### Additional Reading

* G. Zhao, G. Ma, J. Feng, W. Xiao, Nonplanar Slicing and Path Generation 725 Methods for Robotic Additive Manufacturing, The International Journal of Advanced Manufacturing Technology 96 (2018) 3149–3159.
* Satyandra K. Gupta - umd alum and did a crapton of conformal printing stuff
* “Support structures should be avoided because of a long build time, overall cost increase, material wastage, and need of post-processing. **Conventional 14 Journal Pre-proof 3 DOF systems are not capable of providing the dexterity required to avoid printing support structures**. Adding more DOF to a deposition head or build platform enables a change in the direction of deposition [60]. Robots can pro255 vide this functional capability in AM due to additional DOFs. Having support structures can then be avoided or minimized for a given build. This supportless AM methodology differs from the multi-directional AM due to the consideration of relative orientation between the tool and the build platform. Unlike multidirectional AM, where the material deposition is always planar, supportless AM 260 makes use of additional DOFs provided by the system to orient the deposition tool or the build platform to minimize or eliminate the need for support structures [61]. **Because of this, the effective tool path traced by the deposition head can be non-planar in space [62] which is not the case in multi-directional AM**.”
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