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Key in proposal title or summary

"Optimization of Material Properties in 3D Printed Structures for Enhanced Performance in Aerospace Applications"

This research aims to explore the optimization of material properties in additive manufacturing (AM) for aerospace applications. By investigating novel composite materials and adjusting printing parameters, we aim to improve the mechanical strength, durability, and thermal resistance of 3D printed parts. The study will utilize advanced simulation techniques and experimental validation to develop a set of guidelines for producing high-performance AM

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summarising proposal based on language model

Summary:
This research focuses on improving the materials used in 3D printing for aerospace parts. By testing ne composite materials and changing how they are printed, the goal is to make these parts stronger, more durable, and better at withstanding heat. The study will use simulations and experiments to create guidelines for making high-quality 3D printed components that are lighter, more efficient, and more reliable for the aerospace industry.

Disciplines/Subfields:

1. Materials Science
    - Composite Materials
    - Polymer Science
    - Metallurgy
2. Mechanical Engineering
    - Structural Engineering
    - Manufacturing Engineering
3. Aerospace Engineering
    - Aerodynamics
    - Propulsion Systems

4. Additive Manufacturing (3D Printing)
    - Process Optimization
    - Material Development
5. Thermodynamics
    - Heat Transfer
6. Simulation and Modeling
    - Finite Element Analysis (FEA)
    - Computational Fluid Dynamics (CFD)
7. Experimental Techniques
    - Mechanical Testing
    - Material Characterization
8. Reliability Engineering
    - Failure Analysis
    - Life Cycle Assessment
9. Industrial Engineering
    - Production Efficiency
    - Quality Control

getting initial list of reviewers

name	h-index	gender	Content
reviewer_253	34.0	M	Aerospace Engineering Polymers Aeronautics Materials Materials Processing Material Characterization Mechanical Properties Materials Testing Nanostructured Materials Mechanical Behavior of Materials Aerodynamics Aerospace materials Research carried out in this sector is on the study of the thermal, optical, mechanic and electromagnetic properti of metal and composite materials with an organic matrix (thermosetting and thermoplastic). Dimensional stability, thermal-optical properties and thermal ageing of materials a the factors that influence the properties of space structures such as telecommunication antennae. For this purpose, Marchetti attended specific courses at the Euratom of Ispra (1976, Prof. Crivelli Visconti), the Stuttgart DFVLR (Profs. Tsai and Springer) and the Imperial College, London (Prof. Matthews). Certain materials are particularly studied, such as the new hybrid composite laminates in titanium (HTCL), higher-performing than titanium alloys. A further study secto regards the use of carbon fibres, reinforced carbon and silicon carbide matrix (C/C or C/SiC) for reusable space vehicles, heat

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			protection systems, space probes and vehicles with sustained hypersonic speed. The use of carbon/carbon is decisive but is not available in Italy. Marchetti collaborated with the ENEA, th Archer Company of London and with the Zurich Polytechnic (Prof. Alberto Ortona) in the production of C/C plates using various production processes, PIP (Pyrolysis infiltration process) and CVI (Chemical Vapour Infiltration) to obtain a higher-performing material such as silicon carbide. In this fiel much research has been developed on the manufacturing technologies of composite materials: lay-up, filament windin resin transfer moulding, pultrusion, squeeze casting, diaphragm forming. In 2009, in collaboration with Prof. Ricarc Santamaria of the Istituto Nacional del Carbon (INCAR) Ovied Spain, Marchetti developed an original experimental set-up fc carbon fibre production using pitch produced from oil extraction. Prototypes were realized for different aeronautical applications, in particular in the field of helicopters in collaboration with the Agusta Westland Company. In the SASLab laboratory, installations, methodologies and procedures were developed for the thermo-mechanic characterization of metallic materials, composites, films, textiles, rubbers and foams in line with the main internationa standards (ASTM, ISO, UNI, ECSS). All technologies are implemented with numerical codes. A remarkable piece of work, recognized and widely used at an international level, was carried out on Filament Winding that led to the realizatio of a code for the generation of non-geodetic winding trajectories on an axial-symmetric and non-axial-symmetric body, taking into account both the optimization of the best trajectories of the fibre on the spindle and the structural behaviour of the product. This work, within a Brite-Euram EEC programme, has produced numerical codes later verified by national industries, Agusta Westland, and Entec, Bolens internationally. The code named Arianna was thereafter utilized by the space industry for the Italian Vega launcher an for the design and construction of pressure tanks for jet engines.
reviewer_254	61.0	M	Professor of the Mechanics of Materials My research is focusse on the thermo-mechanical behaviour of various composite systems, including certain types of surface coating. There is a

name	h-index	gender	Content
			emphasis on processing and also on the development of analytical and numerical models - both for process simulation and for prediction of thermo-mechanical performance.
reviewer_157	36.0	M	Smart Materials & Manufacturing He actively pursues research on Smart Materials, Bio-composites, Metamaterials, Robotic Materials, 3D and 4D Printing (Additive Manufacturing) Technologies
reviewer_47	57.0	M	Materials Science and Engineering ENGINEERING GENERAL ro Eliaz's research is multidisciplinary and combines fundamental research with applied research and development. Examples include: (1) Additive manufacturing (AM), either from powders or from electrolyte solutions; (2) Development of novel electrochemically-deposited calcium phosphate coatings for dental implants; (3) Development of functional electrochemical coatings (e.g. rhenium coatings that are resistant at high temperatures and in aggressive environments for aircraft, aerospace and catalysis applications); (4) Materials for space applications; (5) The use of Bio-Ferrography for diagnosing osteoarthritis or cancer, determining the efficacy of drug treatments, and monitoring the wear of artificial joints; (6) Corrosion, hydrogen interactio with materials, and failure analysis. The products of his research are being used in defense organizations and implant companies.
reviewer_227	48.0	F	Materials Science and Metal Engineering Development & characterization of new materials incroporating PCM for TES applications in buildings

name of reviewer	rating	list of expertise	reason why this reviewer may be a good fit
reviewer_254	90	Thermo-mechanical behaviour, Composite systems, Analytical and numerical models	Reviewer_254 has a strong focus on the thermo-mechanical behavior of composite materials, which is directly relevant to the proposal's aim of improving materials for 3D printing in aerospace. His expertise in process simulation and performance prediction aligns well with the research goals.

name of reviewer	rating	list of expertise	reason why this reviewer may be a good fit
reviewer_157	85	Smart Materials, Bio-composites, 3D and 4D Printing Technologies	Reviewer_157's research on smart materials and additive manufacturing technologies makes him a suitable reviewer for the proposal. His experience with 3D printing and material development is particularly relevant to the study's focus on enhancing the properties of aerospace parts through innovative printing techniques.
reviewer_47	80	Additive manufacturing, Materials for space applications, Corrosion, Failure analysis	Reviewer_47's multidisciplinary approach, including work on additive manufacturing an materials for aerospace applications, positior him well to evaluate the proposal. His background in failure