BUTTERFLIES Project Bio-Polymers & Additive Manufacturing

PRESS RELEASE

Europe Embarks on Biointelligent Manufacturing Revolution with Launch of 'BUTTERFLIES'

August 2025, The newly launched EU Horizon Europe research and innovation project **BUTTERFLIES** *(Advanced hyBridised manufactUring Technique for nexT generation oF bio-intelLIgent componEntS)* sets out to usher in a new era of biointelligent manufacturing. With a total **funding of €5.67 million** from the European Union via the European Health and Digital Executive Agency (HADEA), this **36 month** effort brings together **13 leading organisations** from across Europe.

Coordinated by **The Manufacturing Technology Centre (MTC)** in the UK, **BUTTERFLIES** aims to pave the way for the large-scale adoption of chitin- and chitosan-based biopolymers in highly advanced additive manufacturing (AM), specifically through binder jetting (BJT) and two-photon polymerisation (2PP).

Biointelligent Manufacturing:

Technology Inspired by Nature

At the heart of **BUTTERFLIES** lies a radical vision: **to harness natural biopolymers and adapt biological processes** to meet the demands of next-generation manufacturing. The project explores chitin, the second most abundant biopolymer on Earth, obtained largely from crustacean shells, and its deacetylated form, **chitosan**, as key input materials.

These bio-resources will be engineered into:

- **Chitin nanocrystal cross-linkers** for binder jetting, offering high-resolution, solvent-free printing.
- **Photocurable chitosan resins** for 2PP, enabling nanoscale precision suitable for applications like organoids and microstructures.

This nature-based approach not only promotes environmental sustainability but also reduces reliance on petroleum-based plastics and conventional synthetic polymers used in current AM technologies.

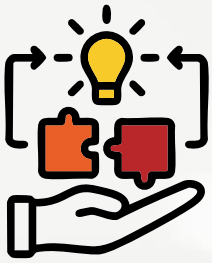
A Continental Collaboration Across Borders and Disciplines

BUTTERFLIES is powered by a diverse and interdisciplinary consortium.
Alongside **MTC**, the project includes:

- **Fraunhofer** (Germany)
- **TECNALIA** (Spain)
- **Vital3D Technologies** (Lithuania)
- **Experimentica** (Lithuania)
- **3Drivers** (Portugal)
- **CONCR3DE** (Netherlands)
- **Optimus 3D** (Spain)
- **ASA Spezialenzyme** (Germany)
- **EWF** (Belgium)
- **ICONIQ Innovation** (UK), responsible for the exploitation strategy
- **ValueData** (Germany), specialising in digital tools
- **EMPA** (Switzerland) as an associated partner

Together, these institutions bring expertise in:

- **Biotechnology**
- **Materials engineering**
- **Biochemistry**
- **Mechanical design**
- **Standardisation**
- **Market deployment**



Ensuring a continuum from lab-scale innovation to industrial application.

Initial target use-cases include **biomedicine** *(e.g., tissue scaffolds, organoids, orthotic devices)* and functional **micro-devices for diagnostics**.

Key technological breakthroughs anticipated include:

- New classes of bio-based printable materials
- Scalable hybrid manufacturing workflows, combining high precision with production throughput
- Automated, intelligent design and manufacturing workflows rooted in nature-inspired biomimetics

By leveraging laser beam shaping, multi-beam processing and custom binder formulations, the project will also demonstrate pathways to industrial-scale 2PP and BJT manufacturing.

A Model for Sustainable Innovation in Europe

Through applied research, demonstrators, open-access case studies, and community engagement, **BUTTERFLIES** will **promote the adoption of climate-friendly biomanufacturing across various sectors**, aligning with the EU Green Deal and digital transition goals under Horizon Europe Cluster 4 programmes.

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Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them. Project Number: 101178321.