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Adaptation and Democratisation of the OHMI One-Handed Recorder

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Who Are We?

Birmingham City University

School of Jewellery



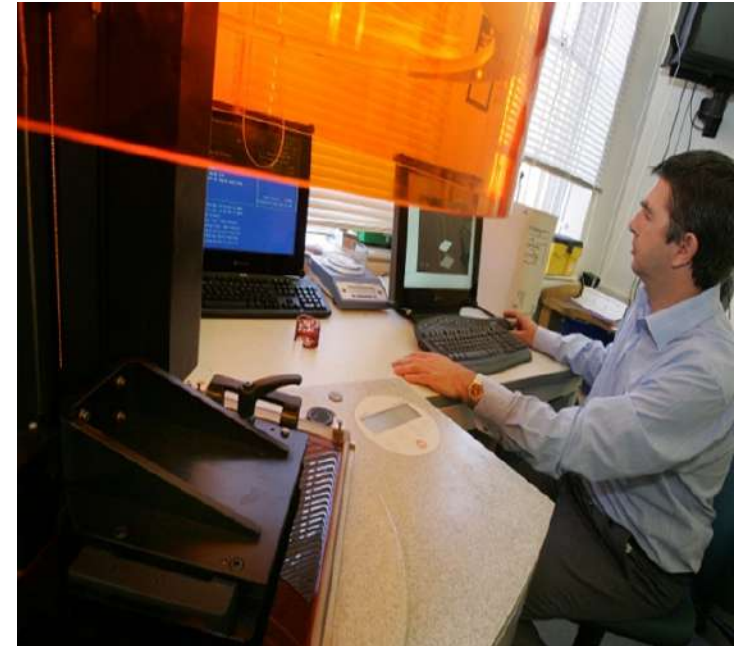


Established in 1890



Centre for Digital Design and Manufacturing

Technology Hub



Access to Digital Technologies

Laser Scanning



Computer Aided Design CAD

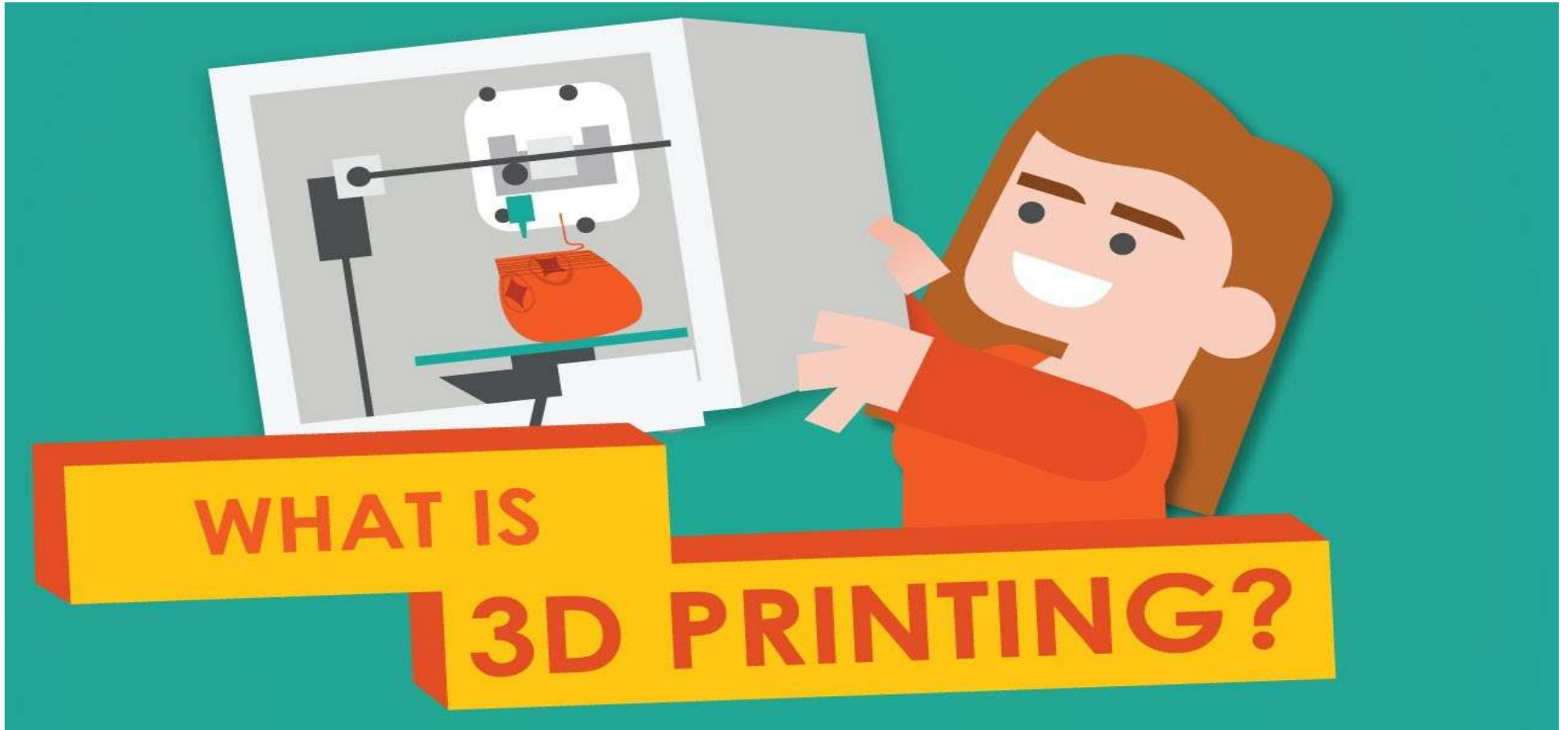
The School of Jewellery Has Considerable CAD Capability



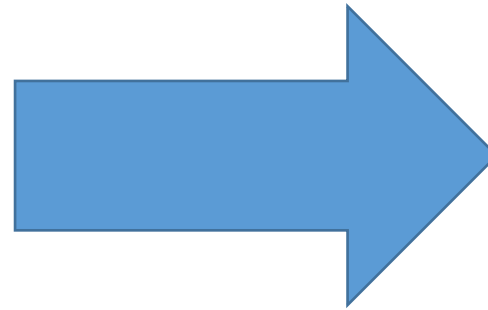
3D Printing

A Number of Different Technologies Available





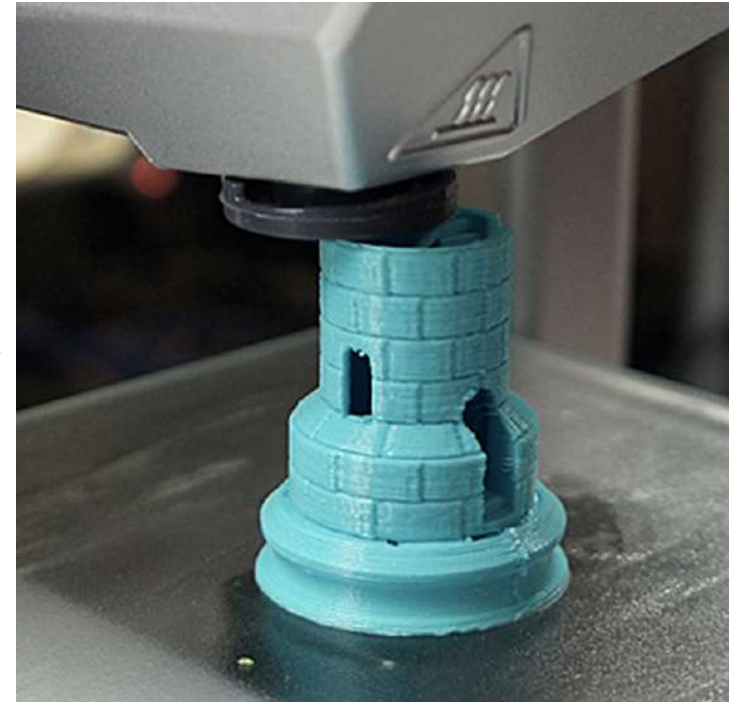
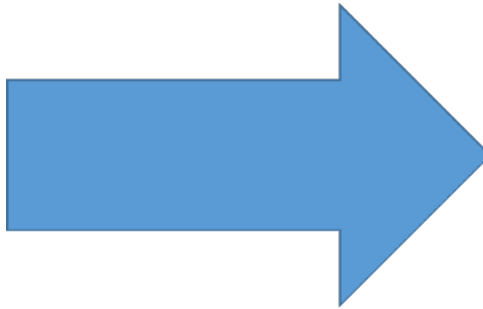
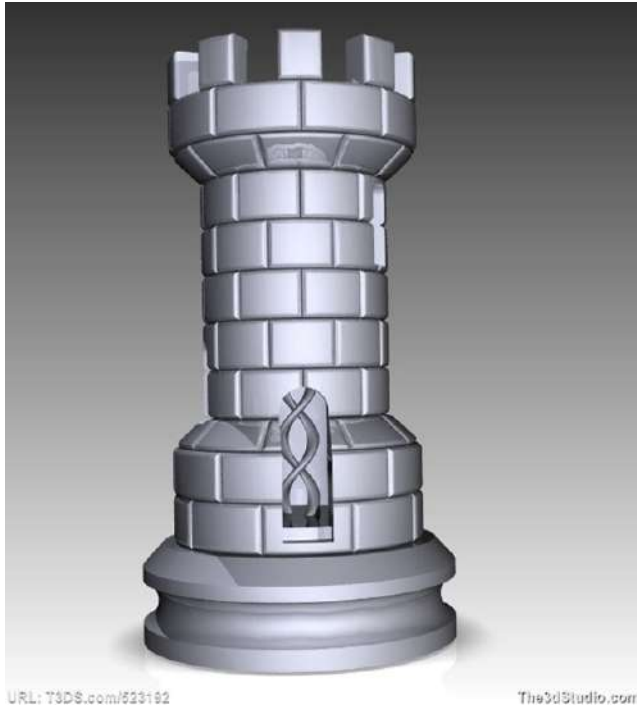
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Digital to Physical



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Digital to Physical



**Custom made Dolmetsch Recorder
Designed and created by Peter Worrell
Adaptable for left-hand or right-hand use**





A Video of an adapted recorder being demonstrated by the designer and maker Peter Worrell



**The Dolmetsch
Recorder
Fully dis-assembled
showing assembly
of the levers**

**15 main
components or**

**27/30 sub
components**

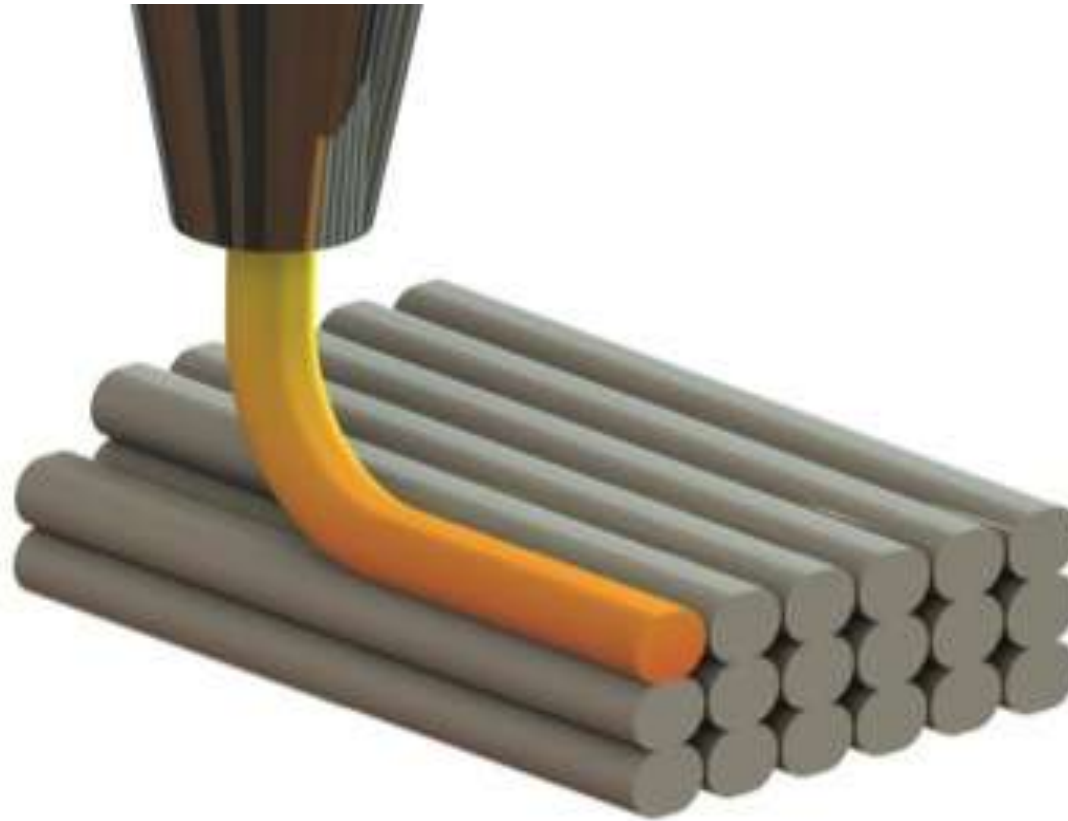


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A standard recorder was designed in CAD and 3D printed on a FDM (Fused Deposition Machine) Although the recorder worked, because of the structure and finish of the material it would be difficult to produce the final model







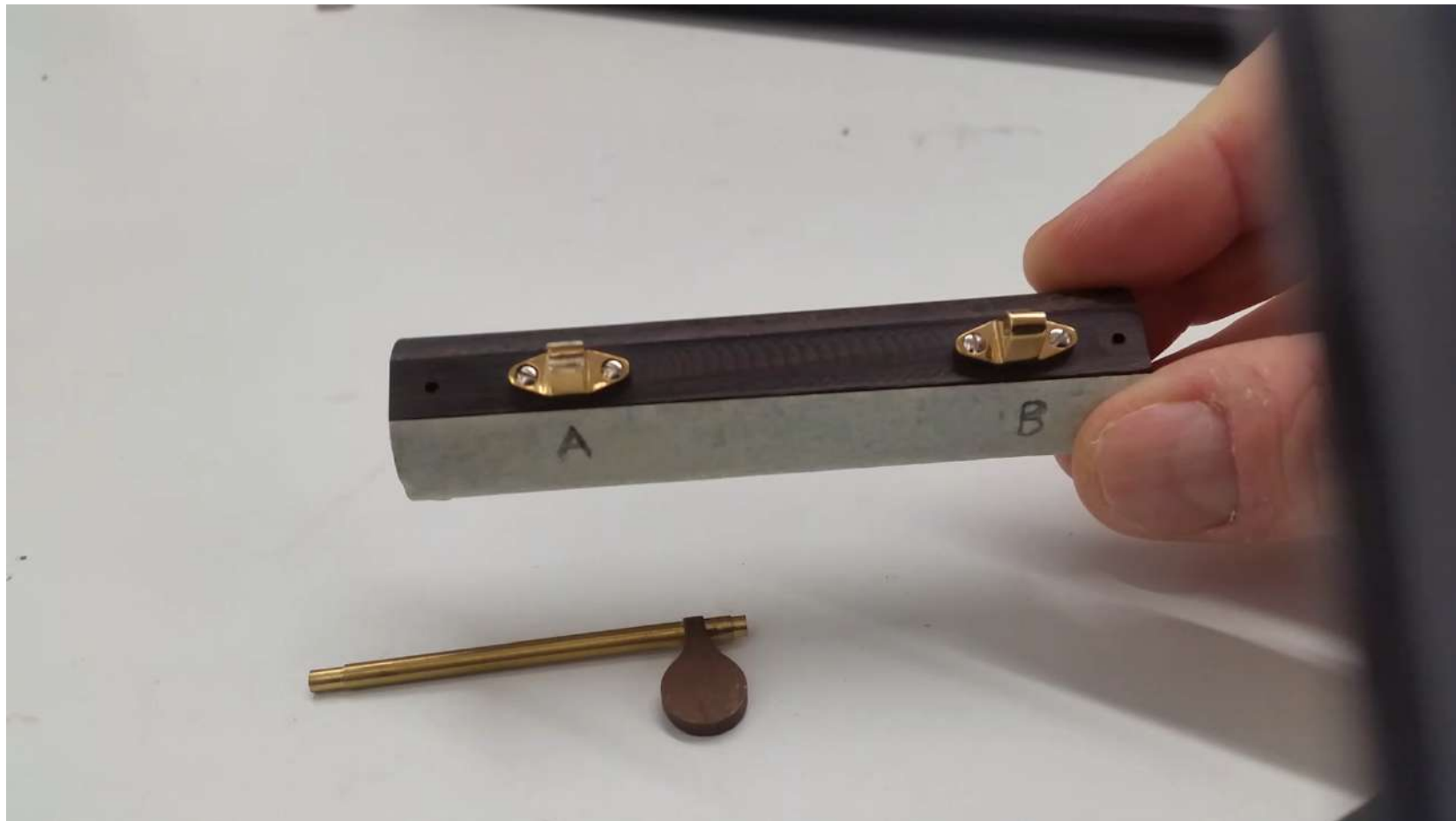
Improved lever configuration using minimum parts



This assembly still uses the screw-in post and screw retainer method



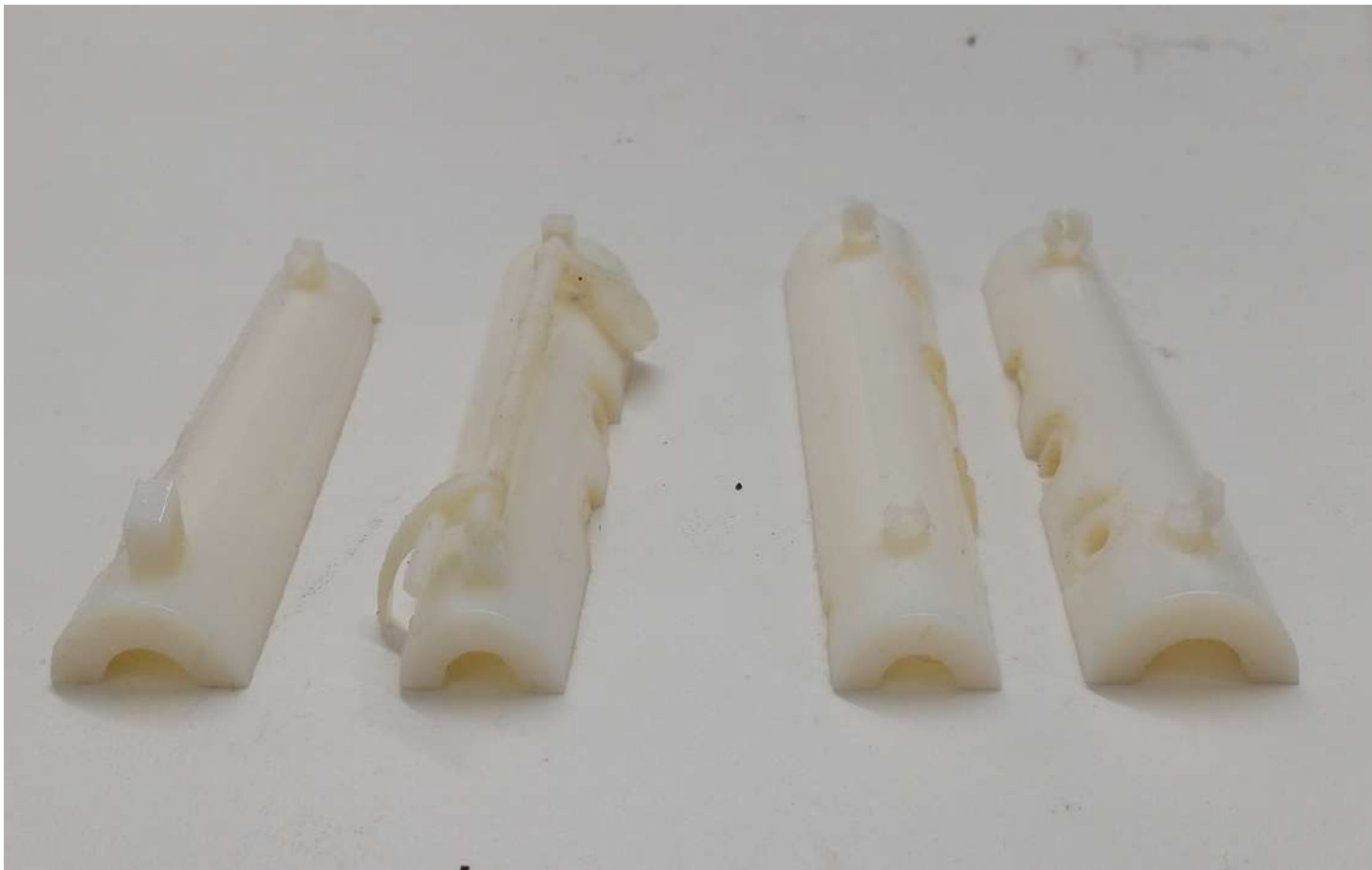
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An enhancement to the assembly process using a clip-fit arrangement was suggested.



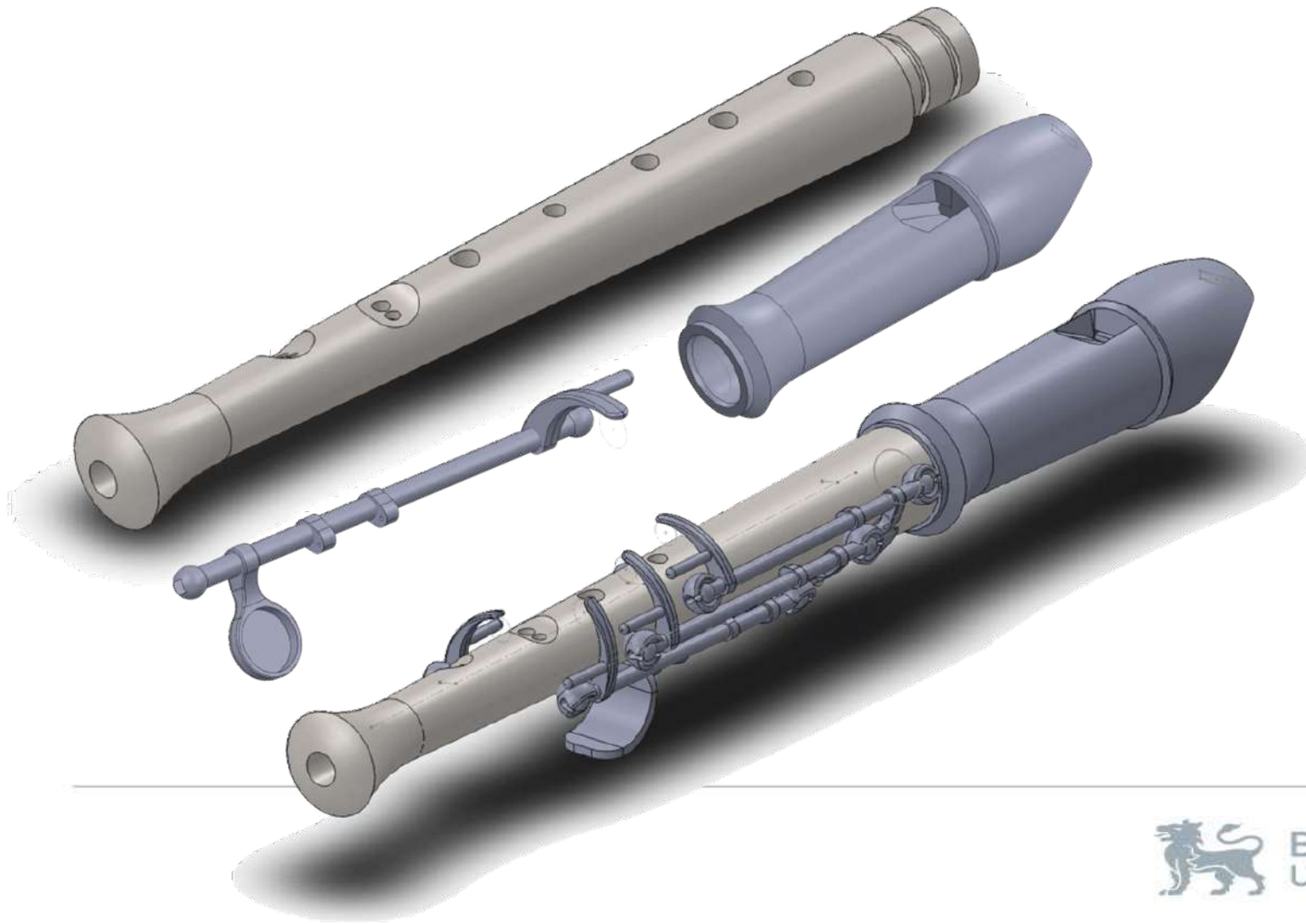
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Several clip-fit designs were produced using the open “U” shape and ball and socket arrangement.



This Video shows an early ball and socket design printed to demonstrate the proposed clip-fit design for easy assembly and maintenance – This is the type of fitting was finally adopted for the OHMI Recorder Design



**3D CAD
design using
Solidworks
software
which enabled
accurate
modelling of
parts and
assemblies**

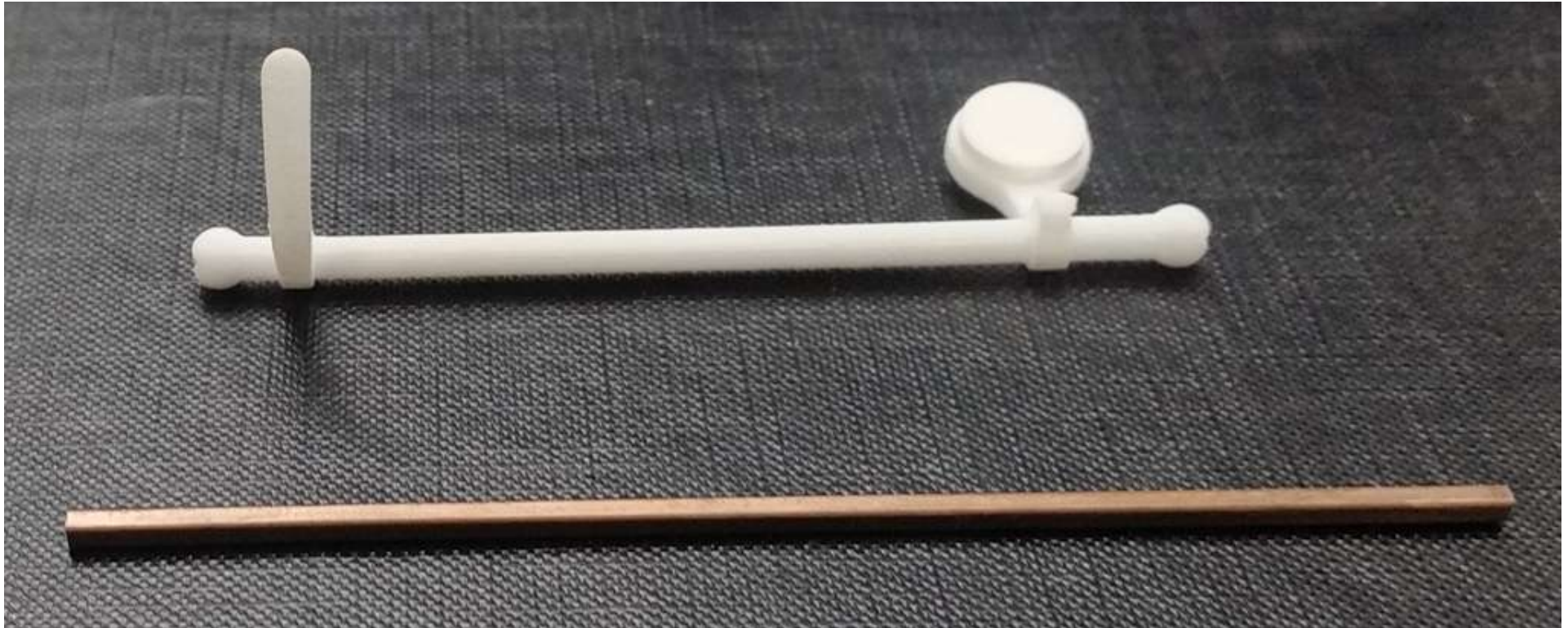


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The rod assemblies printed in nylon



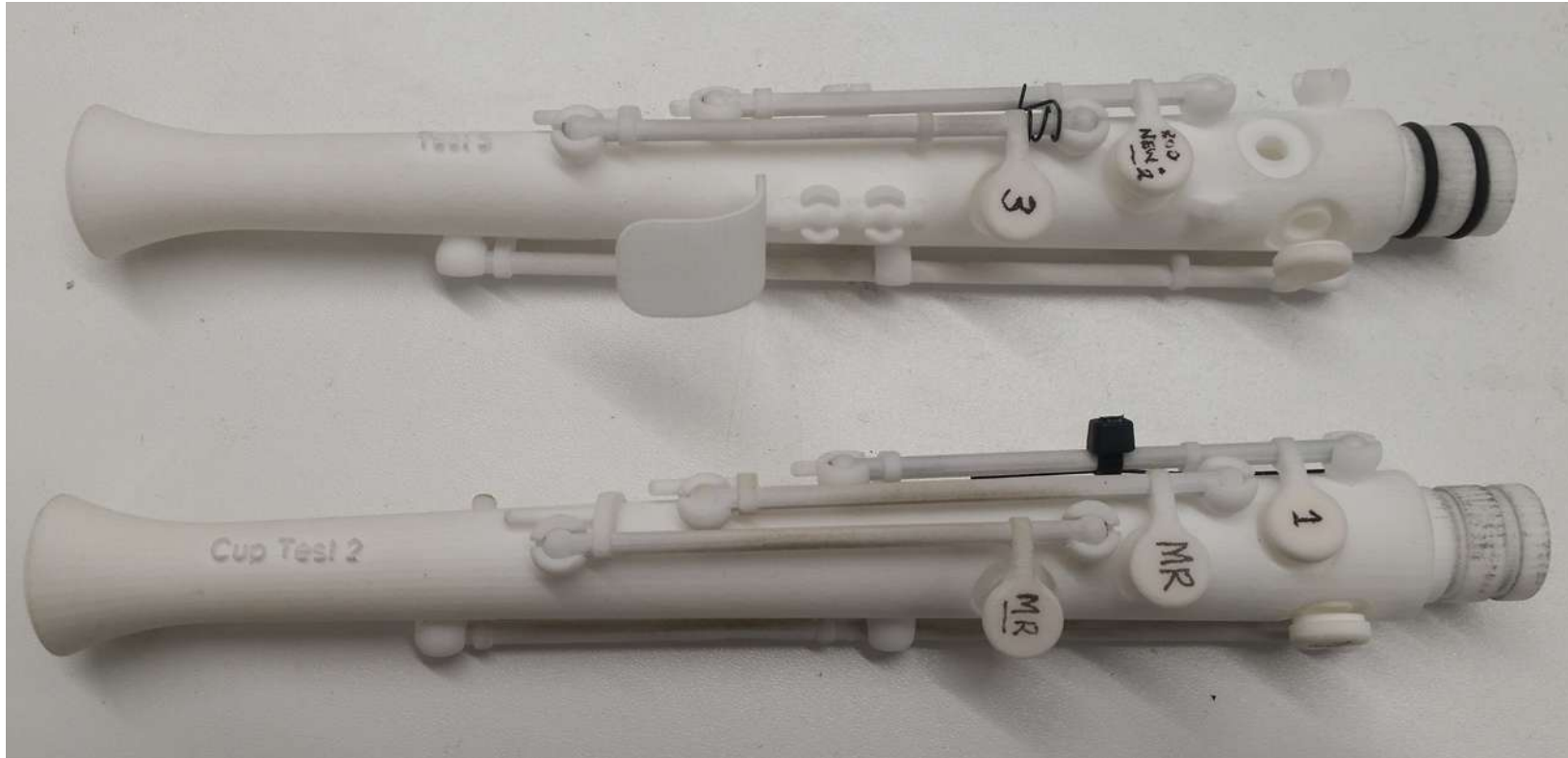
The nylon torsion or twist strength was improved with the addition of a 2mm sq bronze rod through the centre



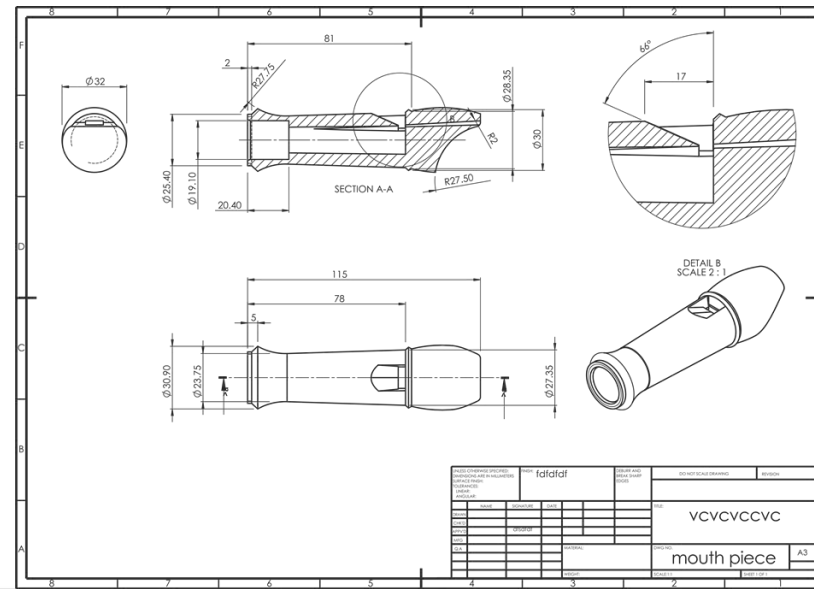
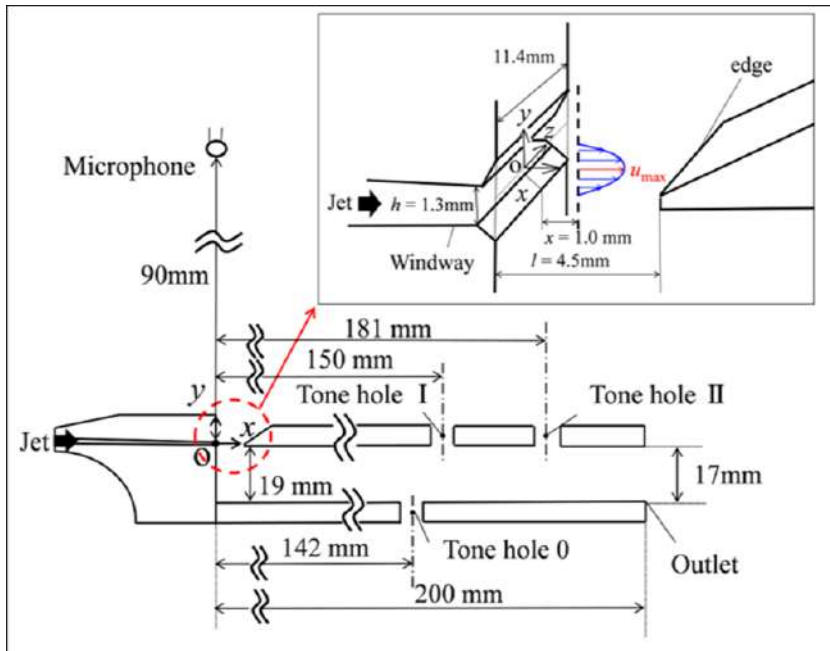
Four design developments of the main Recorder body. Different cup designs and sizes were 3D prototyped in a nylon material



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Two assemblies with modified lever ball and socket arrangements



Doing the maths – drawings that show how complicated it is to design a recorder mouthpiece.



By 3D scanning the mouthpiece, a jig was created in CAD and 3D printed to house the part.



Once the mouthpiece is mounted, CNC machining is used to reveal the internal cavities to enable Measurement and adjustments to be made to the CAD model.



**A selection
of
mouthpieces
printed on
different 3D
printing
technologies**



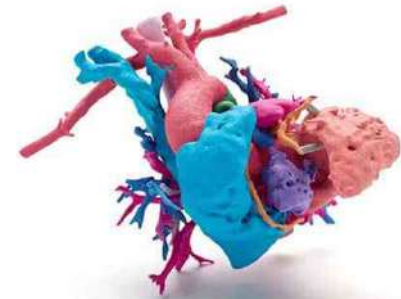
Experimental colouring of the white original 3D printed part (left) using coloured dyes and an electroformed copper coating (far right)



A spring mechanism is required to close the valve. An integrated spring was considered within the 3D print but was found too weak with no reflex action so the original wire spring was used.



The opportunity to build the recorder on a new 3D printer HP Jet-Fusion gave better model results in both quality and density giving nicer tonal quality.



It can also print in full colour.



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A performance meeting of the recorder with Annabel Knight of Royal Birmingham Conservatoire and students to discuss the recorder



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A Video showing the recorder being played – It was identified the valves on the recorder were not sealing tight enough so an extra pair of hands were needed for this performance

Democratisation

the action of making something accessible to everyone.
"the democratization of information through technology"



Acknowledgement to my colleague

Paul Yeomans

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