JOHN PRAKASH SUSAINATHAN |mail: | jprakash@nebrija.es

Career Objective:
: To make the best use of my technical expertise in research and development based career and working towards mutual growth through an innovative methods.

Area of Expertise:
Mechanical characterization (static and dynamic) of materials, Continuum mechanics, Numerical simulation with FEM, Fracture, Impact mechanics, Mechanics of composite materials and wood (Interlaminar and Intralaminar damage), Thermo-mechanical behavior of materials and Manufacturing, Solid state welding (Friction Stir Spot Welding -FSSW).

Academic credentials:

Duration:	**Qualification:**	**University / Institute**
01/01/2014 - 28/03/2017	PhD degree in Mechanical Engineering, with First class. • **Doctoral dissertation:** Development and Characterization of Wood based Eco-sandwich structure. • **Doctoral Advisors:** Dr. Florent EYMA, Dr. Emmanuel DE-LUYCKER, and Prof. Bruno CASTANIE.	INSA of Toulouse, Affiliated to Univ. of Toulouse, Toulouse - 31400, France.
01/10/2006 - 31/12/2006	CAD/CAM using CATIA V5 (Part time)	Central Institute of Plastic Engineering and Technology (CIPET), Chennai - 600032, Tamilnadu (TN), India.
01/07/2004 - 20/06/2006	Master degree (ME) in Engineering Design with 74%.	Govt. college of Engineering, Tirunelveli, Affiliated to Anna University, Chennai - 600025, Tamilnadu, India.
01/08/1998 - 24/05/2002	Bachelor degree (BE) in Mechanical Engineering with 71.6%	Shri Angalamman college of Engg and Tech., Affiliated to Bharathidasan University, Trichy - 620020, Tamilnadu India.
01/06/1997 - 24/05/1998	Higher Secondary (HSLC) with 82.6%	St. Joseph's college higher secondary school (State board), Trichy 620002, Tamilnadu, India.
01/06/1995 - 24/05/1996	Secondary (SSLC) with 88.2%	St. Joseph's college higher secondary school (State board), Trichy 620002, Tamilnadu, India.

Experience summary:

Duration:	**Position:**	**Institution / Company:**
20/01/2020 - Till date	Post-doctoral Researcher	University of Antonio de Nebrija, School of Mechanical Engineering, Madrid - 28040, Spain.
01/01/2018 - 30/09/2019	Innovation Associate,	R&D Projects development department, InterOnline Cooprporation, Aviles-33401 Spain
01/01/2014 - 28/03/2017	Research Fellow (Doctoral),	School of Mechanical Engineering, INSA of Toulouse, Toulouse - 31400, France.
01/10/2013 - 31/12/2013	Marie-curie Researcher (ESR),	Department of Material Science, Tampere Univ. of Technology (TUT), Tampere - 33720, Finland.
01/10/2010 - 16/07/2013	Research Assistant,	Department of Mechanical and Aerospace Engg. Politecnico di Torino, Turin - 10129, Italy.
19/08/2009 - 23/08/2010	Junior Research Fellow (JRF),	Department of Metallurgical and Materials Engg. National Institute of Technology, Tiruchirappalli - 620015, Tamilnadu, India.
01/10/2007 - 23/06/2009	Lecturer,	School of Mechanical Engineering, AVIT, Vinayaka Mission University, Paiyanoor 603104, Chennai, Tamilnadu, India.
20/06/2006 - 05/05/2007	Lecturer,	School of Mechanical Engg. SRM University Kattankulathur - 603203, Chennai, TN, India.
24/06/2002 - 20/05/2004	Production Engineer,	M/S Auren Abratech (Mfrs of Abrasive Grinding wheels), Tiruchirappalli - 620015, TN, India.

Awards:

20/11/2020 Selected as Experienced Researcher (Post-doc) for NEXTGEAR project funded by programme H2020-S2RJU-OC-2019 for the duration of 24 months.

30/07/2017 Selected as Innovation Associate for TUTOR project funded by programme to support innovation at SME (H2020-INNOSUP 2016) for the duration of 12 months.

17/12/2013 Granted Doctoral contract for the duration of 36 months, Ministry of higher education and Research, France.

27/08/2013 Granted Early Stage Researcher (ESR) Fellowship for the duration of 6 months to pursue research at CONTACT project funded by Marie Curie-ITN-FP7 People programme.

29/07/2010 Granted India4EU Fellowship (Doctoral) for the duration of 33 months, Erasmus Mundus External Cooperation Window (EMECW), European commission.

19/08/2009 Granted Research Fellowship (JRF) for the duration of 12 months, MHRD, India.

Invited Presentations:

19/11/2012 - 21/11/2012 "Inter-laminar stress analysis of composite laminates using shear deformation theory", GlaCERCo-ITN: Glass and Ceramic Composites for High Technology Applications –Initial Training Networks funded by Marie Curie ITN, Dept. of Materials science, Politecnico di Torino, Turin – 10129, Italy.

14/06/2010 - 02/07/2010 "Refilling of probe hole of Friction Stir Spot welds with Friction forming", UGC-NRCM Summer School on "Mechanical Property Characterization", Indian Institute of Science, Bangalore - 560012, India.

02/12/2008 - 03/12/2008 "Evolution of Micro-electromechanical systems and its applications", Two days workshop on Engineering Materials and its applications, AVIT, Vinayaka Mission University, Paiyanoor – 603104, Chennai, India.

23/12/2006 - 24/12/2006 "An introduction to Reliability Based Design Optimization (RBDO) and its significance", 1st International conference on Advances in Mechanical Engineering (ICAME 2006), School of Mechanical Engineering, SRM University, Kattankulathur - 603203, Chennai, India.

24/02/2006 - 26/02/2006 Oral seminar on "An introduction to Double-decker Ball bearing and its significant merits", at Department of Mechanical Engineering, Anna University, Tirunelveli – 627007, India.

Publications in Peer-reviewed International Journals:

1. **John SUSAINATHAN**, Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Experimental investigation of compression and compression after impact of wood-based sandwich structures, Composite Structures, 220 (2019); 236-249. **SCI IF=4.829, cited by 2.**
2. **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Numerical modelling of impact on wood based sandwich structures, Mechanics of Advanced Materials and Structures – Taylor & Francis (2018), DOI:10.1080/15376494.2018.1519619. **SCI IF=2.645, cited by 1.**
3. **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Experimental investigation of impact behavior of wood based sandwich structures, Composites Part A, 109 (2018); 10–19. **SCI IF=6.282, cited by 14.**
4. **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Manufacturing and quasi-static bending behavior of wood based sandwich structures, Composite Structures, 182C (2017); 487–504. **SCI IF=4.829, cited by 17.**
5. **S. John Prakash,** S. Muthukumaran, Refilling Probe Hole of Friction Spot Joints by Friction Forming, Materials and Manufacturing Processes, Taylor & Francis, 26:12; 1539-1545 (2011). **SCI IF=2.669, cited by 27.**

Publications (Thesis):

1. **John Prakash Susainathan,** Development and characterization of Wood based Eco-structures, PhD Thesis - 2017, INSA of Toulouse, University of Toulouse, Toulouse – 31400, France.
2. **John Prakash S.,** Reliability Based Design Optimization (RBDO) of fibrous laminated composites, Master's Thesis (ME) - 2006, Anna University, Chennai - 600025, India.

Conference Papers and Communications:

<u>International Conference:</u>

01/07/2019 - 04/07/2019 **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Christophe BOUVET, Bruno CASTANIE, Compression and compression after impact response of wood-based sandwich structures, Proceedings of 5th International Conference on Mechanics of Composites (MECHCOMP2019), Instituto Superior Técnico (IST), Lisbon - 1049-001, Portugal.

24/06/2018 - **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL,

28/06/2018 Christophe BOUVET, Bruno CASTANIE, Wood-based composite sandwich structures, Proceedings of European conference on Composite Structures (ECCM-18), Megaron Athens International Conference Centre, Athens - 11521, Greece.

05/09/2016 - 09/09/2016 **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Christophe BOUVET, Bruno CASTANIE, Impact and post-impact behaviour of wood-based Sandwich structures, Proceedings of International conference on Composite Structures (ICCS-19), Hotel Sheraton, Porto - 4100476, Portugal.

22/05/2016 - 26/05/2016 **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Experimental investigation on impact behaviour of wood-based sandwich structures, Proceedings of International conference on Impact loading of structures and Materials (ICILSM-2016), Politecnico di Torino, Turin - 10129, Italy.

20/03/2016 - 22/03/2016 **John SUSAINATHAN,** Florent EYMA, Emmanuel DE LUYCKER, Arthur CANTAREL, Bruno CASTANIE, Impact behavior of wood-based sandwich structures, Proceedings of International Conference on Sandwich Structures and Materials (ICSS-11), Florida Atlantic University, Florida 33431, USA.

14/12/2006 - 16/12/2006 **S. John Prakash,** An introduction to Reliability Based Design Optimization (RBDO) and its significance, 1st International conference on Advances in Mechanical Engineering (ICAME 2006), School of Mechanical Engineering, SRM University, Kattankulathur - 603203, Chennai, India.

28/08/2006 - 30/08/2006 **S. John Prakash,** D Jebakani, Reliability Based Design Optimization (RBDO) of Fibrous laminated Composites, Proceedings of International conference on Advances in Material Processing and Characterization (AMPC-2006), Anna University, Chennai - 600025, India.

National Conference:

17/03/2006 - 18/03/2006 **S. John Prakash,** D Jebakani, Reliability Based Optimization (RBO) of Fibrous laminated Composites, Proceedings of National conference on Modeling and Simulation in Manufacturing (MOSIM 2006), Annamalai University, Chidambaram – 608002, India.

Participated Scientific trainings (Summer schools, and Seminar &Workshop):

12/2017 - 12/2018 Core training on Industrial Innovation Management in the context of the European SME Innovation Associate-pilot comprised of four seminars provided by IMP³rove –European Innovation Management Academy, Dusseldorf – 40211, Germany.

14/07/2015 - 17/07/2015 Franco-Chinese Symposium: "Damage and Fracture of Composite Structures: Assessment and Monitoring", Institut Universitaire de Technologie (IUT), Tarbes - 65000, France.

30/06/2014 - 01/07/2014 Workshop: "New modelling strategies of damage and failure of composite structures: Abreakthrough in composite sizing?", ISAE Supaéro, Toulouse – 31400, France.

19/11/2012 - 21/11/2012 Winter school: "GlaCERCo-ITN - Glass and Ceramic Composites for High Technology Applications – Initial Training Networks" funded by Marie Curie ITN, Department of Materials science, Politecnico di Torino, Turin – 10129, Italy.

14/06/2010 - 02/07/2010 Summer school: "UGC-NRCM - Mechanical Property Characterization", funded by University Grants Commission (UGC), Indian Institute of Science, Bangalore - 560012, India.

02/12/2008 - 03/12/2008 Workshop: "Engineering Materials and its applications", organized by AVIT, Vinayaka Mission University, Paiyanoor – 603104, Chennai, India.

Research Funding:

20/01/2020 - 19/01/2022 NEXTGEAR project (H2020-S2RJU-OC-2019): "NEXT generation methods, concepts and solutions for the design of robust and sustainable running GEAR" Project No. 881803, **Experienced Researcher - Postdoc**(Project team member).

18/12/2017 - 17/12/2018 TUTOR project (H2020-INNOSUP 2016): "A universal Learning Management System for Robot-based learning", project No. 739813, **Innovation Associate** (Project team member).

01/01/2014 - 31/12/2016 Eco-structures Base Bois - ES2B project (Doctoral contract, Ministry of Higher Education and Research, France): "Development and characterization of wood based Eco-structures", **Research Fellow** (Project team member).

01/10/2009 - 31/03/2014 CONTACT project (Marie Curie - ITN - FP7 People): "Optimization of the effect of the ultrasonic treatment parameters on the properties of CNT hybrid composites", Project No. 238363, **Early Stage Researcher** (Project team member).

01/10/2010 - 16/07/2013 India4EU project (EMECW): "Inter-laminar stress analysis of fibrous laminated composites using Shear deformation theory and Carrera's Unified Formulation, Scholarship No. Ll3C0901255, **India4EU Fellow** (Project team member).

19/08/2009 - Research project (MHRD, India): "Refilling probe hole of friction stir spot welds by friction

23/08/2010 forming", Project No. 412109002, **Junior Research Fellow – JRF** (Project team member).

Science Outreach:

20/04/2010 Organizing Industrial visit with Final year engineering degree (BE) students to High Pressure Boiler Plant (HPBP), Bharat Heavy Electricals Limited (BHEL), Tiruchirappalli – 620014, Tamilnadu, India for exploring usage of welding in manufacturing of boiler components.

20/06/2008 Organizing Industrial visit with third year engineering degree students (BE) to Ennore Thermal Power Station, Chennai – 600057, Tamilnadu, India for exploring Thermal power plant layout and Rankine cycle implementation.

20/06/2001 Underwent In-plant training: Rankine cycle implementation at Thermal power plant and its layout, at Thermal power station 1, Neyveli Lignite Corporation Ltd, Cuddalore - 607 801, Tamilnadu, India

20/12/1999 Underwent In-plant training: Powder metallurgy applications in manufacturing of Armaments, at Ordnance Factory, Tiruchirappalli – 620016, Tamilnadu, India.

Reviewer for Peer-reviewed Journals:

Materials and Manufacturing process, Taylor & Francis publishers, USA. Journals:

Supervision of Graduate Students:

30/07/2015 Loubna Lemkhanter Master's thesis: Mechanical behavior of wood/composite mixed sandwich structures, University of Technology of Troyes, Troyes – 10300, France

14/08/2010 Vijaya Kumar Chinnapayan Master's thesis: Friction welded Tube to Tube-plate joints using an External tool, National Institute of Technology, Trichy - 620015, India.

Research Experience:

• NEXTGEAR: NEXT generation methods, concepts and solutions for the design of robust and sustainable running GEAR (University of Antonio de Nebrija, Madrid, Spain – Jan 2020 - Till date)

Currently, I am working in the School of mechanical Engineering, University of Antonio de Nebrija, Madrid Spain as Post-doctoral Research associate. Here, I am carrying out research project namely NEXT-GEAR funded by a programme H2020-S2RJU-OC-2019, in which I focusses on development of Universal Cost Model (UCM) and the mechanical design and development of rail axle and chassis.

• TUTOR: A universal Learning Management System for Robot-based learning (Inter-Grupo / InterOnline Corporation SL, Aviles, Spain – Jan 2018 – Sep 2019)

Pursued my research in the Project development department, InterGrupo / InterOnline SL, Aviles, Spain as Research associate. I managed an industrial R&D project - TUTOR (Universal Learning Management System for Robot based learning) from InterOnline/Intergrupo SL Corporation funded by H2020-INNOSUP 2016 in which I focus on the mechanical design and development of novel two wheeled autonomous educational robots accessible with the learning management systems. For this project, we successfully developed Educational Robotics Application with the following tools: Java with Android-studio IDE as front-end and C with Arduino IDE as back-end. For another project DARE: Development of Augmented Reality solution for Educational Robots, I involved in developing AR application using the following tools: C# with Unity3D as a front and back-end in order to develop a fully functional product (LMS software + hardware).

• Design and Development of Wooden Based Sandwich Structures for Impact and crash applications. (Institute Clement Ader, INSA Toulouse, France – Jan 2014 - Apr 2017)

The goal of my doctoral thesis is to analyze with a static point of view but also dynamic, associations of wood-based structures for applications in land or aircraft transportation. Sandwich materials made out of wood / carbon, wood / glass, wood / flax and wood / aluminum were manufactured and have gone through thermography based quality inspection. Then these structures were tested for mechanical static and dynamic resistance characterizations and compared with conventional aircraft floor panel such aramid honeycomb/carbon and glass composite skin. Finally, finite element modeling were performed to identify the behavior of these structures, including impact using commercial codes (LS-Dyna and ABAQUS). Those tests were then confirmed by drop-weight impact test. Damage modes and its scenario under drop-weight impact are analyzed using X Ray tomography. Several configuration of wood based sandwich structure (Plywood core with composites skin) were identified as a best compromising solution for replacing current reference sandwich structure used in cargo bay floor panel of the aircraft. In conclusion, this

research will provide arguments against the use of merging wood and composite materials to obtain innovative wood based sandwich structures for energy absorption applications with low carbon impact and light-weight scenario. Those results leads to development of wood based sandwich crash-box structures which causes significant weight reduction in transportation sector such as automotive and rail industries, in order to have better energy absorption capabilities.

• Optimization of the effect of the ultrasonic treatment parameters on the properties of CNT hybrid composites. (CONTACT–Marie Curie ITN) (Tampere University of Technology, Finland – Oct'13 - Dec 2013)
The research aim of CONTACT is the tailored industrial supply-chain development of Carbon nanotube (CNT) filled polymer composites with improved mechanical and electrical properties. This will involve the optimisation of CNT synthesis and dispersion, and the processing of CNT compounds, as well as the modelling and characterisation of CNT and CNT composites. The new technologies will be upscaled for applications in four industrial case studies: construction, wind blades, electrically conducting parts and electrodes for redox-flow batteries.

• Inter-laminar stress analysis on FRP composite laminates using shear deformation theory (Politecnico di Torino, Italy – Oct 2010 - Jul 2013)
The objective is to characterize the mechanical static, elastic three-dimensional finite element inter-laminar stress solutions for composite laminates with resin layers under transverse load and also based on CUF (Carrera's Unified Formulation). Analysis with element layers purely made of resin (simulating the adhesive layers between two lamina) positioned at the interfaces between each of the lamina that constitute the laminate have been performed. The stress solutions of cross ply symmetric and antisymmetric laminates, with and without resin layer and their three dimensional plots on the interface are computed.

• Mechanical characterization of refilling of probe hole in Friction stir spot welds through refilling by friction forming (National Institute of Technology, Trichy, India – Aug 2009 - Sep 2010)
This research is focused on performing refilling of probe hole in Friction stir spot welds (FSSpW) using Aluminum alloy (AA 6061-T6).However, Probe hole left after the welding is the main limitation of their process. In this present study, modified FSSpW has been developed and the refilling is achieved by friction forming process. This process has been called Friction Stir Spot Welding with refilling by Friction Forming Process (FSSpW-FFP). The refilling process increases effective cross-sectional area of the nugget, resulting in higher tensile shear strength and joint efficiency at medium and high tool rotational speeds. Fracture surfaces are analyzed in detail using scanning electron microscope (SEM). The pull out of the nugget, i.e., plug type fracture, occurs in the joint with refilled probe hole, while shear fracture through the nugget is observed in the joint with probe hole.

• Reliability Based Design Optimization of Fibrous laminated Composites (Master thesis, Anna Univ. India)
This project is concerned with design of multi-axial fiber reinforced laminate systems under probabilistic conditions of loads and material properties. The Tsai-Wu failure criterion is adopted as the limit state function of unidirectional ply. It is assumed that system failure occurs when any one of plies in a laminate system fails. Design of optimal stacking sequence of composite laminates under probabilistic conditions based on reliability is carried out. While using multiple check point method, Cross ply laminate yields best reliability without considering the effect of shear stress component, whereas in importance sampling method through reliability index approach, Angle ply laminate yields best reliability for same composite material at given loading conditions with including the effect of shear stress component.

Teaching Courses:

Course name	**Academic level**	**Institution**
Finite Element Analysis (Co-instructor)	Master elective course, 2009	National Institute of Technology, Trichy – 620015, India
Mechanics of materials (Co-instructor)	2nd year 2010	National Institute of Technology, Trichy – 620015, India
Basic Mechanical Engineering, Engineering Drawing and Graphics - (Sole-instructor)	1st year 2006,	SRM University, Chennai - 603203, India.
Engineering Mechanics (Sole-instructor)	1st year 2007,	SRM University, Chennai - 603203, India.
Basic Mechanical Engineering Engineering Drawing and	1st year 2007, 2008,	AVIT, Vinayaka Mission University, Chennai - 603104, India.

Graphics - (Sole-instructor)		
Machine Drawing (Sole-instructor)	2nd year 2008, 2009,	AVIT, Vinayaka Mission University, Chennai - 603104, India.
Strength of materials (Theory & Lab) – Sole-instructor	2nd year 2008, 2009,	AVIT, Vinayaka Mission University, Chennai - 603104, India.
Professional Ethics (Sole-instructor)	Final year 2009	AVIT, Vinayaka Mission University, Chennai - 603104, India.

Mechanical Software Expertise:

- CAD Packages : Catia V5, SolidWorks, SolidEdge
- CAE Packages: LS-Dyna, Abaqus, Ansys, Hyperworks
- Programming: Matlab, C.

Experimental Expertise

- Flexural (3 & 4 Points bending) test on wood based sandwich composites
- Low velocity impact test on wood based sandwich composites
- Compression After impact test on wood based sandwich structures and composites
- Tensile test using electronic tensometer
- Metallurgical analysis of Friction stir spot welds using SEM
- Micro hardness measurements for Friction stir spot joints.

Personal Details

Nationality : Indian
Marital status : Married
Languages : English, Tamil, beginner in French and Spanish
Permanent Address : Plot 49, Thiruvalluvar Street, Ayyappa nagar, K.K. Nagar, Tiruchirappalli 620021, Tamilnadu, India.

References

: Dr. Florent EYMA, Associate Professor,
Dept. of Mechanical and Production Engg.,
Institut Clement Ader, IUT de tarbes,
1 Rue Lautremont,
65000, Tarbes, France,
Email- florent.eyma@iut-tarbes.fr
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: Dr. Emmanuel DE LUYCKER
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47, avenue d'Azereix - BP 1629,
65016 Tarbes, France,
Email- emmanuel.de-luycker@enit.fr
Tel: +33(0)567450120

: Prof. Jordi Viñolas Prat
Director, Escuela politécnica superior,
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: Prof. Giovanni BELINGARDI
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Politecnica di Torino,Duca degli Abruzzi, 24,
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