UPSIDE aims to research a minimally-invasive personalized therapy for Major Depressive Disorder by means of focused ultrasound. Major depressive disorder (MDD) is the leading cause of disability worldwide, affecting 300 million people with a lifetime prevalence of 15%. Furthermore, approximately one third of all MDD patients fail to respond to currently established treatments based on medication and psychotherapy, thus falling into the category of Treatment-Resistant Depression (TRD) patients.

The UPSIDE project will result in a demonstrator which will allow, for the first time, network stimulation and simultaneous biomarker readout in behavioral experiments with animal models featuring depression-like symptoms. This technological breakthrough will pave the way towards a personalized treatment for TRD patients.
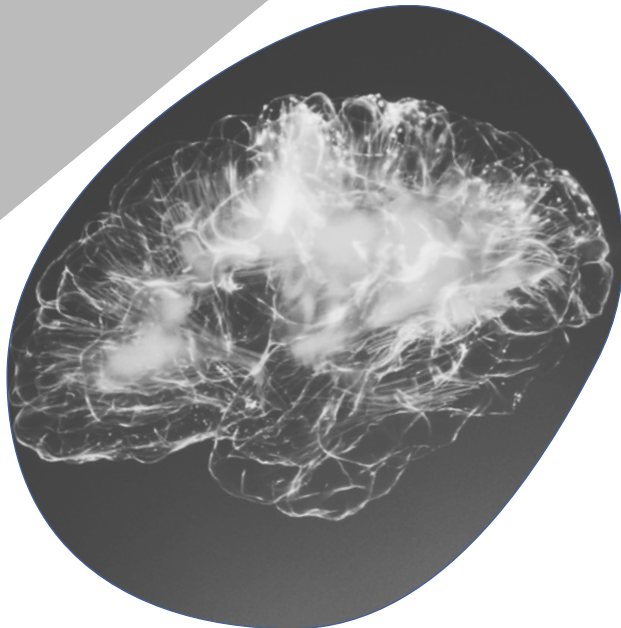
GET IN TOUCH

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Focused Ultrasound Personalized Therapy for the Treatment of Depression
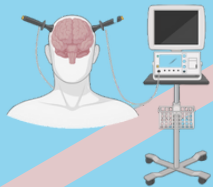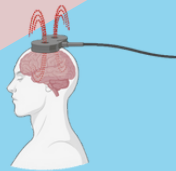
UPSIDE

WHY DO WE DO IT?

300 M people worldwide have MDD

Although, for 1/3 of the patients established treatments fail

&

technologies in place have poor precision, no monitoring or are highly invasive...
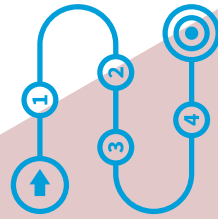
Transcranial **M**agnetic **S**timulation   **E**lectro**C**onvulsive **T**herapy   **D**eep **B**rain **S**timulation

" UPSIDE seeks to improve precision while being minimally invasive

TOWARDS A FULL PROOF-OF-CONCEPT EPIDURAL BRAIN INTERFACE (EBI)

HOW DO WE DO IT?

1 Research and design energy-efficient CMOS circuits for interfacing with 2D arrays of ultrasound transducers and organic neural recording arrays.

2 Design and integrate ultrasound transducers and organic neural recording arrays with the CMOS interfaces in a biocompatible and flexible epidural system, to achieve a full EBI.

3 Research neural signal decoding tools to identify depression biomarkers to enable a personalized therapy for depression.

4 Assess safety and efficacy of the EBI in addressing depression-like symptoms in vivo, in behavioral rat models of depression.

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5 BENEFICIARIES

2 ASSOCIATED PARTNERS

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