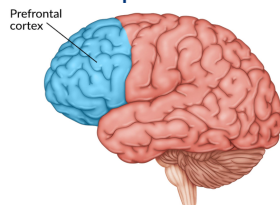


Low Intensity Ultrasound Neurostimulation Therapeutic Device

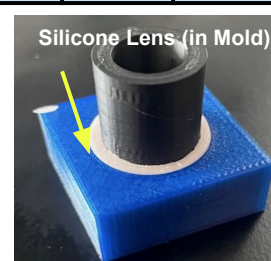
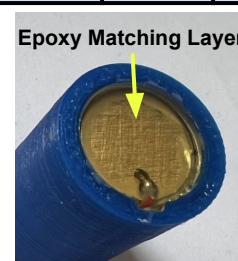
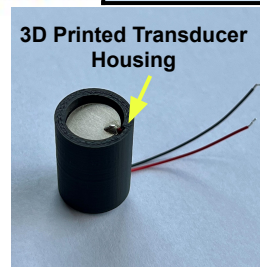
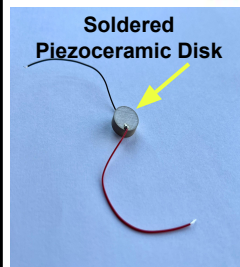
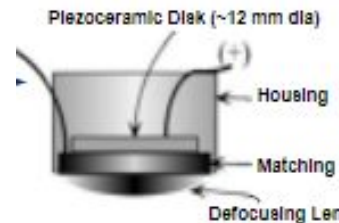
Background

- The prefrontal cortex of PTSD patients is understood to be the most accessible and susceptible brain region for neurostimulation
 - Existing neurostimulation devices (TMS) are limited in both time and cost for patients
- Ultrasound can produce neuromodulatory effects within specific brain regions at certain frequencies
- Need better understanding of how ultrasound neurostimulation treatments affect brain performance

Objective: Develop a transducer device that is capable of neurostimulation using ultrasound within the 400-700 kHz frequency range



Solution



Frequency Range:
400 - 700 kHz

Resonance Frequency (kHz)
(Hydrophone Verification Test)

Disk ID #	Trial 1	Trial 2	Trial 3	Mean	SD (±)
1456	424	417	420	420.3	2.87
1911	579	580	578	579	0.82

Constraints

- C.1.) Time (~9 months)
 C.2.) Budget (\$300)
 C.3.) Resources
 (Dr. Lewin & Dr. Schafer Lab)

Requirements

- R.1.) Freq. 400-700 kHz
 R.2.) Compact Size (18 x 25 mm)
 R.3.) Performs within Safety Standard in CFR Title 21

Impact

- Novel neurostimulation device with compact and cost effective design allows for greater accessibility for PTSD patients and hospitals

Future Work

- Testing further PZT frequencies
- Clinical trials of ultrasound device
- Addition of fNIRs feedback system to improve stimulation