Special Issue on

Additive Manufacturing (3D Printing) in Medicine and Dentistry

Call-for-Papers

Manufacturing took a different turn in the early 80’s when additive manufacturing (3D printing) was first used in rapid prototyping, and commercial 3D printing machines appeared in the market. Since then, the world has seen such an unparalleled progression that 3D printing is now widely accepted as one of the key technologies in the so-called fourth industrial revolution or Industry 4.0. Today, 3D printers are used to manufacture end-use products rather than mere prototypes. 3D printing technology turns traditional manufacturing process upside down, because materials are added to build parts rather than being removed, as the computer-controlled machine deposits material layer-by-layer to build a product. 3D printing technology is disrupting because, to a large extent, it does away with tooling during product development, reduces assembly processes and shortens supply chains. Design freedom and environmental friendliness are other advantages.

This special issue focuses on the exploration and analysis of the trends and activities taking place worldwide regarding the exciting area of 3D printing technology in medicine and dentistry. The theme focuses on the manufacturing aspects rather than pure medical and dental details.

This special issue welcomes contributions on innovations and applications of 3D printing in the areas that include, but not limited to,

1. Medical modeling and non-implanted medical devices: 3D printing of medical models and non-implanted medical devices, includes the printing of models of human tissues, structures and organs, braces, splints, glasses, hearing aid devices, prosthetic and orthotic devices, etc.; as well as dental models such as braces, splints, crowns, bridges, veneers, drill guides, partial dentures and frames, and customized orthodontic aligners.

2. 3D printing of medical implants, which are manufactured to replace a missing biological structure, and support a damaged anatomic structure.

- Metal 3D printing of personalized artificial joints
- 3D printed personalized implants for cranio-maxillofacial injuries, trauma, and birth defects
- 3D printed dental implant bars and implant supra-structures

3. 3D printing for tissue engineering and regenerative medicine applications:
- 3D printing of scaffolds for tissue engineering
- Biomaterials for the manufacture of biologic substitutes with 3D printing, including various ceramics and polymers: non-degradable and degradable materials
- Bioprinting of living cells for tissue fabrication
- New bioprinting processes and their underlying physics
- Development of new bioinks and their processability and bioprintability
- Development of new bioprinter technologies

4. 3D Printing Technologies for Medical Devices:
- Laser-based fabrication of medical devices
- Laser-based additive manufacturing techniques for processing of biomaterials
- Enhanced functionality of laser-processed biomaterials over conventionally-processed materials
- 3D Printing Technologies for drug delivery and bio-sensing

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