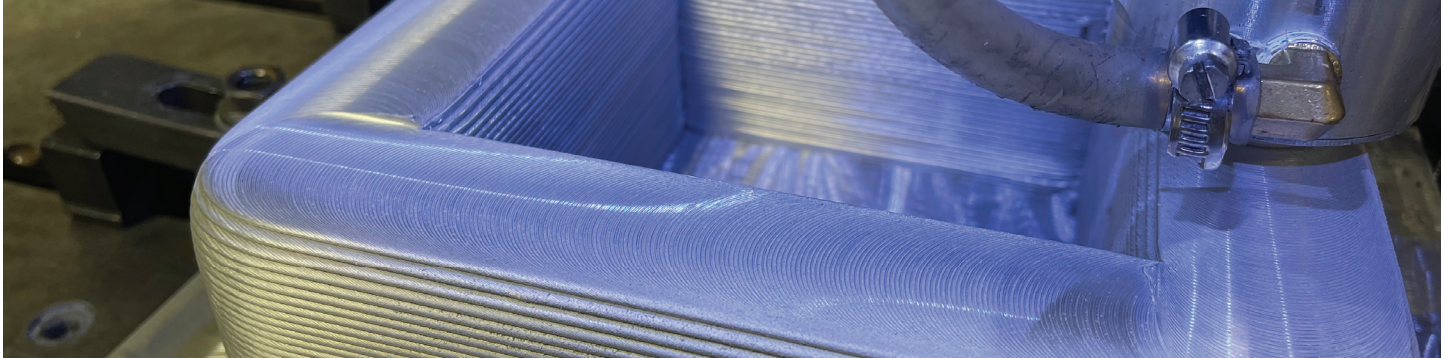
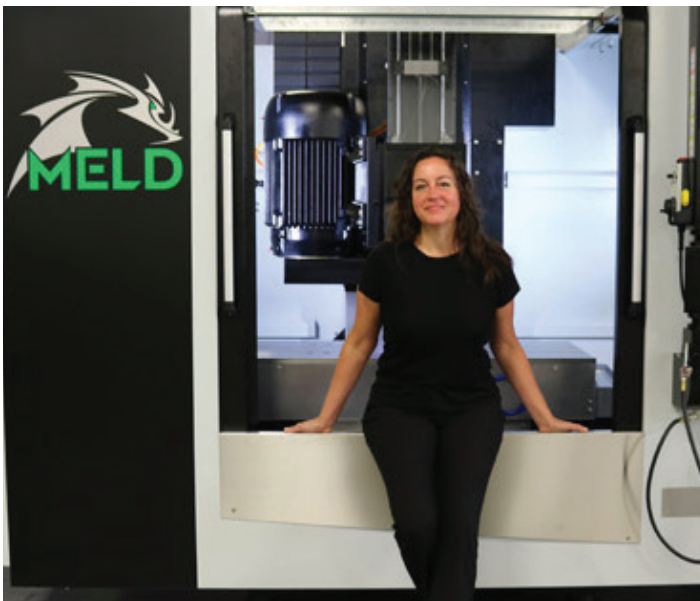


# 3D Printing of Solid Metal Parts



Created in 2018, the MELD Manufacturing company has developed a metal 3D printer that looks a bit special: while most current solutions are based on the process of melting metal particles, this machine operates by friction and pressure in order to achieve a deformation of the material. The metal can be deposited layer by layer in the open air, thus removing the constraint of a closed chamber filled with gas. MELD technology also offers the possibility of repairing existing parts, such as the process of depositing material under concentrated energy, adding features to the part or reworking the coating. It is thus compatible with more metals and allows the manufacture of larger parts. We met with the company's founder and CEO, Nanci Hardwick, to learn more about this innovative process.



## **Can you introduce yourself and your link with additive manufacturing?**

Hi, my name is Nanci Hardwick and I am an entrepreneur who has been developing MELD technology for over a decade now. I officially launched the company two years ago.

## **Why did you create MELD Manufacturing?**

I believe MELD has the power to redefine how we do things. The company contributes to a circular economy by reducing waste in manufacturing and allowing the reuse of materials and parts that would be discarded. With MELD, we help to make progress in environmentally friendly manufacturing, as it is energy and waste efficient and works in the open air.

## **How does your 3D metal printing technology work?**

MELD does not resemble any other printing process and belongs to its own category of processes because it does not melt metal. It actually relies on a thermo-mechanical process that produces very high pressure and friction: these allow the plastic deformation of the extruded material and the substrate on which the layers are deposited - remember that the plastic deformation corresponds to the irreversible transformation of a part that occurs by a rearrangement of the position of its atoms. It is a versatile technology because it can use any metal. It is simple and offers predictable results. It is fast and able to print the largest parts. It is also unique in its ability to repair existing parts.

## **What are the challenges of large format 3D printing? How do you overcome them?**

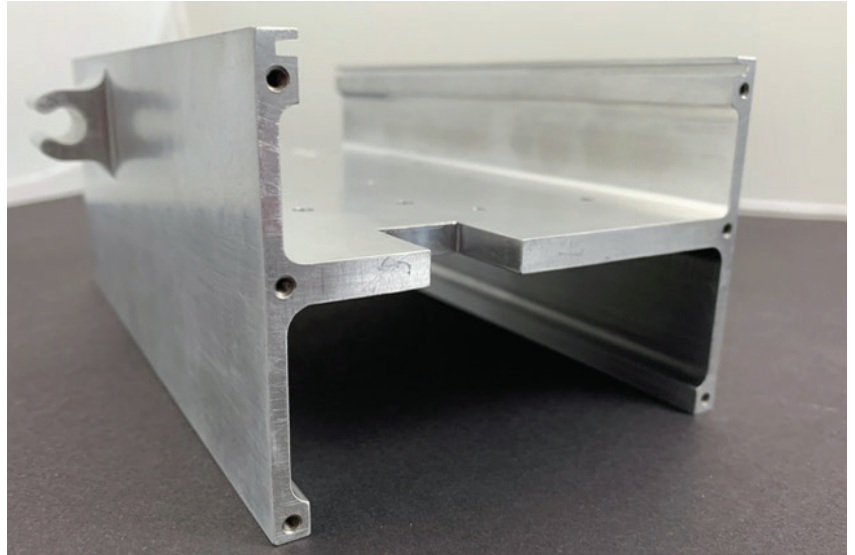
The main obstacle to large-scale 3D printing, that MELD has been able to overcome, is the printing environment. Fusion processes must be conducted in special chambers that protect the molten metal from oxygen during the construction of the part. Beyond costs, this limits feasibility. MELD technology does not use this melting process and can therefore be carried out in the open air, which makes it extremely flexible.

## **What type of applications is MELD Manufacturing suitable for?**

MELD machines can manufacture large parts in any metal. Whether users add features to parts such as bosses and ribs, build whole parts or repair them, the same machine meets their needs.

## **Who is your machine for?**

Some of the most important gains come from the use of MELD technology to print lightweight and highly resistant metals. For example, with MELD, you can print titanium parts. This very expensive material is often used in part geometries that see up to 90% of the material being machined away. This represents 90% waste. By printing the same part, we use only what we need, so much less material. This reduces the associated costs. The Ti64 printed with MELD technology exceeds the ASTM standard for forged materials. This means that you can now print parts that were previously only possible by forging. Currently, a user can wait two years before receiving some forged parts. It is therefore possible to reduce the manufacturing time from several years to a few hours, with less costs and less waste.



## **What are the future plans of MELD Manufacturing?**

We are working on other projects with high-value materials, as many of these metals cannot be used in other additive manufacturing processes at all. We look forward to expanding our international distribution network in 2021 and to completing our equipment offer. While we are excited about the size of the parts and the performance of the materials obtained with MELD technology, we still need to emphasize the ability to repair existing parts. Not only is re-use essential for our environment, but sometimes millimetres of material can save hundreds of thousands of dollars.

