

## Closed-loop focused ultrasound neuromodulation: Testing different strategies in healthy human participants

Dr Cyril Atkinson-Clement was employed on this project which developed pilot approaches for closed-loop focused ultrasound neuromodulation. This work has refined our ideas on developing this technique further leading to an MRC programme grant on developing closed-loop stimulation for brain and mental health applications. The programme grant uses focused ultrasound and transcranial magnetic stimulation to improve cognitive performance, first in healthy participants and then in patients suffering from mental health conditions (depression, schizophrenia, or bipolar disorder) or from Tourette's syndrome.

After finishing his research associate position within this project, Dr Atkinson-Clement has moved on to a faculty position (lecturer) at the University of Plymouth continuing research on focused ultrasound neuromodulation.

We are currently in the process of looking into commercial opportunities of this research and have started the company DeepBrain (<https://deep-brain.net>).

### Outcomes:

MRC 5-year Programme Grant on Closed-loop Neuromodulation for Mental Health

Funded Value: £2,364,041

Funded Period: Aug 25 - Aug 30

<https://gtr.ukri.org/projects?ref=UKRI527>

[Ventricle stimulation as a potential gold-standard control stimulation site for transcranial focused ultrasound stimulation](#)

**C Atkinson-Clement, M Kaiser...** - Brain Stimulation, 2024

<https://doi.org/10.1016/j.brs.2024.12.003>

[Optimizing transcranial focused ultrasound stimulation: An open-source tool for precise targeting](#)

**C Atkinson-Clement, M Kaiser** - Neuromodulation, 2025

<https://doi.org/10.1016/j.neurom.2024.06.496>

[Dynamic changes in human brain connectivity following ultrasound neuromodulation](#)

**C Atkinson-Clement, M Alkhashki, M Gatica...** - Scientific reports, 2024

<https://doi.org/10.1038/s41598-024-81102-w>

[Neuromodulation perception by the general public](#)

**C Atkinson-Clement, A Junor, M Kaiser** - Scientific Reports, 2025

<https://doi.org/10.1038/s41598-025-89437-8>

[Understanding the high-order network plasticity mechanisms of ultrasound neuromodulation](#)

**M Gatica, C Atkinson-Clement...** - PLoS Computational Biology, 2025

<https://doi.org/10.1371/journal.pcbi.1013514>