Worksheet 3:

Example applications for optical tweezers

Realising that light can move and hold tiny particles and systematically taking advantage of this phenomenon are some of physicist Arthur Ashkin's greatest achievements.[1] He was awarded a well-deserved Nobel Prize in Physics in 2018 due to the enormous range of applications of these optical gripping instruments, which have become indispensable in **biological and medical research** and **experimental material science**.

Exercise:

Search for applications of optical tweezers on the internet and write down keywords for the most important results that you find. In particular, look up the recent development of light-based instruments known as **"holographic optical tweezers"**.

The following links may be helpful with your research:

- www.news-medical.net/life-sciences/What-are-Optical-Tweezers.aspx
- www.physicscentral.com/explore/action/tweezers.cfm
- https://physics.nyu.edu/grierlab/nreview2c/
- https://physicsworld.com/a/optical-tweezers-where-physics-meets-biology/
- www.int.laborundmore.com/archive/758333/Cell-experiments-with-optical-tweezers-are-revolutionising-biomedicine.html
- www.leibniz-ipht.de/en/research-units/research-departments/fiber-research-and-technology/detail.html?tx_news_pi1%5Bnews%5D=2094&cHash=3d2949955835f00daca1e134518a5000
- www.mpg.de/research/photonic-wheel
- www.advancedsciencenews.com/holographic-optical-tweezers-applied-living-zebrafish-embryos/

[1] There is an interesting excerpt from an interview with Arthur Ashkin starting at minute 54:36 of the following video: www.mediatheque.lindau-nobel.org/videos/37984/2018-interview-arthur-ashkin.