C., What's the technical and environmental interest to reuse a recycled poly(propylene)-hemp fiber composites ?, Polymer Degradation and Stability, 2011, 96 (10), 1732-1739
59	Le Duigou, A , Davies, P. and C Baley, Environmental impact analysis of the production of flax fibres to be used as composite material reinforcement", Journal of Biobased material and bioenergy, 5, 1-13, 2011
60	Le Duigou A. , Deux JM, Davies P, Baley C. PLLA/flax mat/balsa bio-sandwich manufacture and mechanical properties. Applied Composite Material. 1-18, 2010
61	Le Duigou A . Davies P. Baley C. Macroscopic analysis of interfacial properties of flax/PLLA biocomposites. Composites Science and technology, 70(11),2010, 1612-1620
62	Le Duigou A. , P. Davies, C.Baley. Interfacial bonding of flax/Poly(L-lactide) bio-composites. Composites Science and Technology.2010, 70,2,231-239
63	Bourmaud, J.Rivière, G.Raj, A. Le Duigou , C.Baley. Investigation of the use of a mussel-inspired compatibilizer to improve the matrix-fiber adhesion of a biocomposite, Polymer testing, 28(6), 2009, 668-672.
64	Le Duigou A. , Davies P, Baley C. Seawater aging flax/PLLA composites. Polymer Degradation and Stability, 94(7),2009,1151-1162
65	Le Duigou , I. Pillin, A. Bourmaud, P. Davies, C. Baley Effect of recycling on mechanical behaviour of bio-compostable flax/poly(L-lactide) composites, Composites Part A, 39(9), 2008, 1471-1478

Book chapter

1	V Gager, A Le Duigou, A Boumaud, F Pierre, K Belhouli et C Baley, Influence of the Nonwoven Biocomposite's Microstructure on Its Hygro-mechanical Behaviour Influence de la Microstructure d'un Biocomposite Non-tissé sur Son Comportement Hygro-mécanique, in Revue des Composites et des Matériaux Composites et Matériaux Avancés, vol 29, n°4, p 215-224 2019
2	M Peron, A Céline, M Castro, F Jacquemin et A le Duigou, Biocomposites with Asymmetric Stacking for the Study of Hygro-mechanical Couplings, in Revue des Composites et des Matériaux Composites et Matériaux Avancés, vol 29, n°4, p243-252, 2019
3	S Requielé, A Le Duigou, A Bourmaud et C Baley, Hygroscopic and Mechanical Properties of Hemp Fibre Reinforced Biocomposites, in Revue des Composites et des Matériaux Composites et Matériaux Avancés, vol 29, n°4, p253-260, 2019

4	C Baley, A Le Duigou , A bourmaud, Les fibres de lin : source de biospiration, Chapitre 2 ouvrage CNRS INSIS dédié à l'ingénierie verte, sous la direction de M. Meireles-Masbernat, L. Nicolas, A. Slaoui, 08/2019,
5	C Baley, A Le Duigou , C Morvan, A Bourmaud, Tensile properties of flax fibers in Handbook of Properties of Textile and Technical Fibres : A. R. Bunsell : CH08, 2018, ISBN: 978-0-08-101272-7
6	A Le Duigou , A Bourmaud, A Bergeret, J Beigbeder, C Baley Chapitre 7 - Analyse de cycle de vie des biocomposites et gestion de leur fin de vie, In Composites polymères et fibres lignocellulosiques. Propriétés, transformation caractérisation Coll. Science et ingénierie des matériaux, 02/2017, ISBN : 9782746247772
7	A Bourmaud, A Le Duigou , C Baley mechanical performance of flax based biocomposites induced by different manufacturing process, In book: Biocomposites, pp.365-399, December 2015 DOI: 10.1016/B978-1-78242-373-7.00013-5
8	C Baley, A Le Duigou . Flax and Hemp fibres : A natural solution for the composite industry- What's new in 2014 ?, Minimizing environmental impacts over the entire life cycle, Technical book, JEC composites publication, p30-32. 2014
9	Baley, C., A. Le Duigou , A. Bourmaud, P. davies, M. Nardin, and C. Morvan, Reinforcement of polymers by flax fibres: The role of interfaces. Chapter 7. Biobased composite for high performance material. From strategy to industrial application- Editors: R Chollakup, W Smitthipong and M Nardin, 2014. ISBN: 978-1-4822-1448-2. http://www.crcpress.com/product/isbn/9781482214482
10	C Baley, A Le Duigou . Flax and Hemp fibres : A natural solution for the composite industry, <i>Eco design, Life Cycle Analysis and recycling</i> , Technical book, JEC composites publication , 2012

International conference (**invited**)

1	A le Duigou, G Chabaud, M Castro Deeper insights in the 3D printing process-related performance of continuous flax fibre reinforced PLA composites, ECCM (accepté mais annulé pour COVID)
2	M. Castro, A. Le Duigou, First International Workshop "Bioinspired hygromorph composites by 3D/4D printing: towards shape changing metamaterials", - 4 September 2019, Santiago, Chili
3	G Chabaud, M Castro et A Le Duigou, 3D and 4D printing of composite for morphing application, SAMPE European Contest
4	Requile S, A Le Duigou , A Bourmaud and C Baley, Interfacial properties of hemp fibre/epoxy: effect of moisture and induced hygroscopic, ECCST, Mai 2019, Sorrento.
5	A. le Duigou , 3D printing of continuous flax fibre/PLA biocomposites for structural applications, ECCST, Mai 2019, Sorrento.
6*	A, le Duigou, How to transform a biocomposite weakness into a novel functionality ? Toward novel smart bioinspired hygromorph Biocomposite, PLENARY LECTURE, ECCM18, Athens
7	S Requile, A, le Duigou , A Bourmaud and C Baley, Moisture effect in hemp/epoxy composites, ECCM18, Athens
8	A Le Duigou , F Scarpa, J Beaugrand and M Castro, Natural fibre actuator for smart bioinspired hygromorph biocomposite, ECCM18, Athens
9	C Baley, A Le Duigou, N Renouard, A Jouin, A Bourmaud, Structures navales en biocomposites recyclables. Fast 2017 (Fast Sea Transportation), Nantes
10	A Bourmaud, D Siniscalco, O Arnould, A Le Duigou et C Baley, Flax fiber cell walls characterization by peak force quantitative nanomechanics technology, 4 th international conference on biobased material and technology, Nantes mars 2017
11	Lecompte, T.; Le Duigou, A , Mechanics of straw bales for building applications, ICCBBM, ECOGRAPHI 2017, Clermont ferrand
12	A le Duigou , Hygromorph biocomposites as a novel functionality for natural fibres, International conference on Green Material, Kobe, 2016
13	A Bourmaud, A Akesson, A le Duigou , M Skrivars, J Beaugrand, and C Baley, Recycling of L-Poly-(lactide)-Poly-(butylene-succinate)-flax biocomposite, MODEST, Cracovie, 2016
14	Menasria, F; Perrot, A; Rangeard, D; Le Duigou, A , Mechanical enhancement of casted and compacted earth-based materials by sand, flax fiber and flax fabric, ICBBM, Clermont Ferrand, 2017
15	A Bourmaud, A Le Duigou and C Baley, Ageing of biocomposite, conference Marrakech, Mars 2016
16	J Merotte, A Le Duigou , A bourmaud, K Behlouli, Christophe Baley Mechanical and acoustic behaviour of porosity controlled randomly dispersed flax/PP biocomposite, ECCM, 2016
17	A Le Duigou , Pine cone as a source of inspiration for moisture induced self-shaping flax/PP biocomposite, 8 th Plant Biomech, Nagoya, 2015
18	T Lecompte , A. Subrianto, A. Perrot, A, Le Duigou , G.Ausias, A novel pull-out device used to study the influence of pressure during processing of cement-based material reinforced with coir, 1rst International conference on biobased building material, 21-24 June 2015
19	J Summerscales, A Le Duigou and C Baley, A checklist for the description of natural (bast) fibre reinforced composite, ICCM, 2015
20	J Summerscales, A Le Duigou and C Baley, A checklist for the description of natural (bast) fibre reinforced composite, Azores, 2015
21	A Le Duigou , M Castro , Hygroscopic behaviour of natural fibres :opportunity to develop new adaptive biocomposites, 2 nd ICNF Azores, 2015
22	M. Deroine, A. Le Duigou , Y-M. Corre, P-Y. Le Gac, P. Davies, G. César, S. Bruzard, Accelerated ageing and lifetime prediction of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) immersed in distilled water, MoDeSt, 1-4 septembre 2014, Portoroz, Slovénie
23	A Le Duigou . Biocomposite : Role of interfaces, International Symposium on Bioplastics, Biocomposites and Refining, Guelph, May 2014,
24	F Vincent, JF Feller, M Castro, A Bourmaud and A Le Duigou . Multifunctional biocomposites for lightweight structure: high performance materials and health monitoring with conductive nanocomposites, MEET seminar « High performance green material for energy efficiency in transport, Alençon 2013
25	F Vincent, JF Feller, M Castro, A Bourmaud and A LeDuigou . Multifunctional biocomposites for lightweight structure: high performance materials and health monitoring with conductive nanocomposites, Euro-japanese conference, Nantes 2013
26	A Le Duigou , A Kervoelen, A Legrand, M Nardin, and C Baley. In vestigation of flax/thermoset interfacial properties : definition of flax fibre surface, Composite week @ Leuven, Septembre 2013
27	G. Coroller, A. Lefeuvre, A. Le Duigou , A. Bourmaud, G. Ausias, C. Baley. Effect of flax fibers individualization on tensile mechanical properties of flax/epoxy unidirectional composite, 19 th ICCM Montreal, August 2013
28	A Le Duigou , C Baley, Exploring durability of biocomposites, EcoComp, Birmingham, July 2013

29	A Le Duigou, A Bourmaud, P Davies, C Baley, Exploring durability of biocomposites for marine application, IRENAV INNOVSAIL, Lorient, June 2013
30	A le Duigou. LCA tool to justify natural fibre composite use in automotive application, MEET seminar « High performance green material for energy efficiency in transport », Lorient, April 2013
31	A le Duigou, Why LCA is an important tool for biocomposites development ? Rencontre Franco-Russe, AMAC, St Petersburg, July 2012
32	A Bourmaud, A Le Duigou, C Baley, Recycling of natural fibre composites, PDS, Pragues, Septembre 2012
33	Le Duigou A, C Baley and Davies P. Analysis of shear properties of flax fibres. ICCM 18, August 2011, Jeju Island South Korea
34	Le Duigou A, A.Bourmaud, P Davies, C Baley. Influence of bio-based treatments on flax/PLLA interfacial bonding properties, ICCS 16 Porto, 27-30 June 2011
35	A.Bourmaud, Le Duigou A, C Baley. What's the technical and environmental interest to reuse a recycled poly(propylene)-hemp fiber composite ?, ICCS 16 Porto, 27-30 Juin 2011
36	Le Duigou, P. Davies, C.Baley, Protection of flax/PLLA biocomposites from seawater ageing by external layers of PLLA, DURACOSYS, Patras (Greece) 12-15 septembre 2010
37	Le Duigou, P. Davies, C.Baley <i>Interfacial properties of flax/Poly (L-Lactide) biocomposite</i> . TSAI Best Student Paper Award 17 th International Conference on Composites Materials-ICCM 17, 27-31 July 2009.
38	Le Duigou, P. Davies, C.Baley <i>Interfacial properties of flax/Poly (L-Lactide) biocomposite</i> . 17th International Conference on Composites Materials-ICCM 17 Edinburgh, 27-31 July 2009
39	Le Duigou, P. Davies, C.Baley <i>Effect of Seawater Aging on flax/PLLA Biocomposite</i> . International Conference on Advanced Engineered Wood&hybrid Composites. Maine, USA, 6-10 July 2008
40	Le Duigou, P. Davies, C.Baley <i>Seawater aging of Flax/PLLA biocomposites</i> . In International conference on innovation in high performance sailing yachts. IRENAV INNOVSAIL. Lorient May 2008

National conferences (invited)

1	M Castro, G Chabaud et A Le Duigou, 4D printing of composite for morphing purpose, FabAddComp JST Fabrication additive des Composites 2020, Lorient
2	A Le Duigou, D Correa, M Ueda, R Matsuzaki et M Castro, 3D and 4D printing of natural fibre biocomposites, FabAddComp JST Fabrication additive des Composites 2020, Lorient
3	G.Chabaud, M.Castro et A.Le Duigou, Impression 4D de matériaux composites multi-stimulables pour le morphing de structures, Congrès Français de Mécanique, 27 Août 2019, Brest
4	G.Chabaud, M.Castro et A.Le Duigou, Impression 3D et 4D de matériaux composites à fibres de carbone continues: des applications structurelles au morphing de structures, Journées Nationales sur les Composites, 2 Juillet 2019, Bordeaux
5	A Le Duigou, KEYNOTE, Prix Daniel Valentin, JNC 2019
6	PJ Liothier, MP Pucci, A Le Duigou, J Tirilló, F Sarasini, S Drapier, effet de la formation de l'interface et des propriétés des fibres dans le comportement mécanique d composites bio-sourcés fabriqués par infusion, JNC 2019
7	A Le Duigou, KEYNOTE, Biocomposites hygromorphes : une autre vision des biocomposites, Journée INRA, CEPIA-TRANSFORM, 26-27 Avril 2019
8	G Chabaud, M Castro et A Le Duigou, Impression 3D et 4D de composites pour morphing de structures, concours SAMPE
9	V Gager, A Le Duigou, A Bourmaud and C Baley, Influence de la microstructure d'un biocomposite non tissé sur son comportement hygromécanique, ECOMAT18, St Nazaire 2018
10	S Requile, A Le Duigou, A Bourmaud and C Baley, Etude multi-échelle de l'interface chanvre/epoxy: influence des contraintes hygroscopiques, ECOMAT18, St Nazaire 2018
11	A le Duigou, KEYNOTE, Biocomposites hygromorphes, GDR Symbiose, Paris 2018
12	M. Capron, D. Siniscalco, M. Ramonda, T. Cubersr, R. Arinero, A. Le Duigou, A. Bourmaud, C. Baley, O. Arnould, Caractérisation mécanique de la paroi cellulaire des fibres végétales par Microscopie à Force Atomique, Congrès Français de Mécanique, Lille 2017
13	A Le Duigou, M Castro, BioComposites hygromorphes : nouvelle fonctionnalité pour les fibres végétales, JNC 20, 2017
14	A Le Duigou, M Castro, A Céline, M Peron, F Jacquemin. Biocomposites à empilement non symétrique pour étudier l'influence des déformations hygroscopiques sur leur comportement hydrique, JNC 20, 2017
15	J Merotte, A Le Duigou, A Bourmaud, K Belhouli et C Baley, Biocomposite non tissés pour application automobile, JNC 20, 2017
16	A. Le Duigou, KEYNOTE, Comportement hygroscopique des biocomposites : verrous et opportunités, Colloque Fatigue et durabilité des matériaux biosourcés, Besançon, Mai 2016
17	A. Le Duigou, Effets hygroscopiques au sein de biocomposites : Inconvénients pour biocomposites statiques et opportunités pour biocomposites dynamiques, Journée Physique des plantes, Marseille, 30 septembre-01 octobre 2015
18	A. Le Duigou, Effets hygroscopiques au sein de biocomposites : Inconvénients pour biocomposites statiques et opportunités pour biocomposites dynamiques, GDR MEPHY, ESPCI Paris, 14 septembre 2015
19	A Le Duigou, Interface fibre de lin/polymère, Journée AMAC/MECAMAT « fibres végétales isolées », Lorient 24 septembre 2015
20	A Le Duigou, Adhérence entre les fibres végétales et un polymère : Mesure et spécificité des fibres végétales, GDR MIC, Lorient 24 septembre 2015
21	A. Le Duigou, Comportement hygroscopique des fibres végétales : verrou ou opportunité de développement des biocomposites à nouvelles fonctionnalités? JNC 2015
22	J Merotte, A Bourmaud, A Le Duigou et C Baley, Influence du taux de porosité sur les performances mécaniques d'un composite non-tissé lin/PP, JNC 2015
23	C Gourier, A bourmaud, A Le Duigou et C Baley, Analyse des propriétés en traction de fibres de lin après différents cycles thermiques, JNC 2015

24	Le Duigou A. Vieillissement aqueux des biocomposites. Club d'intérêt SINFONI, Mars 2015
25	A le Duigou, M Castro, Comportement hygroscopique des fibres vegetales, verrou ou opportunité de developpment de biocomposites actionneurs ? Mephy, Paris ESPCI, Novembre 2014.
26	A. Bourmaud, J. Beaugrand, L. Marrot, C. Gourier, A. Le Duigou et C. Baley Caractérisation de parois vegetales de lin et de chanvre par nanoindentation ? Indentation 2014 , 10-12 décembre 2014
27	M. Deroiné, A. Le Duigou , Y-M. Corre, P-Y. Le Gac, P. Davies, G. César, S. Bruzaud, Suivi du vieillissement accéléré du poly(3-hydroxybutyrate-co-3-hydroxyvalérate) en milieu marin GFP Ouest 2014, 12-13 juin 2014, Rouen, France
28	Le Duigou Antoine, Analyse de Cycle de vie des biocomposites, couplage entre micromécanique et ACV, Colloque MECAMAT, Aussois 2014
29	Le Duigou, A, Baley C, Durabilité des interfaces fibre de lin/epoxy. Journée Nationales des Composites (JNC), Juin Nantes 2013
30	Deroiné M, Le Duigou A, Davies P, Bruzaud S. Vieillissement accéléré de polylactide en milieu aqueux, GFP national, Nantes, Juin 2013
31	Le Duigou A, Matériaux sandwich et impacts environnementaux, Conference composite bio-sourcé Eurolarge, 18 Octobre 2012, Lorient
32	le Duigou A, Comment utiliser l'ACV en R&D des éco-matériaux?, GFP national, Lorient, Juin 2012
33	Deroiné M, Le Duigou A, Davies P, Bruzaud S. Vieillissement accéléré de biopolymère en milieu marin GFP national, Lorient, Juin 2012
34	Le Duigou A, Bourmaud A, Baley. Minimisation de l'impact environnemental des matériaux composites par l'intégration de fibres végétales Colloque : De cordes et de toiles, le chanvre à la mer. Cultures, usages et innovations des origines à demain, 26/27 Juin 2012
35	Baley, C. Bourmaud A, Le Duigou A. Fibres de lin : des tissus de soutien toujours valorisable dans le domaine des matériaux. Colloque : De cordes et de toiles, le chanvre à la mer. Cultures, usages et innovations des origines à demain, 26/27 Juin 2012
36	Bourmaud A, Le Duigou A, Baley, C. Utilisation industrielle des fibres végétales. Colloque : De cordes et de toiles, le chanvre à la mer. Cultures, usages et innovations des origines à demain, 26/27 Juin 2012
37	Le Duigou A, Grohens Y. Analyse de Cycle de Vie, Ecole d'été « Matériaux composites renforcés par des fibres végétales ». 2-3 Juin 2010 Lorient
38	Davies P, Le Duigou A, Baley C. Vieillissement marin de biocomposites PLLA/lin. Journée Scientifique et techniques (JST) Matériaux composites renforcés par des fibres végétales. 3-4 Juin 2010 Lorient
39	Le Duigou A, P Davies, C Baley. Analyse de cycle de vie d'un biocomposite PLLA/Lin. Journée Scientifique et techniques (JST) Matériaux composites renforcés par des fibres végétales. 3-4 Juin 2010 Lorient
40	Le Duigou, P. Davies, C.Baley. Etude de la liaison interfaciale fibre/matrice d'un biocomposite lin/Poly(L-Lactique) . Journée Nationale des Composites (JNC), Toulouse.10-12 juin 2009
41	Le Duigou, A. Bourmaud, I. Pillin, C. Baley. Etude de la recyclabilité d'un composite bio-compostable PLLA/lin. JST EcoMatériaux (AMAC) " 2007, 11-12 octobre 2007, Caen
42	P. Davies, A. Le Duigou, C. Baley. Etude du vieillissement en milieu marin de bio-composites PLLA/lin. JST EcoMatériaux (AMAC), 11-12 octobre 2007, Caen