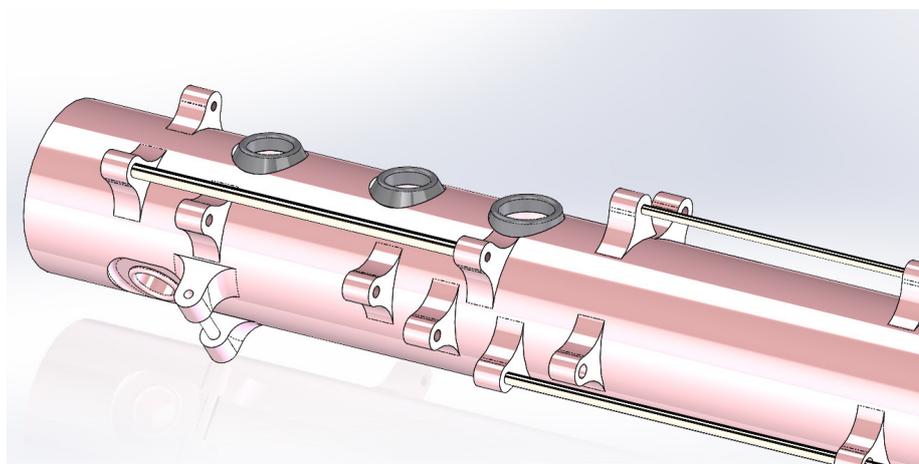


A schematic diagram of the one-handed clarinet by Sophie Hyman

# THE ONE-HANDED CLARINET

APRIL UPDATE



A CAD drawing of the top part of the one-handed clarinet body by Michael Sanders

## Digitising the One-Handed Clarinet

One of our most recent developments is fully digitising the existing one-handed clarinet. Peter Worrell, the inventor of the one-handed clarinet, worked with Michael Sanders to do this.

Michael is a CAD designer with a variety of different experiences, from point of sale display racks to cabinets for furniture makers. He also designs bespoke cases and wooden keywork for musicians. Michael has also designed and made flutes from unusual materials, using his knowledge of plastics and 3D printing. Michael is also a musician, playing at folk sessions

in Leicester where he is based. Michael accepted the challenge of digitising the one-handed clarinet, due to this interest in 3D printing.

As musicians and makers, Michael and Peter have been able to communicate easily throughout this process. Peter says; "We both talk the same language regarding components of an instrument and also share some of the same manufacturing techniques". They were able to draw the clarinet using the existing data. They also evaluated different manufacturing processes, allowing them to different ways the new instrument could be put together.

Thanks to Peter and Michael's work digitising the body of the instrument, we have started to have success with 3D printing...

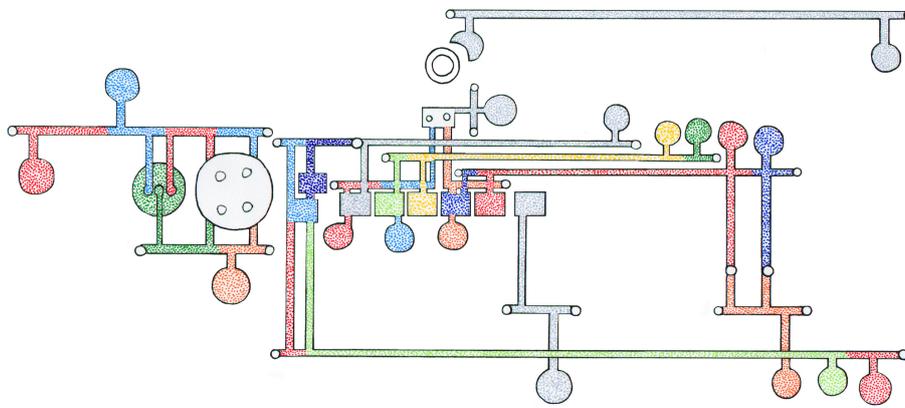
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# THE ONE-HANDED CLARINET

APRIL UPDATE



*A 3D printed one-handed clarinet barrel, bottom joint, top joint and bell by Sharon Jones*



*The first 3D printed one-handed clarinet components on the Ultimaker 2 3D printer*

## 3D Printing the One-Handed Clarinet for the First Time:

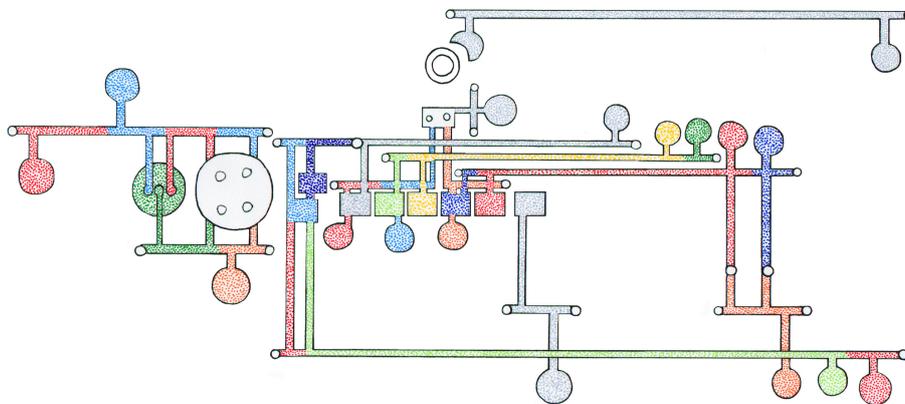
When Michael and Peter completed the CAD drawings, they were able to send them to our Team Lead, Sharon Jones. Sharon was able to print the components out of BASF Ultrafuse Pro PLA on an Ultimaker Extended 2+. PLA (polylactic acid) is a plant based polymer which is industrially compostable, but holds its shape in printed form for a number of years. The brand Sharon used has chemical additions which support hardening and also faster printing. The Ultimaker printers are hobbyist/industrial crossover machines. Sharon used the extended version as the body parts of the clarinet are longer than 20cm. The total printing time for our first prototype was 25 hours\*.

- Barrel - 2 hours 10 min
- Upper Joint - 8 hours
- Lower joint - 10.5 hours
- Bell - 4.5 hours

Currently the print is optimised for draft quality, rather than pushing for the quickest print time. The bell and barrel would be quicker on a smaller machine, as speed is limited on taller machines.

This 3D prototype has not only allowed us to begin testing the process of 3D printing, but it is also allowing Peter and Michael to check the positions and modifications they made when creating their CAD drawing. PLA is able to be machined (turned) quite well, although the cutter angles need adjusting to produce a good surface finish. It isn't currently possible to test the sound of material due to the printing process leaving a raised bead in the bore of the clarinet. Our next steps are to remove this raised bead, and to look at the different material options available to 3D printers. There is also continued work to do on quality and print finish, as well as dimensioning.

\*current print settings - wall 3, layer height 0.15mm, 10% infill, support and brim



# THE ONE-HANDED CLARINET

APRIL UPDATE



*Maria with her one-handed clarinet and SYOS mouthpiece*

## The One-Handed Clarinet in Context

In our monthly updates, we would like to highlight the difference that one of these instruments can make to someone's life. This month we asked the parents of Maria, who has recently started playing a one-handed clarinet...

"For us as parents, it means a lot. Something we never thought Maria would be able to do is to play an instrument, however, it is now possible. The price of the beautiful instrument was also out of budget, but now Maria has the opportunity to play on a high quality instrument."

"Having the huge opportunity to play an adapted clarinet is beyond our dreams, but thanks to incredibly amazing and generous people this was made possible. We are forever grateful and proud of the things Maria was able to achieve."

## NEXT MEETING:

Date: 16th April 2021

Time: 12:30

Access: Please email [rachel@ohmi.org.uk](mailto:rachel@ohmi.org.uk) to request a link to the meeting

Agenda:

- Brief intros
- Technical Update - 3d printed parts first POC - are they possible to work with?
- Next steps - updated prints? Amended files? Keywork? Assembly?
- OHMI Trust and Music Hubs updates - current situation of potential need for 2021/22 and Maria's progress
- Legacy - which parts of this model could be undertaken by others and what training would be desirable?
- Grant applications and support for grant writing
- AOB

