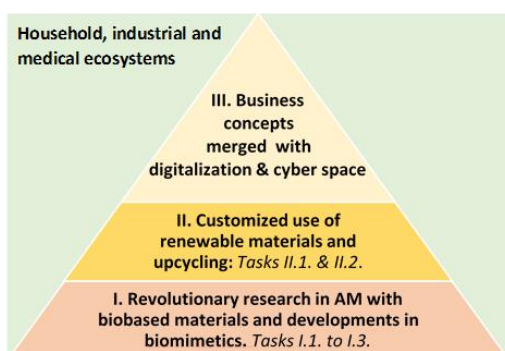


3D-Manufacturing of Novel Biomaterials



Industrial biorefineries are in great role in implementing national bioeconomy strategy and promoting the development towards renewable resource utilization. The grand challenge in biorefining is the full utilization of biomass into high value-added products. In our *3D-Biomat* project, we will provide valorization pathways to overcome this gap. Our project combines the bioeconomy with the megatrend of digitalization via research and development of novel biomaterials with digital design and advanced 3D-additive manufacturing techniques including production value chains and business models. This production route will offer revolutionary pathways for biorefining and enable novel distributed, local and small to medium scale production opportunities. The *3D-Biomat* route will also promote the circular bioeconomy.

The *3D-Biomat* research is divided to three thrust areas covering (I) fundamental research of polymeric biomaterials, (II) use of the materials developed and, (III) creation of business and cyber/digitalization concepts, each having their respective main objectives and specific hypotheses. We will achieve dramatically new material concepts and production value chains by combining novel biomaterials with the fast-developing 3D-additive manufacturing technologies. Materials and technology research meet in this integrated approach and in consideration of the relevant ecosystem, from household to industrial environments.



Our project merges together three renowned research lines in a complementary way: Prof. Seppälä group's excellent background in polymer synthesis especially in biopolymer synthesis and functionalization; Prof. Rojas group's

internationally recognized lignocellulose chemistry and engineering towards plant derived hierarchical materials; and Prof. Partanen group's world-leading research in additive manufacturing (AM), especially in high resolution stereolithographic. The 3D-Biomas consortium covers research of the whole value chain: from digital product design, to novel material and production technologies as well as demonstration of the products. Our focus is on converting digital information to design and individualized high performance products.

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