

Additive Manufacturing Research and Applications

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1. Introduction and Scope

Additive Manufacturing (AM) has undergone somewhat of a revolution over the last decade and it has now evolved into a viable industrial manufacturing solution, able to create complex geometries which are unachievable with traditional manufacturing methods. Thus, AM is becoming more and more capable of redefining the manufacturing landscape. There have been significant advances made in the existing ecosystem for AM in the areas of design digitization, deposition methods, printer capabilities, component geometry re-imagination, and post-processing methods. Big data and machine learning are each reaching a level of maturity whereby they have become capable of assisting in targeted, rapid problem-solving.

However, further research is required to overcome many challenges faced by additive manufacturing today, particularly in the research area of powder manufacturing technologies in 3D printing, pre-and post-processing technologies and approaches, AM processes and optimizations, inspection processes and quality evaluation, as well as new materials for 3D printing, design and simulation in AM (topology optimization, microstructure design), new materials in 3D printing such as silicone, new AM machine design, and development, etc.

2. Contributions

This Special Issue offers a wide scope in the research field around 3D printing, including the following [1–18]: the use of 3D printing in system design, AM with binding jetting, powder manufacturing technologies in 3D printing, fatigue performance of additively manufactured metals such as the Ti-6Al-4V alloy, 3D-printing method with metallic powder and a laser-based 3D printer, 3D-printed custom-made implants, laser-directed energy deposition (LDED) process of TiC-TMC coatings, Wire Arc Additive Manufacturing, cranial implant fabrication without supports in electron beam melting (EBM) additive manufacturing, the influence of material properties and characteristics in laser powder bed fusion, Design For Additive Manufacturing (DFAM), porosity evaluation of additively manufactured parts, fabrication of coatings by laser additive manufacturing, laser powder bed fusion additive manufacturing, plasma metal deposition (PMD), as-metal-arc (GMA) additive manufacturing process, and spreading process maps for powder-bed additive manufacturing derived from physics model-based machine learning.

3. Conclusions and Outlook

This Special Issue of *Metals* was well supported by a diverse range of submissions and consists of a final publication of 18 high-quality peer-reviewed articles. As Guest Editors of this Special Issue, we are very pleased with the final result and hope that the present papers will be useful to researchers and designers working on the area of additive manufacturing. We would like to warmly thank all the authors for their contributions and all reviewers for their efforts to ensure a high-quality publications. At the same time, we would also like to thank the many anonymous reviewers who assisted in the reviewing process. Sincere thanks are also owed to the Editors of *Metals* for their continuous help, and to the *Metals*



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