INTERNATIONAL WORKSHOP ADITIVE MANUFACTURING

2ND INTERNATIONAL WORKSHOP

ADDITIVE MANUFACTURING AND SUSTAINABILITY

BOOK OF ABSTRACTS

IWAM 24

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Editors:

João da Rocha e Silva, Instituto Politécnico de Bragança, Portugal;

João Eduardo Pinto Castro Ribeiro, Instituto Politécnico de Bragança, Portugal

Jorge Santos, Instituto Politécnico de Bragança, Portugal

Rui A. Lima, Universidade do Minho, Portugal

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WELCOME

We are pleased to present the International Workshop on Additive Manufacturing and Sustainability Book of Abstracts. This compilation brings together researchers, professors, and innovators from around the world who are advancing additive manufacturing (AM) and sustainable practices.

As the global community prioritizes environmental responsibility, additive manufacturing has emerged as a transformative technology capable of revolutionizing industries while reducing ecological footprints. This workshop unites advanced research, innovative applications, and progressive strategies to examine how additive manufacturing can enhance sustainability.

Within these pages, you will find a diverse array of abstracts showcasing ground-breaking work in areas such as:

Sustainable materials and processes in AM,

Energy efficiency and waste reduction,

Circular economy and lifecycle analysis,

Each contribution reflects a commitment to addressing the challenges and opportunities at the intersection of technology and sustainability. We hope this collection not only informs but also inspires collaboration and innovation among participants.

We are profoundly grateful to the authors, reviewers, and organizers whose unwavering commitment has enabled the publication of this book. A special thank you to our sponsors and partners for their unwavering support in bringing this workshop to life.

We appreciate your participation in this wonderful adventure. Let's work together to advance sustainability and innovation!

Warm regards,

The IWAM 2024 Organizing Committee,

João Rocha

João E. Ribeiro

Jorge Santos

Rui Lima

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Study, design, and manufacturing of 3D-printed orthoses

B. Nogueira[1], João Rocha[1,2]

[1]Instituto Politécnico de Bragança, 5300-253, Bragança, Portugal

[2]GICoS, Instituto Politécnico de Bragança, 5300-253, Bragança, Portugal

(*)Email: a51814@alunos.ipb.pt

This study highlights the growing presence of three-dimensional (3D) printing in everyday life, particularly in the manufacture of customized medical devices. In the field of additive manufacturing (AM), Material Extrusion (MEX), ISO/ASTM 52900:2023, (fused deposition modeling (FDM)) has become a widely used technique due to its affordability, accessibility, and ability to create personalized solutions.

In this case, a 3D-printed hand orthosis was designed to assist a woman suffering from tendinitis in her thumb. The orthosis was designed to reduce pain and provide support to improve her daily functionality. Material Extrusion (MEX), FDM technology was used to build the device layer by layer, resulting in a lightweight yet durable structure tailored to the patient's needs.

One of the key benefits of 3D printing in orthotic design is the ability to create customized, patient-specific solutions at a lower cost than traditional manufacturing. In addition, rapid prototyping allows for quick modifications based on patient feedback, improving comfort and effectiveness.

This study reinforces the potential of 3D printing in medical applications and demonstrates how FDM-printed orthotics can help alleviate pain and improve quality of life for people with musculoskeletal conditions. As the technology continues to evolve, personalized healthcare solutions will become more accessible and efficient.

Keywords: 3D Printing in Orthotics, Material Extrusion (MEX), Fused Deposition Modeling (FDM), Customized Hand Orthosis, Additive Manufacturing in Healthcare