On an annotated bibliography…

The following annotated bibliography deals with 3D Printing, from its polymers to its future in the manufacturing industry. As a continuation to our reading of Cradle to Cradle, 3D printing with the correct polymers can result in a more ideal product lifecycle. The advancement of biopolymers and the hyperlocal manufacturing offered by the additive making process allow designers to reduce manufacturing's footprint. This follows my post from last week, notably the products made by Batch.Works.

Gary Chinga Carrasco (2019). *Novel Biocomposite Engineering and Bio-Applications*. [online] MDPI. Available at: https://doi.org/10.3390/books978-3-0365-1737-7.

This book is a collection of articles by various researchers and details advances in 3D printing nanotechnology as it relates to the biomedical field. More examples are provided on grafts and prothesis with many authors delving into the chemical compositions of the inks they are researching for these procedures. These articles are a very in-depth and require a higher knowledge of medicine and chemical engineering but even with a base understanding, the exciting possibilities are apparent.

Izdebska-Podsiadły, J. (2022). *Polymers for 3D Printing*. William Andrew.

The author introduces 3D printing, from the basics to the more advanced. While the other books detail processes and procedures associated with additive manufacturing, this book differs in that is delves into more depth with the polymers used in the printing. Written by a collection of scientists and professors, each contributing to their field of study. Of particular note is chapter 18 on polymer biomaterials which could allow for the printing of artificial skin to act as

wound treatment. This chapter details not only the applications, but also the requirements of the polymers and the properties necessary for printing of this complexity.

Ralf Anderhofstadt and Disselkamp, M. (2023). *Disruptive 3D Printing*. [online] Carl Hanser Verlag GmbH Co KG. Available at: https://app.knovel.com/hotlink/toc/id:kpDDP00001/disruptive-3d-printing/disruptive-3d-printing.

This book covers two sides of the additive manufacturing industry, written by a business coach and the Head of Additive Manufacturing for Daimler trucks. The first is a very top down introduction to 3D printing detailing the technical aspects involved in additive manufacturing (vs more common subtractive). Multiple interview segments with various industry CEO's discuss the advantages of this type of manufacturing. Different materials are also discussed at length in this first chapter. The second part looks at industry disruptions as a consequence of using 3D printing. Due to its unique business model, logistics and warehousing among others risk losing their place in the business status quo as consumers become "prosumers", a term used to describe a customer more involved in the product manufacturing process. The authors believe in 3D printing's ability to seriously change the way products are made and role in which consumers will play in their manufacturing. It is written to introduce additive manufacturing and to predict the disruption to the supply chain to come if more companies choose to employ this business model.

Sheng, R. (2022). *3D Printing*. [online] Woodhead Publishing. Available at: https://doi.org/10.1016/C2021-0-02154-4.

While still a large proponent of 3D printing, this book is less about the disruption to existing industries and more about introducing the various industries that currently utilize 3D printing. Written by an engineer with 30 years of

experience at companies like Boeing and GE, the goal is to help fellow engineers possess the skills necessary to apply existing additive manufacturing techniques to their industries. 18 different industries are profiled – from fashion to aerospace. The challenges of 3D printing are also discussed.