Text in italics are template instructions. Remove and replace all instructions with regular font text.

Title: *Max. 20 words. A good title should contain the fewest possible words that adequately describe the content of a paper.*

Authors: *Author one, author two, and author three*

Affiliations: *Affiliation one, affiliation two*

Contact email: *Contact email: Include institutional email address of the corresponding author*

Abstract: *Max. 200 words. Remember that the abstract is what readers see first in electronic abstracting and indexing services. This is the advertisement of your article. Make it interesting, and easy to be understood. Be accurate and specific, keep it as brief as possible.*

Keywords: *At least 3 keywords. There is no limit on the no. of keywords you can list. Please remember that effective keywords should not repeat words appearing in your title, and should be neither too general nor too narrow.*

Specifications table:

Hardware name	*Insert hardware name*
Subject area	• *Engineering and Material Science* • *Chemistry and Biochemistry* • *Medical (e.g. Pharmaceutical Science)* • *Neuroscience* • *Biological Sciences (e.g. Microbiology and Biochemistry)* • *Environmental, Planetary and Agricultural Sciences* • *Educational Tools and Open Source Alternatives to Existing Infrastructure* • *General*
Hardware type	• *Imaging tools* • *Measuring physical properties and in-lab sensors* • *Biological sample handling and preparation* • *Field measurements and sensors* • *Electrical engineering and computer science* • *Mechanical engineering and materials science* • *Other (please specify)*
Open source license	*Please specify the open source license. For more details see the guide to authors.*
Cost of hardware	*Approximate cost of hardware (complete breakdown will be included in the Bill of Materials).*
Source file repository	*Insert a URL link to the source file repository*

1. Hardware in context

Include a short description of the hardware, putting into context of similar open hardware and proprietary equipment in the field.

2. Hardware description

Describe the hardware, highlighting the customization rather than the steps of the procedure. Highlight how it differs/which advantage it offers over pre-existing methods. For example, how could this

hardware: be compared to other hardware in terms of cost or ease of use, be used in the development of further designs in a particular area, and so on.

Add 3-5 bulleted points to broadly explain to other researchers how the hardware could be potentially useful to them, for either standard or novel laboratory tasks, inside or outside of the original user community.

- ...
- ...
- ...

3. Design files

The complete design files must be either uploaded to an approved online repository, uploaded at the time of submission on the online Elsevier submission interface as supplementary materials [CAD files, videos,...], or included in the body of the manuscript [e.g. figures]. The two approved online repositories are Mendeley Data and the Open Science Framework [OSF instructions]. Mendeley data: https://data.mendeley.com/ Open Science Framework: https://osf.io/ Open Science Framework HardwareX instructions: https://osf.io/wgk7q/wiki/home/

- *CAD files. Authors are encouraged to use free and open source software packages for creating the files. For CAD files, OpenSCAD, FreeCAD, or Blender are encouraged, but if not available source files from proprietary CAD packages such as Autocad or Solidworks and other drawing packages are acceptable. OpenSCAD:*
- *3D printing. Supplementary files that facilitate the digital replication of the devices are encouraged. For example, STL files for 3-D printing components. We recommend uploading CAD files to the NIH 3D Print Exchange as Custom Labware and providing a link to the location. NIH 3D Print Exchange: http://3dprint.nih.gov/*
- *Electronics. PCB layouts and other electronics design files can be uploaded to the Open Hardware Repository or other repositories. Open Hardware Repository: http://www.ohwr.org/*
- *Software and firmware. All software files used in the design and operation of the hardware should be included in the repository. Provide a description of software and firmware and use extensive comments in the code.*

3.1 Design Files Summary

Design file-name	**File type**	**Open source license**	**Location of the file**
Design file 1	*e.g. CAD file, figures, videos*	*All designs must be submitted under an open hardware license. Enter the corresponding open source license for the file.*	*Enter a link to the online location or the sentence: "available with the article", as appropriate*
Design file 2	...	...	...

For each design file listed above, include a short description of the file here (one or two sentences)

4. Bill of materials

For a complex Bill of Materials, the complete Bill of Materials (editable spreadsheet file e.g., ODS file type or PDF file) can be uploaded in an open access online location such as the Open Science Framework repository. Include the link here. Alternatively, the Bill of Materials can be uploaded at the time of submission on the online Elsevier submission interface as supplementary material.

- *To make it easy to tell which item in the Bill of Materials corresponds to which component in your design file(s), use matching designators in both places, or otherwise explain the correspondence.*
- *For material type, select from: Metal, semi-conductor, ceramic, polymer, biomaterial, organic, inorganic, composite, nanomaterial, semiconductor, non-specific, or other*

Designator	**Component**	**Number**	**Cost per unit currency**	**Total cost**	**Source of materials**	**Material type**
Designator 1	*Name of Component 1*	*Number of units*	*Cost per unit*	*Total cost*	*Source*	*Material type*
Designator 2	...	...	...	...	...	...

5. Build instructions

Provide detailed, step by step instructions for the construction of the reported hardware include all necessary information for reproducing the submitted hardware.

- *Explain and, when possible, characterize design decisions. Including design alternatives if they exist.*
- *Use visual instructions such as schematics, images, and videos.*
- *Clearly reference design files and component parts described in the Design File Summary and Bill of Materials.*
- *Highlight potential safety concerns that may arise*

6. Operation instructions

Provide detailed instructions for the safe and proper operation of the hardware.

- *Step-by-step operational instructions for operating the hardware.*
- *Use visual instructions as necessary.*
- *Highlight potential safety hazards.*

7. Validation and characterization

Demonstrate the operation of the hardware and characterize its performance over relevant critical metrics

- *Demonstrate the use of the hardware for a relevant use case.*
- *If possible, characterize performance of the hardware over operational parameters.*
- *Create a bulleted list that describes the capabilities (and limitations) of the hardware. For example consider descriptions of load, operation time, spin speed, coefficient of variation, accuracy, precision and etc.*

8. Declaration of interest

[a statement must be included even if there is no conflict of interest] All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in a summary declaration of interest statement in the manuscript file. If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. More information.

9. Human and animal rights

- *If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with the appropriate ethical guidelines.*
- *If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals. Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.*
- *All animal experiments should comply with the ARRIVE guidelines and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, EU Directive 2010/63/EU for animal experiments, or the National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed.*

References

- *Include at least one reference, to the original publication of the hardware you customized.*
- *Include other references as required. Include references to put your device in context in the literature. For more information on the reference format in HardwareX please see the Guide for Authors at: https://www.elsevier.com/journals/hardwarex/2468-0672/guide-for-authors*