

# International Conference on **Medical Physics**

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### **Additive manufacturing – basic research activities in the area of powder and beam based processes**

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So called 3D-Printing processes offer nearly unlimited freedom of part-design. Due to this fact, the processes are spotlighted especially for building complex, highly individualized parts, like implants. Despite the high theoretical potential of 3D-Printing processes related to production of complex products, only few of them meet the requirements for real 'Additive Manufacturing' of small lot size series. Often powder and beam based processes are ascribed to meet requirements of industrial production. Powder and beam based processes are a well-established technologies for rapid prototyping applications (known for example as Selective Laser Sintering – SLS), although there is still a deficit in basic process knowledge. Considering the demands of series production, especially of sensible products like implants, the powder and beam based techniques are faced with various challenges concerning suitable material systems, process strategies and part properties. Consequently, basic research is necessary to understand and optimize processes in order to enable a shift from rapid prototyping to rapid manufacturing of small lot sized series. A better understanding of the manifold interactions between materials, processes and resulting part properties are fundamental. State of the art is a strong variation of part properties even for superficial equal processing or material conditions. An explanation for this fact might be competing and superposing effects, which are not understood yet. The Collaborative Research Centre 814 – Additive Manufacturing (CRC 814), established 2011 in Erlangen by German Research Foundation (DFG), investigates further mentioned interactions. Therefore metal as well as polymeric powders are focused. Furthermore the built up of multi-level simulation models and the setup of inline measurement systems is performed. Within the lecture an overview about the interdisciplinary research activities of CRC 814 is given.

#### **Biography**

Maximilian Drexler graduated in 2011 his studies in mechanical engineering at the Friedrich-Alexander-University Erlangen-Nuernberg, Germany. In the same year he started his scientific work within the Collaborative Research Centre 814 – Additive Manufacturing. In 2013 he became managing director of this research project. Maximilian Drexler published over 10 papers facing the selective beam melting process.

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#### **Notes:**