

**Introducing 3D Printing into the Production Chain:**

***Modeling the Effects and Providing Guidance Using Data  
Analysis and Advanced Modeling***

*Prof. Stefanie Mueller*

**2020-2021 Seed Project Report**

**MIT Portugal Partnership 2030**

**MIT** Portugal

## 1. PROJECT TEAM

### MIT Principal Investigator:

- Prof. Stefanie Mueller, MIT Electrical Engineering and Computer Science (EECS), joint with MIT Mechanical Engineering (MechE), Computer Science and Artificial Intelligence Lab (CSAIL), <http://www.stefaniemueller.org/>

### Research Team and Collaborations:

- **Portuguese Academic Collaborator:** Prof. Samuel Moniz, University of Coimbra, Faculty of Sciences and Technology, Industrial Engineering and Management, <http://www.uc.pt/go/samuelmoniz>
- **Portuguese Industry Collaborators:** Ikea Industry Furniture/Retail Company, Amkor Technology Portugal
- **US Industry Collaborators:** Ford Automotive

**SUMMARY-** Additive manufacturing, such as 3D printing, holds the promise to significantly change how products are manufactured. For instance, the ability to produce products in one piece rather than multiple parts significantly reduces the need to develop specialized tools and equipment for assembly and eliminates assembly time. In addition, since 3D printing can create parts on-demand, warehouses that stock large quantities of replacement parts are no longer needed. While 3D printing holds great promise, it is difficult for companies to estimate the effect of introducing 3D printing into their production chains. The goal of our project is to use data science techniques and advanced modeling approaches to provide production managers with information on how 3D printing would impact their production chain. This will allow production managers to determine if they should switch to 3D printing and if yes, what steps need to be taken to adapt the production chain.

## 2. OUTCOMES & ACHIEVEMENTS

### Research:

- Joint journal paper between Prof. Mueller (MIT) and Prof. Moniz (University of Coimbra) submitted to the 'Journal of Manufacturing Systems', paper is titled: 'Introducing Additive Manufacturing in Supply Chains: Challenges and Opportunities'.
- The research was also presented as a poster at the annual MIT Portugal conference.

### Visiting Students:

- Prof. Moniz PhD student Paulo Nascimento is visiting Prof. Mueller's lab from February 2022 – May 2022.

### Fellowships:

- Prof. Moniz PhD student Paulo Nascimento received an FCT-MPP2030 PhD grant for which Prof. Mueller provided a support letter.

### Co-Advising:

- Prof. Mueller is a co-advisor of PhD student Paulo Nascimento together with Prof. Moniz.