PERSONAL INFORMATION

Ana Pavlovic

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Gender: Female **Date of birth:** 12/04/1981

Fiscal Code: PVLNAA81D52Z158Y

Nationality: Serbian and Italian

Married: Yes **Children:** Yes*

*[*two maternity leaves of five moths each: 12/10/2017-28/03/2018 and 12/07/2020 – 02/01/2021]*

PRESENT POSITIONS

- Junior assistant professor at the Interdepartmental Centre for Industrial Research in Advanced Mechanical Engineering Applications and Materials Technology (CIRI MAM), University of Bologna.

FIELD OF THE RESEARCH

- My prominent fields of investigation involve and have involved, both basic and applied level, the most advanced issues related to the application of numerical computation in solving structural design and industrial design problems, especially in the presence of composite materials. The use of the Finite Element Method, in the context of implicit and explicit calculation and of meshless methods, aimed at modelling complex aspects of a structural, fluid and multi-physics nature are some of the most relevant investigations performed in the last years. In particular, linear and non-linear static analyses, contact problems, non-linear constitutive laws of the material (plasticity, viscoelasticity, etc.) and large displacements, study of natural vibration frequencies, dynamic response study for variable loads have been aspects under consideration during my activity.
- Specifically, the research themes deal with: *Theoretical and experimental study of the mechanical behaviour of composite materials; Design and development of criteria for the design of mechanical composite components; Theoretical and experimental study of the mechanical behaviour of bio-composites and their application in the industrial world; Application of ceramic materials and their use in industry; New methods of measurement, process and product sustainability.* Furthermore, this research activity has been always characterized by a strict collaboration with the industrial reality, both Italian and international.

Links to useful contents: Google Scholar ; Research Gate ; Academia

A: EDUCATION

EDUCATION

1996-2000 **Maturity: Classical Maturity, at *Prva Kragujevacka Gimnazija* of Kragujevac, Serbia**

2000-2005 **Degree in** Mechanical Engineering on October 19th, 2005
Department of Applied Mechanics, Faculty of Engineering, University of Kragujevac, Serbia
Strength analysis of safety cage; Safety cage represent one of the most important part of equipment in sport cars. It has to be made in the way to absorb kinetic energy and on that way reduce contusion of driver. Geometrical and material nonlinear analysis was done using software PAK. Using displacement control method was possible to get critical forces for structure. Those results gave necessary safety factor and strength, and acceptable results were obtained using material with better properties.

2007-2011 **PhD:** in Engineering of Materials on May 25th, 2011
University of Bologna, Department of Civil, Chemical, Environmental and Materials Engineering
Methodology for validation of reliability and safety of industrial system and products; Experimental tests are a fundamental practice for improving the reliability and the functionality of mass- oriented products. Essential information on the modern approach for design/process validation using experimental testing were provided. Only joining theoretical knowledge, simulation analysis and experimental results, it is possible to obtain a complete, fundamental information for further research and manufacturing. Accelerated life tests and software for simulation can be extremely useful to interpret reliability of the product, to allow shorter testing procedures and a fast way for removing mistakes that are noticed in basic experimental diagnostic.

2012-2014 **Post Doc** in Material Engineering
University of Bologna, Department of Civil, Chemical, Environmental and Materials Engineering
Performance-based analysis of slender panel structures; Two-dimensional panel structures are lightly used in the engineering field such as the diffusion of thin section profiles in various sectors of engineering, to the stiffened panels mainly used in the aeronautical field for the construction of fuselage parts, to the box structures. Providing an answer to the analysis and design needs of this structural

typology has represented a significant application interest for the industrial world.

ADDITIONAL TRAINING

2024 Professional training on numerical simulation, ESSS Engineering
2023 Professional training on numerical simulation, ESSS Engineering
2017 Seminar on Composite Manufacturing Simulation Solution" organized by ESI Group
2015 Karalit CFD (3 days course); ModeFrontier (5 days course); OpenFoam for CFD application (3 days course)
2013 Spinner Consortium: Enrolled in the financing for innovation projects; Enrolled in the European design
2012 Ansys CFD Summer School
2003 Practical Application of Finite Element Methods in PAK software
DAAD Summer School – Dynamic of fluids

COMPUTER SKILLS

Excellent knowledge in numerical implicit and explicit simulations using software: **ANSYS WB and ANSYS ACP** for geometry modelling, structural static analysis, modal analysis, linear and on linear buckling analysis, thermal, transient and explicit dynamic analysis.
Excellent knowledge in numerical explicit simulations such as crash test, impact analysis using software: **LS DYNA**
Good knowledge in numerical simulations using software's: **FEMAP, NASTARN PAK, FLUENT, CFD, CFX**
Good knowledge in design using CAD/CAM software's: **CATIA, Pro E, Solid Edge, Mechanical DeskTop, AutoCAD, Inventor**
Excellent knowledge of **Microsoft Office™ tools, Internet Explorer, Windows XP, MAC**

B: DIDACTIC ACTIVITY AT UNIVERSITY LEVEL

ACADEMIC COURSES

My teaching activities were primarily performed at the School of Engineering at University of Bologna, Degree in Mechanical Engineering at Campus of Bologna and Forlì and at the University of Modena and Reggio Emilia.

- **Structural fem modeling applications** [6CFU] **-** [years 2024/25]
- **Master on Composite Materials in Faenza – MACOF** [6CFU] **-** [years 2021/22; 2022/2023]
- **Machine Elements (Module2) LM [3CFU x 2] -** [years 2019/20; 2021/22; 2022/2023]
- **Finite Element Structural Calculation Laboratory LM [3 CFU x 7] -** [years 2014/15; 16/17; 17/18; 18/19; 19/20; 20/21; 21/22; 22/23]
- **Product Engineering [6CFU x 3 anni]** [years 2009/10; 2010/11; 2011/12]
- **Machine Elements L [6CFU x 3 anni]** [years 2007/08; 2008/09; 2009/10]
- **Design and optimization of end-of-line production plants** (Post Degree Master Course) - [years 2019/20]
- **Use of Modelling and Simulation Tools to Solve Engineering Problems (XXXI Cycle of PhD Course) [150H]** [years. 2015/16]

ACADEMIC BOARD MEMBER

INCARICO DI INSEGNAMENTO
Dottorato: XXXI CICLO, A.A. 2015-2016
Corso: Utilizzo di strumenti di modellazione e simulazione per la soluzione di problemi dell'ingegneria industriale
Struttura: Dipartimento di Ingegneria Civile, Chimica, Ambiente e dei Materiali – Università di Bologna
Ruolo: Professore a contratto [150h]
01-10-2015 / 31-12-2015

Membri del Consiglio del Dottorato di ricerca in Scienze e Tecnologie Aerospaziali; Il Corso persegue la formazione di ricercatori e ingegneri altamente qualificati, operanti nei campi tipici dell'Ingegneria Aerospaziale e in grado di affrontare le problematiche relative alle attività di progettazione e ricerca con un elevato livello di multidisciplinarietà; Co- Relatore per il dottorato del Gandhi Yogesh
01.01.2020 – 01.01.2024

Membro della Commissione di Laurea in Ingegneria Meccanica presso Dipartimento di Ingegneria Industriale, Campus Forlì, Alma mater Studiorum - Università di Bologna; membro di commissione e relatore di alcune tesi di Laurea.
01.01.2020 – 01.012.2020

Membro della Commissione di Laurea per il Dottorato di Ricerca in Ingegneria dei Materiali in collaborazione con Università di Rio Grande do Sul, Brasile; membro della commissione internazionale e co- Relatore della tesi di dottorato del Felipe Vannucchi De Camargo. Si trattava di un dottorato di ricerca in co-tutela con doppio accordo firmato.
01.01.2019 – 01.12.2021

Membro della Commissione di Laurea per Master post-laurea in collaborazione con International Service Education Unit - Engineering and Architecture; Università di Marsiglia, Francia (doppio accordo); membro della commissione internazionale (Italia, Francia, Germania); Relatore della tesi di Vladyslav Mikhnych
01.01.2021-01.12.2021

DIDACTIC ACTIVITIES OUTSIDE THE UNIVERSITY

Institution: Enterprise Fund
Course: 'Advanced Integration in Industrial Controls'
Details: the professionalizing course was developed in collaboration between the University of Bologna and some companies (Coditech Sas, Autec Srl, CT Point Srl) with the aim of training 25 engineers and technicians in advanced engineering issues for products and processes.
Topics: Experimentation and measurements; Dynamics of structures; Structural modeling of systems.
Role: Adjunct Professor [50 hours]
From 02/15/2022 to 10/30/2022

Institution: FUTURA, Public Institution Body for Professional Training and Territorial Development
Details: Professional training course, funded by the Emilia-Romagna Region and supervised by the University of Bologna,
Topics: Component and system design; use of commercial 3D design software (Solid Edge, ProE, CATIA); numerical simulation techniques to support mechanical design and component sizing.
Role: Contract professor [30 hours x 2 years]
A.A. 2007/08 - 2009/10
From 01/09/2007 to 31/03/2010

INVITED LECTURES

1. **Title: Tips and Tricks for Numerical Analysis of Low-Velocity Impacts on Bio-composites,**
   Event: 2nd International Conference on Mathematical Modelling in Mechanics and Engineering
   Hosting: Mathematical Institute SANU, Belgrade, 12-14. September 2024.
2. **Title: Hybrid Simulation of Dynamic Loading on Floating Laminates: Combining FEM and SPH Methods**
   Event: Polish National Conference on Fracture Mechanics
   Hosting: Wroclaw University of Science and Technology, Faculty of Mechanical Engineering [September 2023, Wroclaw, Poland]
3. **Title: Finite Element Modeling for ecological sustainability**
   Event: A summer school on "Sustainable development of yachting and cruise industry
   Hosting: Faculty of Maritime Studies [July 2023, Kotor, Montenegro]
4. **Title: Parallel computing for crash simulations: the case of a minicar.**
   Event: International Workshop on HPC Methods for Engineering Application, Post-processing and optimization.
   Hosting: CINECA [20.06.2017, Milan, Italy]
5. **Title: Numerical Simulation for Investigating the Contact Problems in Industrial Life.**
   Event: International Mini symposium of Contact Mechanics: Theory and Applications
   Hosting: Mathematical Institute of the Serbian Academy of Science and Arts (SASA), [14.03.2017, Belgrade, Serbia]
6. **Title: Sustainable mobility solutions.**
   Event: Workshop The solar future is already here! (Conductor Patrizio Roversi)
   Hosting: European Researchers' Night, [25.09.2015, Bologna, Italy

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C: DOCUMENTED TRAINING OR RESEARCH ACTIVITIES AT QUALIFIED

After my degree in Mechanical Engineering, my research was oriented to the use of numerical methods in solving mechanical structural and design problems. All research fellowships were given to me by University of Bologna and its different departments such as: Department of Industrial Engineering (DIN); Interdepartmental Centre for Industrial Research Mechanical Engineering and Materials Technology (CIRI MAM); Department of Civil, Chemical, Environmental and Materials Engineering (DICAM).

02/09/2019 – 13/02/2025 ***Design of composite structures through advanced use of finite element models.*** *The most advanced issues relating to the use of numerical calculation in the resolution of the design problems characteristic of structural and industrial engineering are being addressed by using composite materials. The use of finite element method (FEM) is expected, in the context of implicit and explicit calculation aimed at modelling complex aspects of a structural, fluid and Multiphysics nature* ***(RTD A)***

01/07/2016 – 15/12/2018 ***Development of advanced solutions for optimizing the dynamics of processing plants with a view to reducing the energy consumption and the environmental impact.*** *Research was dedicated to structural development of different types of treatment plants (e.g. sanders, shearing machines) used in the final stages of the production process of ceramic tiles of exceptional dimensions (over 2x3 meters). In particular, this study has made it possible to redesign significant sections of said systems (e.g. frame, bases, support structures, tilting beams) starting from the simulation of static loads (weights, balances), dynamic loads (inertial forces) and impulsive loads (impacts) expected during operation as well as during handling phases.*

01/01/2014 – 31/12/2014 ***Hydro-elastic slamming of composite structures.*** *Development and subsequent experimental validation of numerical models for the study of the effects of hydro-elastic slamming on thin structures in composite material (mainly reinforced with fiberglass, carbon and natural fibers). These models also made it possible to support the redesign phase of a boat hull.*

02/01/2012 – 01/01/2014 ***Performance-based analysis of lean panel structures***. *The aim of the research was to create a theoretical operational framework for the analysis of two-dimensional panel structures. These structural types are lightly used in the engineering field such as the diffusion of thin section profiles in various sectors of engineering, to the stiffened panels mainly used in the aeronautical field for the construction of fuselage parts, to the box structures.*

01/01/2011 – 31/12/2011 ***Integrated methodologies and technologies for the design, construction, and development of a new generation of advanced instrumental assets.*** *Realization of dynamic analysis: ways of vibrating, resonance and frequency response of an automatic machine, dynamics of the rotating rings: static, dynamic tensions and proper pulsations. FEM modeling of dynamic problems: modal analysis, rigid and flexible dynamic analysis and simulation of a work cycle. Redesign by the use of innovative materials (e.g. hybrid composites).*

01/09/2006 – 31/08/2007 ***Evaluation methodology for the reliability and safety of industrial systems and products.*** *Study of the structural response in static and dynamic terms of machining centers (CNC plants for processing wood, composites, and other light materials). The behavior of some work plants was simulated during normal operating conditions and in the most common incidents in order to verify the structural behavior of its parts when some design parameters change.*

RESEARCH CONTRACTS

Since 2007, I was also contractually involved by the University of Bologna (CoCoCo) in additional research activities, addressed to solve applied problems in industrial engineering:

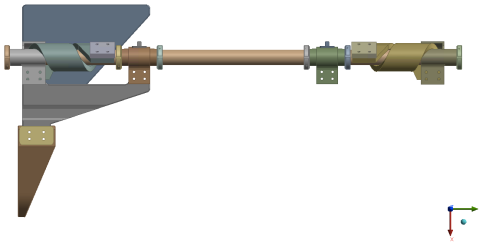
- Use of non-linear numerical modelling techniques on high anisotropy materials for automotive applications. Use of advanced simulation techniques through the commitment of Finite Elements in the development and optimization of the design and construction solutions necessary to transform the current multi-seater solar vehicle into a two-seater solar road vehicle through structural analysis for weight reduction, dynamic analysis, crash test analysis. (250h in 2 months; 2018-2019)
- Application of the FEM on mechanical structures and assemblies. Solid / shell modelling for model preparation. Application of different innovative materials and different mathematical models. (600 hours in 6 months; 2015-2016)
- The state of the art of composite materials at the service of rail transport. The state of the art of design techniques in rail transport using composite materials. State of the art of simulation techniques for the use of composite materials in rail transport. Description of rail transport components suitable for use with composite materials. Conceptual design and finite element verification of rail transport systems / components suitable for connection with composite materials. (600 hours in 6 months; 2012-2013)
- Methodology for assessing the reliability and safety of industrial systems and products. (800 hours in 10 months; 2010)
- Study and test of advanced materials with advanced functions for applications of industrial interest. (800 hours in 7 months; 2007-2008)

VISITING RESEARCHER

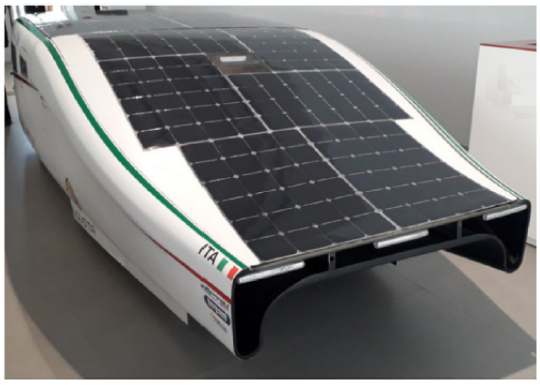
Institution: Faculty of Mechanical and Civil Engineering of Kraljevo, University of Kragujevac, Serbia
Period: 06/11/2008 to 12/11/2009
Framework: SeRViCe - Strength Railway Vehicles Center of Faculty of Mechanical Engineering [EU FP7 RegPot Project]
Participants: Kragujevac Univ., Serbia (Coordinator), Bologna, KTH Stockholm (Sweden) and others.
Role: Scientific and international strengthening of the research group; numerical design and simulation activities

Institution: Faculty of Engineering, University of Kragujevac, Serbia
Period: since 27/03/2012 to 26/06/2013
Framework: DIAUSS - Development and improvement of automotive and urban engineering studies in Serbia [EU Tempus Programme]
Participants: 16 partners from Serbia, Italy (U. Bologna, Polytechnic Turin, FIAT), Lithuania, Slovakia
Institution: Faculty of mechanical Engineering, University of Montenegro
Period: 29.06.2023 – 14.07.2023
Framework: Erasmus Plus; Mobility for Learners and Staff
Role: Didactic and technical-scientific activity in the field of innovative materials.
Details: The 3RComposites project, of sustainable mobility, aims to create a framework of transnational collaboration with a broad time horizon between Italy and Montenegro on the theme of 'Blue Growth', considered a key area for integration between the countries of the area Adriatic and Mediterranean. This recovery of resources, mainly referred to materials reinforced with glass or carbon fibers, can take place through rather innovative processes conceived and developed by the University of Bologna
Institution: Faculty of mechanical Engineering, University of Montenegro
Period: 19.07.2023 – 18.08.2023
OUTGOING - Proposal for Strategic Development Project of the Departments
Project: SeaComp - Sea Waste from Adriatic to Enhance Marine Composites
Participants: University of Bologna, University of Montenegro (MNE), Brunel University, London (UK)
Role: Technical-scientific activity in the development of an innovative class of marine composites with a significantly reduced environmental impact.

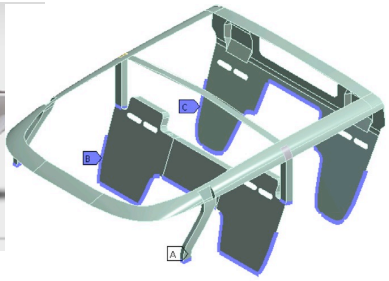
D: IMPLEMENTATION OF PROJECT ACTIVITIES RELATING TO THE COMPETITION SECTORS IN WHICH IT IS ENVISAGED



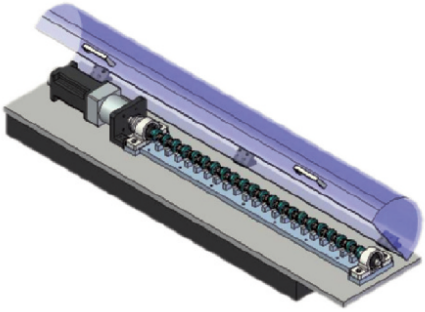
Title: **Solar Car Suspension.**
Authors: G. Minak, A. Pavlovic, L. Bernabei,
Year: 2021
Details: A torsion bar suspension where the torsion bar was done by a composite spring. Thanks to the composite design, in terms of dimensions and layout (e.g., layer thickness, fibres orientation and so on) a proper behaviour -was set
Others: under patenting

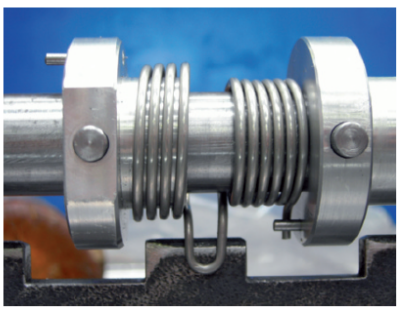


Title: **Solar Roof**
Authors: G. Minak, A. Pavlovic, C. Fragassa
Year: 2019
Details: With the scope at improving the performance of the solar prototype, the solar roof design was changed in the way to optimize multidisciplinary aspects (as lightness, stiffness, thermal exchange).
Others: several vehicle profiles were designed and compared. Two solutions were accepted, one for the race car and the other for the road model.

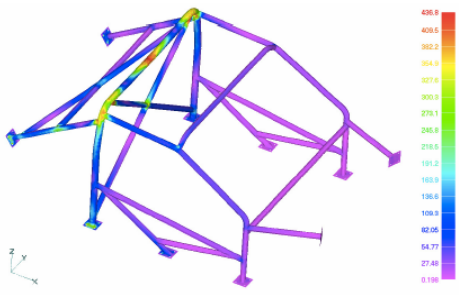


Title: **Solar Vehicle Design**
Authors: M. Lukovic, A. Pavlovic., G. Minak
Year: 2018
Details: The 1st solar passengers' car was designed and developed. My role was mainly related to the design and optimization of the composite structure (monocoque, safety cage, roof), including crash test analysis
Others: several papers are available on the topic.





Title: **Dual Effect Spring Testing Machine**
Authors: C. Fragassa, A. Pavlovic, M. Salvatore
Year: 2009
Details: This equipment was designed with the scope to speed up the long phase of testing dual effect springs used for engine control. Thanks to several design solutions, it was possible to simultaneously test 10 springs with fast and complex loads
Others: After using the equipment for testing over 100 springs and 10E6 cycles, it was sold.



Title: **Rally car roll bar design**
Authors: M. Zivkovic, A. Pavlovic.
Year: 2000
Details: The concepts of design for safety were applied at the scope to optimize the metal roll bar design in the case of a rally car.
Others: The roll bar was manufactured and used during international racing competitions. This argument is detailed in my thesis.

E: ORGANIZATION AND COORDINATION OF NATIONAL AND INTERNATIONAL RESEARCH GROUPS OR PARTICIPATION

INTERNATIONAL PROJECTS PARTECIPATION AND COORDINATION

[1] **GIVES** - Green Integrated Vehicle Energy System [Bilateral project MoU R&I IT-SRB; 2024-26] *undergoing approval*
Scope: The GIVES project aims to merge transnational scientific knowledge and technical skills to devise innovative solutions tailored for integration within an electric-hydrogen hybrid concept car, promoting sustainable mobility. It focuses on ultra-light vehicles, highly efficient powertrains, electric-hydrogen hybridization, and eco-friendly materials.
Role: National Coordinator.

[2] **HySEMS** - Energy Transition and Hydrogen-related Research [[Bilateral mobility IT-SRB; 2024-26] *undergoing approval*
Scope: HySEMS aims to enhance & share knowledge in sustainable mobility with special attention on the safe use of hydrogen in light vehicles.
Role: National Coordinator.

[3] **ATC EVO** [EU, CEI – KEP; 304.4.56-20; 2021-2022]
Scope: ATC EVO, An Evolution of the Automotive Training Centre Serbia toward the Concepts of Light and Sustainable Mobility, goes in the direction of modernizing local know-how in the field of Light Vehicles and Sustainable Mobility by knowledge transferring key elements of vehicle design and manufacturing regarding not yet existing skills. But it also makes the most of existing educational infrastructures: the knowledge transfer action will take place by teaching those professors already involved inside the ATC competence center and by taking advantage of its didactical facilities.
Role: National Coordinator, 'Training of Trainers' Course, Teaching Activity.

[4] **COMPOSITES FOR ALL** [EU, CEI – KEP; 304.4.20; 2021-2022]
Scope: Composites for All' stands for a collaboration between Higher Educational Institutions (HEIs) that aims at moving a first step in filling the existing knowledge gap between Western Balkan (WB) and Europe Union (EU) in the field of high performing light materials. In particular, the project is focused on the strategic material segment of fiber-reinforced polymers (FRP) and in the CEI target countries of Montenegro (MNE), Bosnia Herzegovina (BIH) and North Macedonia (MKD). Despite their relevance for the rest of the world, in fact, composite materials are almost unknown in these emerging territories: no specific research centre have been established for working on them; only few professors have included these topics in own classes, their industrial use is almost limited to low-value applications and materials.
Role: National Coordinator, 'Training of Trainers' Course, Invited Professor, Teaching Activity; Research Activity.

[5] **ERASMUS Plus [EU, KA,107 2020-2023]**
Scope: Mobility for Learners and Staff, Higher Education Student and Staff Mobility between University of Bologna and University Montenegro. The 3RComposites mobility project aims to create a transnational collaboration framework with a broad time horizon between Italy and Montenegro on a topic of 'Blue Growth', considered a fundamental area for integration between countries in the Adriatic and Mediterranean area. This recovery of resources, mainly referred to materials reinforced with glass or carbon fibers, can take place through rather innovative processes conceived and developed by the University of Bologna.
Role: Teaching Activity.

[6] **ATC Serbia: Automotive Training Centre** [EU RSEDP2; 2011-2013]
Scope: Strengthening of the didactic infrastructures located in Central Serbia and their redirection towards the strategic sector of automotive engineering thanks to the creation of a network of 3 didactic laboratories at 3 different engineering faculties, as well as the realization of courses for specialist training of researchers, technicians and students with an involvement of about 1,500 people in 2 years. The project involved the technical-financial support of important companies in the sector such as: FIAT Group and Zastava Group.
Role: Coordinator of the project activities 'Training of Trainers' Course Coordination; Transfer of Technology to Industry; Teaching Activity; Research Activity on Reliability Methods and Tools; Numerical simulations, (contract by Polytechnic School, project budget: 558.272€)

[7] **ADRIA HUB: Bridge technical differences and social suspicions contributing to transform the Adriatic area in a stable hub for a sustainable technological development** [IPA CBC Adriatic; 2012-2015]
Scope: creation of a collaboration network between universities, companies and other institutional bodies with the aim of scientific and technological strengthening of the Adriatic area through a common action of scientific research, industrial innovation and knowledge transfer.
Role: National Coordinator; Pilot projects coordination; Actions Development for a long-term sustainability; Transfer of Technology to Industry; Teaching Activity; Research Activity on Design Methods and Tools; Numerical simulations, (contract by faculty of Engineering of Banja Luka and Podgorica, project budget: 2 180 000€).

[8] **IMPuls: Innovation Management for new Products** [EU RSEDP2; 2011-13]
Scope: Increasing the capacity of rapid prototyping laboratories for the promotion and continuing education in the field of digital technologies for product development; stimulating innovation and increases the competitiveness of the economy and its environment promoting and applying digital technologies for new product development.
Role: Main Investigator for the use of FEM methods and tools in the design and optimization of industrial parts.

[9] **DIAUSS: Development & Improvement of Automotive and Urban Engineering Studies** [EUTempusJEP; 2012-14]
Scope: Development of study curricula with a strong interdisciplinary and international value as a support to the automotive industry and to the social growth of urban areas. In particular, the project involving 17 international partners is aimed at establishing and / or strengthening the first and second level university courses of various universities in the Balkans, improving their system integration both with the industrial world and with high schools.
Role: Support to the National Coordinator, 'Training of Trainers' Course, Invited Professor, Teaching Activity; Research Activity on Vehicle Design and Multidisciplinary in Design.

NATIONAL PROJECTS

[1] **NEXT-HMC** [FISA 2024] *approved*
Scope: Next-Generation Sustainable Hybrid Metal Composites
Role: Project coordinator.

[2] **SANYTECH** [FISR; 2023-2026] *undergoing approval*
Scope: realization and production of protective device to effectively contrast spread of SARS-CoV-2, but also able in post-emergency conditions for more general utilization as a virucidal and bactericidal system.
Role: Project coordinator.

[3] **ASCCENT** Advanced Structural Composites for Easily Reconfigurable Application [PRIN 2022 under 40; 02.09.2023-01.09.2025]
Scope: Principal Investigation at University of Bologna; planned research activity to be carried out within my institution has the aim of supporting implementation of a fused filament fabrication method with the new technology the co-deposition of continuous fibers next to the polymer.
Role: Project coordinator. Research activities.

[4] **MOVERT** Development and testing of a vertical take-off technological demonstrator for Urban Air Mobility and Delivery applications [PR FESR 2021-2027; 01.01.2024-30.09.2024]
Role: Research activities.

[5] **SANYTECH** [FISR2020IP_04308; 2021-2022]
Scope: design and develop a protective device to effectively contrast the current spread of SARS-CoV-2, but also able in post-emergency conditions for more general utilization as a virucidal and bactericidal system. This will be achieved by reconverting a nebulizing equipment now used for different purposes to allow the vaporization and controlled release of sanitizing substances.
Role: Project coordinator. Research activities.

[6] **Two seats for a Solar Car** [MAECI, Strategic Projects; 2019-2021]
Scope: Conceptual, functional and construction vehicle redesign aimed at transforming a 4-seat solar prototype, developed for racing, into a more conventional car, able to be conventionally register. Car construction and on road test.
Role: Use of advanced simulation techniques through the commitment of Finite Elements in the development and optimization of the design and construction solutions necessary to transform the current multi-seater solar vehicle into a two-seater solar road vehicle through structural analysis for weight reduction, dynamic analysis, crash test analysis.

[7] **Onda Solare: a vehicle from the future. From the idea to the prototype in less than 24 months** [Por FESR, 2016-2018]
Scope: Conceptual, functional, and constructive design of a solar electric vehicle for race
Role: Application of the FEM method on mechanical structures and assemblies. Solid / shell modelling for model preparation. Application of innovative materials and solutions by developing several FE mathematical models.

[8] **IPERCER: Process innovation FOR the sustainable ceramic tile supply chain** [Por FESR, 2016-2018]
Scope: Optimize and make efficient the production cycle of large porcelain stoneware slabs by studying process and modeling solutions for the entire large format supply chain through an integrated approach that also makes use of experimental measurements in the field. The efficiency of the ceramic production cycle wants to be achieved both in technological terms (improvement of compaction, firing, measuring methods, etc.) and in energy terms (reduction of consumption) through a validation with industrial partners in the sector
Role: Structural development of different types of treatment plants used in the final stages of the production process of ceramic tiles of exceptional dimensions.

[9] **RoboTraining - Progettando e Costruendo un Esoscheletro Innovativo** [Accordo MISE-ICE-CRUI; 2012-2014]
Scope: Development of a new concept of sports and rehabilitation equipment capable of supporting combinations of movements generated by the human body, even complex ones, proposed as an innovative solution for gyms and hospitals. Servo-assisted joints, rapid prototyping of shapes, virtual design and aesthetics, FEM simulation of kinematic mechanisms, composite materials, hybrid joints, sensing encoders, active control devices, experimental calibration of the intensity of the efforts are just some of the disciplinary areas were the aspects essentials of technological research. The international collaboration saw the participation of 3 universities, 2 research centers, 1 high school.
Role: Research activities.

[10] **DeUrbisVento - Utilizzo duale di impianto microeolico in ambito urbano** [Min. Ambiente; 2012-2013]
Scope: Development of energy generation design solutions in urban areas with wind farms with combined energy recovery functions. In particular, the aim was to combine energy production with an air extraction system for passive cooling.
Role: Research activities.

[11] **Alma@Service - Materiali compositi al servizio del trasporto ferroviario** [Accordo MISE-ICE-CRUI; 2010-2012]
Scope: Evaluation of the technical-industrial potential related to the replacement of metallic materials with non-traditional materials, such as GFRP, in the design of freight wagons. In particular, the project provided for the experimental determination and theoretical modeling of the influence of environmental effects on fatigue life and on the residual resistance of GFRP specimens produced in an autoclave. Functional models have been produced to demonstrate the applicability of the production technologies of these composite materials in the field of rail freight.
Role: Research activities.

COLLABORATION WITH INDUSTRY

Several responsibilities of applied research were entrusted to me by private institutions:

Trelleborg (http://www.trelleborg.com/en)	Validation of Full Rubber Trelleborg by Quasi Static Structural Simulation
Magneti Marelli Spa (www.magnetimarelli.com)	Design validation of metal and polymer gears for automatic clutch. FEM analysis of components and mechanisms. Evaluation of the effect of tolerances.
Robopac (http://www.robopac.com/it/)	Material selection and design. Structural design and optimization of rotational parts using dynamic numerical simulation.
Aurea Servizi SAA (http://www.aureaservizi.com/it/)	Environmentally friendly resins - Design and simulation of components made of composite materials, including hybridization of fibers and low-emission resins.
CDR Italy Srl (http://www.cdritaly.com)	Analysis of the industrial components (as wheels) respect to static and dynamic loads. Structural parts' design and optimization. (including a patent on an innovative polymer wheels' fork)
MDue Spa (http://www.mdue.it)	Static Structural and Dynamic Analysis of the industrial components respect to safety conditions in the case of high-speed impacts.
NIER Engineering Srl (http://www.niering.it)	Validation of Static Structural and Modal behaviour of the Ex-vessel components of the ITER Electron Cyclotron Upper Launcher by FEM simulations
SCM Group Spa (www.scmgroup.com)	Structural design optimization of CNC machines for woodworking Investigating the dynamic impact of projectiles on flexible barriers by numerical simulation.
Studio Pedrini Srl (http://www.studiopedrini.it)	Design and simulation of components made of composite materials in the case of packaging machines. Material chance and engineering of packaging machines by the use of composites
Tazzari Group Spa (https://www.tazzari-zero.com)	Dynamic explicit analysis for safety design and validation: using numerical techniques for crash tests simulation and safety improvements in the case of ZERO microcar.
GT Line (https://www.gtline.com)	Determine whether the technical suitcase withstands a free fall from a height of 9 meters onto the rigid surface, simulating the stresses and structural deformations of polypropylene under realistic conditions. Stability in stacking conditions, with main objective of the FEM analysis is to verify the structural resistance and stability of the specific suitcase.

F: PATENTS

Type: Industrial Invention Patent number: 102022000012050 Date: 07/06/2022

Title: "Integrated Device For Dosage, Mixing And Fast Nebulization Of Suspension Chemical Substances For The Purpose Of Cleansing And Sanitizing Surfaces And Environments"

Authors: Ana Pavlovic, Cristiano Fragassa, Massimo Mele, Radovani Asti, Marco Arru

Topic: The present invention belongs to the technical field of systems for cleaning and sanitizing surfaces and environments, in particular of internal environments such as residential, commercial, hospital premises, more generally medium and small-sized environments

Type: Industrial Invention Patent number: 102020000013711 Date: 09/06/2020

Title: "Fastening device with security release function, made by additive manufacture"

Authors: Cristiano Fragassa, Giangiacomo Minak, Ana Pavlovic, Asti Radovani

Topic: Fixing device with safety release function, made by means of additive manufacturing. More specifically, the present invention relates to a fastening device for functional components of means of transport, buildings, and the like, which can be easily and quickly unlocked in case of need.

Exploitation: The patent was donated to the University of Bologna which proceeds to its commercial exploitation within its 'Third Mission' policy.

Type: Industrial Invention Patent number.: PS102019000005408 Date: 09/04/2019

Title: "Polymer Joint for Mechanical Suspension of Light Ground Vehicles"

Authors: Minak G, Fragassa C, Brugo T. M., Peghetti D., Pavlovic A., Baschetti G.

Topic: Patent with the aim of protecting, as a technical discovery, the use of Dyneema® tapes as connection parts for suspensions and structural parts in light vehicles (e.g. motorcycles, tricycles and quadricycles), as well as the related technology that has led to develop specific fixing solutions and appropriate precautions to eliminate the problem of viscoelastic deformation of the material. Thanks to this invention, standard solutions have been replaced, such as spherical plain bearings, with a saving in terms of weight of the order of 50%, but also with various other advantages, especially in terms of dimensions, functionality, and maintenance.

Exploitation: The patent was used for producing a new generation of extra light suspension systems to be installed in our solar car and then donated to the University of Bologna which proceeds to its commercial exploitation within its 'Third Mission' policy.

Type: Industrial Invention Patent number: 102016000110680 Date: 03/11/2016

Title: "Composite wheel support for electrical transformer"

Authors: Pietro Baracco, Ana Pavlovic

Topic: Innovative wheel support consisting of a fork made of composite material and comprising a portion: upper configured to be connectable to an electrical transformer; two vertical positions connected monolithically to the upper portion each comprising a surface configured to rotatably contain and support a roller and in particular its pin; herein said vertical portions comprise a plurality of ribs oriented from the bottom upwards.

EXPLOITATION: THE PATENT WAS SOLD AND BECAME PART OF THE STRATEGIC IRP ASSET OF CDR ITALY SRL.

G: NATIONAL AND INTERNATIONAL CONGRESSES AND CONFERENCES

SCIENTIFIC EVENTS ORGANIZATION	
2024	2nd international conference on Mathematical modelling, Mathematical Institute of SASA, September 12th-14th, Belgrade, Serbia
2017	Symposium on Contact Mechanics: Theory and Applications, Mathematical Institute of SASA, March 14th, Belgrade, Serbia
2016	15th Youth Symposium on Experimental Solid Mechanics, June 8th -11th, Rimini Italy
2015	Exhibition Corner: Onda Solare – The future is here!. Researchers Night, 25th September, Bologna, Italy
2015	Workshop on FEM modelling of Structures in Reinforced Sheet with FEMAP, Bologna, Italy
2015	Workshop on Soft Skills and their role in employability, new perspectives in teaching, assessment and certification, Bertinoro, Italy
2015	Public Training Exhibition: Sole in piazza: Onda Solare, a solar vehicle for the future. Bologna, Italy
2014	43rd **AIAS National Conference**, September 9th -13th, Rimini, Italy
2008	1st Symposium on Multidisciplinary Studies of Design in Mechanical Engineering, Bertinoro, Italy
2007	6th Youth Symposium on Experimental Solid Mechanics, May 9th -12th, Vrnjacka Banja, Serbia
2004	5th Int. Scientific Conference Research and Development of Mechanical Elements and Systems, Sept. 16th -17th, Kragujevac, Serbia
PARTECIPATION AT NATIONAL AND INTERNATIONAL SCIENTIFIC EVENTS	
2026	29th International Conference on Composite Structures (ICCS29), IN-PERSON + ONLINE event, 22-26 June 2026, Cagliari (Italy).
2024	27th International Conference on Composite Structures (ICCS27), Sep. 3th – Sep. 6th, Ravenna, Italy
	19th Youth Symposium on Experimental Solid Mechanic - YSESM, June 5th – June 7th, Rome, Italy
	2nd International Conference on Mathematical Modelling in Mechanics and Engineering, September 12-14, Belgrade, Serbia
2023	52° Conference AIAS, 6-9 September
	GEF 2023 - Quindicesima Giornata di Studio Ettore Funaioli 14 luglio, Bologna, Italy.
2022	MVM 9th International Congress Motor Vehicles and Motors 2022, Serbia.
2021	50° National Conference AIAS, Virtual Conference, 1-3 September, Italy.
2020	23rd Int.l Conference on Composite Structures & 6th International Conference on Mechanics of Composites, 1-4 September, Porto, Portugal.
	9th Int. Scientific Conference Research and Development of Mechanical Elements and Systems, Sept. 5th -7th, Kragujevac, Serbia
2019	Quality festival Conference, May 29th to June 1st, Kragujevac, Serbia
	16th International Conference on Tribology, May 15th -17th, Kragujevac, Serbia
2018	International CAE Conference, October 8th -9th, Vicenza, Italy
	47° National Conference AIAS, Villa San Giovanni, September 5th – 8th Calabria, Italy
	International Conference of Contemporary materials, September 2nd - 3rd, Banja Luka, B&H
2017	16th International Conference on Fracture and Damage Mechanics, July 18th - 20th Florence, Italy
	Nano Innovation 2017, Conference & Exhibition, September 26th -29th, Rome, Italy
	4th South-East European Conference on Computational Mechanics, July 3rd – 5th Kragujevac, Serbia
	15th International Conference on Tribology, May 17th -19th, Kragujevac, Serbia
2016	15th Youth Symposium on Experimental Solid Mechanic, Jun 8th – 11th, Rimini, Italy
	IX International Scientific Conference Contemporary Materials 2016, September 4th -5th Banja Luka, B&H
	45° National Conference AIAS, University of Trieste, 7th-10th September 2016, Trieste, Italy
	10th International Conference ICQME, September 28th -30th, Petrovac, Montenegro
2015	8th International Congress of Croatian Society of Mechanics, September 29th – October 2nd, Opatia, Croatia
	5th International Conference on Innovative Natural Fiber Composites for Industrial Applications, October 15th -16th, Rome, Italy
	44° National Conference AIAS, University of Messina, September 2nd -5th, Messina, Italy
	8th international conference Contemporary Materials 2015, September 6th -7th, Banja Luka, B&H
2014	International Congress Motor Vehicles & Motors 2014, Kragujevac, Serbia
	International LET's 2014 Conference, Bologna, Italy
	43° National Conference AIAS, September 9th -12th, Rimini, Italy
	8th International Quality Conference, May 23rd, Kragujevac, Serbia
	VIII International Conference "Heavy Machinery-HM 2014", Jun 25th -28th, Zlatibor, Serbia
2013	ICCE 21, July 2013, Tenerife, Spain
	DAS2013, September 25th -28th, Primosten, Croatia
	International CAE Conference and Exhibition, Verona, Italy
2012	29th Danubia Adria Symposium, September 26th -29th, Belgrade. Serbia
2010	The 14th AMME-14 Conference, May 25th -27th, Cairo, Egypt
	Week of Innovative Regions in Europe (WIRE2010), March 15th -17th, Granada, Spain
2009	19th International Scientific Conference, TRANSPORT 2009, Sofia, Bulgaria
	8th Youth Symposium on Experimental Solid Mechanics, May 20th -23rd, Gyor, Hungary

2008	1st Symposium on Multidisciplinary Studies of Design in Mechanical Engineering, Jun 26th -28th, Bertinoro, Italy
	7th Youth Symposium on Experimental Solid Mechanics-YSESM, May 14th -17th, Wojcieszyce, Poland
2007	6th Youth Symposium on Experimental Solid Mechanics-YSESM, May 9th -12th, Vrnjacka Banja, Serbia
2006	22nd Danubia Adria Symposium DAS, September 22nd -25th, Zilina, Slovaks
	5th Youth Symposium on Experimental Solid Mechanics - YSESM, May 10th -13th, Puchov, Slovakia
	5th International Scientific Conference Heavy Machinery - HM'05, Jun 28th – July 3rd, Kraljevo, Serbia
2005	4th Youth Symposium on Experimental Solid Mechanics - YSESM, May 4th -7th, Castrocaro Terme, Italy
2004	3rd Youth Symposium on Experimental Solid Mechanics - YSESM, May 12th -15th, Porreta Terme, Italy

H: NATIONAL AND INTERNATIONAL AWARDS AND RECOGNITIONS FOR RESEARCH ACTIVITIES

AWARDS

AIAS member of the Italian Scientific Society of Mechanical Design and Machine Construction (AIAS). The association represents the point of reference in Italy in the field of mechanical design and machine construction (SSD Ing.Ind/14), promoting dissemination, training and research in the sector; from 01.01.2014 to today

Mechanical Design Award - Award released by the international jury of the American Solar Challenge for 'Best vehicle design, with particular reference to the skilful use of composite materials' in reference to Emilia 4, a solar vehicle created within the 'Onda Solare' project. My role was to support the development of the vehicle by dealing with the numerical verification of all the different structural parts of the vehicle. The optimization of these parts, made in fiber-reinforced composite sandwiches, including combinations of uncommon materials (e.g., Kevlar, basalt), sometimes required the development and validation of specific models, which represented the essential part of my work . Thanks to this effort, the vehicle was around 60 kg lighter than any other competitor. 40 Universities including MIT, Michigan, Georgia Tech, Harvard competed for this award; from 22-07-2018 to today

AIAS Software Simulation Award 2017
Institution: **Italian Scientific Society of Mechanical Design and Machine Construction (AIAS)**
Recognition: for the best numerical investigation for the work '*Numerical study of the impact at low speed on biocomposites*', assigned on 07.09.2017

ADEKO Award
Institution: International **Association of Design, Elements and Construction (ADEKO)**
Recognition: for *Improving the quality of Design Construction*, assigned on 01.09.2019

Best Student / Best Thesis Award
Institution: **Faculty of Engineering, University of Kragujevac, Serbia**
Recognition: 1st Prize for best student + best thesis in Engineering, 2005.

Best Student Award
Institution: **Embassy of Norway**
Recognition: 1st Prize for best student of the A.A. 2002/2003 + International scholarship

Best Student Award
Institution: **DAAD German Academic Exchange Service** (representing the most relevant German organization for international academic cooperation)
Recognition: 1st Prize for best student of the a.a. 2001/2002 + International scholarship

RECOGNITIONS

Scientific Ambassador
Institution: **Scientific Fund, Republic of Serbia**
Recognition: Ambassador of Science of Serbia in Italy [since 01.01.2019]

Scientific Expert
Institution: **Ministry of Education, University and Research (MIUR)**
Recognition: Expert registered for the Peer-Reviewers for the Italian scientific evaluation (REPRISE) [10.09.2019]

Project Evaluator/Supervisor
Institutions: Science Fund & Innovation Fund Serbia (over 50 projects evaluated)
Role: Scientific expert for evaluation of international research projects
Institutions:

- European Union / EIT HEI Initiative (n. 5 projects evaluated); M-ERA NET (No. 7)

- Republic of Serbia / Science Funds (n. 20); Innovation Funds (No. 18); Mini & Matching Grants Scheme (No. 15).
From 01/01/2017 on going

REVIEWER BOARD MEMBER

- Composite Structures (Elsevier)
- Composite Part B (Elsevier)
- Manufacturing Letters (Elsevier)

- Applied Science (MDPI)
- Materials (MDPI)
- Material Science (AIM Press)
- Arabian Journal for Science and Engineering (Springer)
- Computer Modelling in Engineering & Sciences (Tech Science)
- Journal of Advanced Manufacturing Systems (World Scientific)
- Science and Engineering of Composite Materials (Walter de Gruyter)
- Facta Universitatis – Mechanical Engineering (U. of Nis)
- FME Transactions (U. Belgrade)
- Journal of Applied and Computational Mechanics (Shahid Chamran University of Ahvaz)
- International Journal of Quality Research (Centre of Quality, Montenegro)

GUEST EDITOR

- Special Issue on 'Experimental and Numerical Investigation of Composite Materials'. Materials; MDPI. (ISSN 1996-1944).
- Special Issue on 'Multiscale Composite Materials Characterization – Manufacturing, Testing and Structural Integrity Analysis'. Journal of Composite Science; MDPI. (ISSN 2504-477X).
- Special Issude on "New Insights in Mechanical Behavior of Advanced Materials and Composites: from Computational Methods to Experimental Application. Journal of Materials (ISSN 1996-1944)

PUBLICATIONS

In line with my prominent research fields, the over 100 contributions, between scientific and conference papers, are mainly related to the use of the numerical methods (FEM and SPH) in the design and optimization of structures, especially in the presence of quite uncommon materials (as natural/hybrid composites, rapid prototyping resins, not-uniformly reinforced concretes, post-treated ceramics). I have investigated the behaviour of these materials, as constituents of mechanical structures or industrial products, in a large range of different conditions (as static and dynamic loads, impacts, wear and so on). With this scope, part of papers refers to the experimental characterization of materials and components.

BIBLIOMETRY

SCOPUS **(12-06-2023)**

N. of articles	h-Index	N. of citation
118	**24**	**1872**

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2. *A. Pavlovic, A. Papavassilioua, G. Minak, Explosion response of carbon fiber composite structures in solar-hydrogen vehicles, Composite Structure. (in press)*
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4. **Pavlovic, A.**, Da Silva Moreira, M., Guilherme, C. E. M., Corra De Souza, J. H., Dos Santos, E. D., & Isoldi, L. A. (2025). Influence of Curvature Radius on Mechanical Behavior of Extruded 6061-T6 Aluminum in Roll Bending. Journal of Applied and Computational Mechanics.
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