EnderScope Community Project

Getting Started

The **EnderScope** is a **scanning microscope** made from **a low-cost Ender 3D printer**. Using 3D printed parts and low-cost electronics, a small microscope replaces the print head of the printer.

The EnderScope was designed to be **low-cost** and **accessible**. By doing this, we want to make research instruments like microscopes more available to those outside the formal scientific community.

We have designed this instrument thinking this is easy to build and use. But of course that's just our opinion. So we want to hear from you, the users, just how easy/difficult this process is. We then will incorporate this feedback into the project, allowing us to **co-develop the final version** of the EnderScope with the community users.

The EnderScope was initially designed for the purpose of **detecting microplastics in filtered seawater samples** but you can use it for anything (and we strongly encourage this!). The microscope is also open-source so we strongly welcome and encourage modifications.

How does this project work?

- We will supply your group with an Ender 3D printer, assembly instructions and the parts to build an EnderScope.
- The EnderScope is yours to keep.
- We will ask for feedback on the **assembly process** (so please keep some notes when assembling!), the **user experience** of using the EnderScope and we want to know **what you use the EnderScope for** (we may ask what you use the EnderScope to look at, we may ask to share some images and we would love to see any modifications you make).

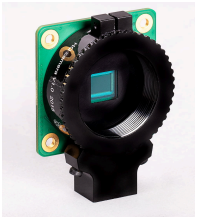
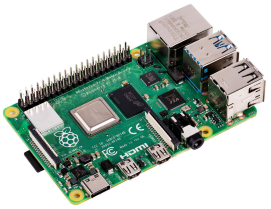
For technical support please contact niamh.burke2@ucdconnect.ie.

Here are some details about the EnderScope and this project:
Details about The EnderScope Community Project: www.experiment.com/enderscope
EnderScope Github with assembly instructions and design files: https://github.com/Pickering-Lab/EnderScope
This project is funded by the Experiment Foundation and UCD College of Health and Agricultural Sciences.

Parts Checklist

With each EnderScope kit you should have:

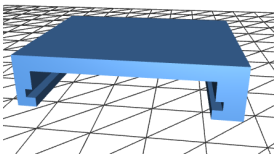
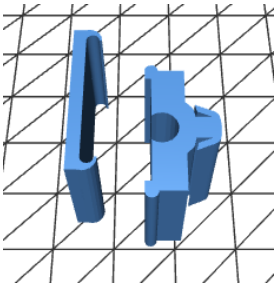
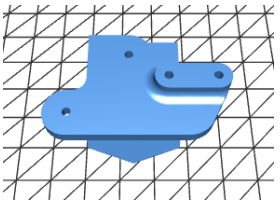
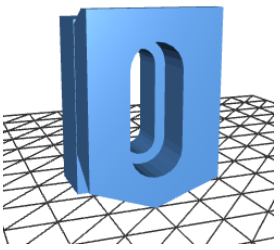
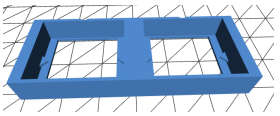
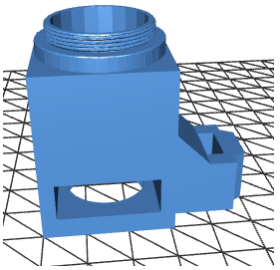
Non-Printed Parts

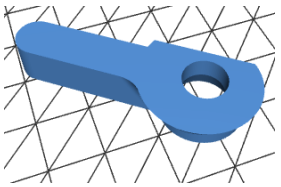
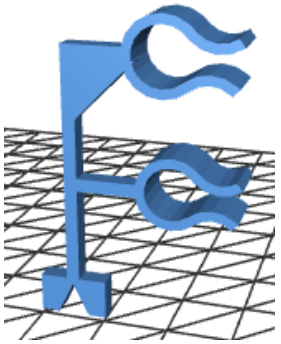
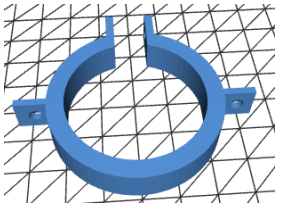
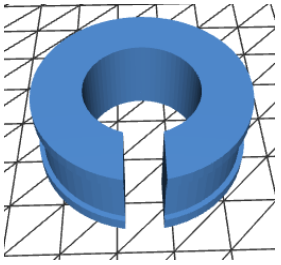
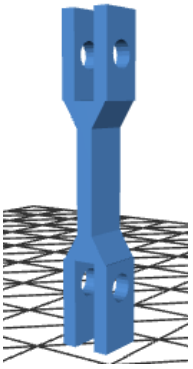
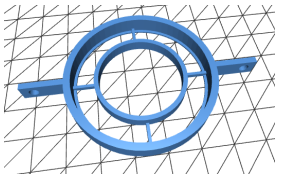
Item	Qty	Picture	Tick (✔)
Ender 3 Pro 3D printer	1		
4x RMS Finite Conjugate Objective Lens	1		
Raspberry Pi HQ Camera	1		
Raspberry Pi 4 Model B	1		
Raspberry Pi Touchscreen monitor, keyboard and mouse	1 of each		
Pi camera CSI ribbon cable (Long ~100cm)	`1		

Raspberry Pi 5V Power supply USB Type C and UK adapter plug	1 of each		
5V Power Supply USB	1		
Arduino Nano	1		
Push Button	1		
220 Ohm Resistor (brown black black red red)	1		
Male to Male Jumper Wires			
USB type A - mini B Cable	1		

USB type A - Micro USB Cable	1		
Lighting Gels			
16 LED Ring	1		
Glass from picture frame, 2mm in thickness, 21x30cm	1		
Binder Clips	4		
M4 Screw (16/20mm long)	1		
M3 Screw (16/20mm long)	1		
Washers (M3, M4)	Few of each		
M6 Square nut	1		
Flathead screwdriver (not supplied)	1		
M2.5 Screw (8mm)	2		
M6 12mm cap head screw	1		
M3 Screw (12mm) and M3 nut	4 of each		
Assembly Instructions	1		
Bed Level Sheet	1		

Printed Parts

Item	Qty	Picture	Tick (✔)
ArduinoNanoHolder	1		
CableTidy	1		
EnderHotendToolHolder	1		
EnderScopeToolHolder	1		
FilterSlider	1		
LensTube	1		

Lever	1		
LimitSwitchExtender	1		
NeopixelClamp	1		
NeopixelClamp_GenericInsert	1		
NeopixelConnecter	2		
NeopixelMount	1		

ToolHolderBase	1