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The opportunities for direct digital manufacturing in medicine

Direct Digital Manufacturing is a set of technologies which are set to revolutionize manufacturing. Direct Digital Manufacturing is able to directly produce an object from a digital definition without the use of moulds or other specific tooling. As such it is particularly suited to objects or process which require mass customisation. This clearly has huge potential in the field of medicine and healthcare for which personalisation is a critical requirement for many devices. Direct Digital Manufacturing involve additive manufacturing procedures which include 3d printing, stereolithography and selective laser melting. We review these technologies with regard to their potential for medical applications and we consider the changing landscape of direct digital manufacturing as it develops the capacity for functionally graded materials, functional materials and the move from design by form to design by function. We illustrate the possibilities using current projects from the broad based portfolio of work on direct digital manufacturing currently underway at CDRSP. A major use of direct digital manufacturing is the generation of scaffolds for tissue engineering. However, the scope for medical applications of direct digital manufacturing is much wider than that and we speculate on the future trends.

Biography

Geoffrey Mitchell completed his PhD in Materials Physics working at Cambridge. He undertook postdoctoral studies at Hokkaido University and subsequently moved to the University of Reading UK where he eventually became Professor of Polymer Physics. He is currently Vice-Director of the Centre for Rapid and Sustainable Product Development, a leader in the development of Direct Digital Manufacturing especially in the application of such technology to medicine. He has published more than 300 papers in reputed journals and 4 books.

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