



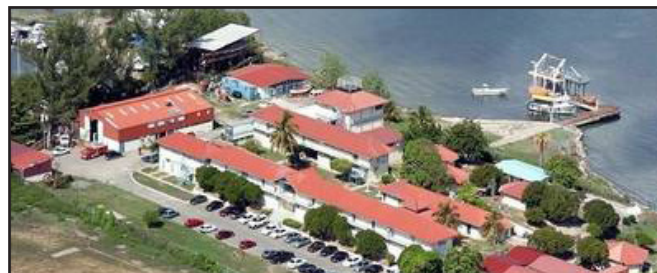
## The Effects of Tropical Marine Climate on 3D Printing - Strategies to Combat Hygroscopy of Plastic Filaments

**Erica C. Simmons**

*Caribbean Maritime University, Kingston, Jamaica*

### Abstract:

This paper discusses the challenges faced with 3d printing thermoplastics at the Caribbean Maritime University in the tropical marine climate of Kingston, Jamaica and the strategies implemented to overcome these issues. 3D printing or additive manufacturing has brought about massive changes in the manufacturing sector and will continue its disruption cycle for some time to come. Today plastic continues to be the leading 3D printed material for its cost, flexibility and durability. Some of these plastic materials also known as “filaments” are hygroscopic meaning they tend to attract and absorb moisture from the air. The materials such as nylon and polyvinyl alcohol (PVA) are significantly affected by moisture in the air and the results typically include poorly printed parts or in some cases in near liquid form. At the Caribbean Maritime University, the team performed research and development that has sought to improve the Additive Manufacturing factory’s humidity levels to protect the filaments integrity and performance. In addition, to preserve the strength and performance of the filaments, the use of desiccants and filament drying techniques were tested. Implementing these strategies has brought significant improvements in 3D printing strength and quality. This paper gives before and after examples of the research project.



### Biography:

Erica Simmons is the Executive Director, Centre for Digital Innovation & Advanced Manufacturing (CDIAM) at the Caribbean Maritime University in Kingston, Jamaica. A patented inventor, Mrs. Simmons is a leader in Digital Transformation. She is an IEEE Sr. Fellow and holds a degree in Sociology from the University of North Texas.

### Publication of speakers:

1. Berkowitz, Michael. (2007). Erica B. Simmons. Hadassah and the Zionist Project. :Hadassah and the Zionist Project. *American Historical Review*. 112. 1508-1509. 10.1086/ahr.112.5.1508.
2. Slater, Dan & Simmons, Erica. (2010). Informative Regress: Critical Antecedents in Comparative Politics. *Comparative Political Studies - COMP POLIT STUD*. 43. 886-917. 10.1177/0010414010361343.
3. Simmons, Erica. (2014). Grievances do Matter in Mobilization. *Theory and Society*. 43. 513-546. 10.1007/s11186-014-9231-6.

[International Conference on Manufacturing : 3D Printing, Robotics & Automation | May 21, 2020 | London, UK](#)

**Citation:** Erica C. Simmons; The Effects of Tropical Marine Climate on 3D Printing - Strategies to Combat Hygroscopy of Plastic Filaments, *Advanced Manufacturing* 2020: May 21, 2020; London, UK