

Internship proposal 2024-2025

(internship from January to June 2025)

Host laboratory: *University of Plymouth, UK*

Host team : *Fouragnan's lab*

<https://www.elsa-fouragnan.com/>

Internship supervisors : *Elsa Fouragnan, Associate Professor,
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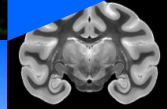
Project title :

Transcranial Ultrasound Stimulation targeted to the reward circuitry in addiction

Project summary :

This work will include the first preclinical trial employing Transcranial Ultrasound Stimulation in addiction as well as additional work exploring the possibility of TUS crossover dissociation. Crossover dissociations disconnect two brain regions in opposite hemispheres such that these can no longer communicate in the same hemisphere, leaving unilaterally intact functioning homologues. Capitalizing on the high spatial resolution and specificity of TUS, the project will use this approach to inform clinical interventions.

This proposal has two central aims (A1 preclinical trials; A2 multisite TUS) which will be tackled in interlinked WPs all involving the same brain regions across different networks. We will target a subcortical and a deep cortical region (the striatum and the anterior cingulate cortex) regulating reward-based learning. (A1) will use TUS to modulate learning circuits in addiction using double dissociation. (A2) will establish a multisite human TUS approach with the equivalent of A1 using crossover dissociation. We will follow the Open Science Framework principles for both aims.



3-5 recent publications :

- [The importance of acoustic output measurement and monitoring for the replicability of transcranial ultrasonic stimulation studies](#) 2024
Klein-Flügge, Fouragnan, Martin
Brain Stimulation: Basic, Translational, and Clinical Research in ...
- [ITRUSST Consensus on Biophysical Safety for Transcranial Ultrasonic Stimulation](#) 2023
Attali, Schafer, Fouragnan, Caskey, Chen, Darmani, Bubrick, Sallet, Butler, ...
arXiv preprint arXiv:2311.05359
- [Transcranial focused ultrasound-mediated neurochemical and functional connectivity changes in deep cortical regions in humans](#) 2023
Yaakub, White, Roberts, Martin, Verhagen, Stagg, Hall, Fouragnan
Nature Communications 14 (5318), 10.1038/s41467-023-40998-0
- [Anticipatory reward dysfunction in alcohol dependence: An electroencephalography monetary incentive delay task study](#) 2023
Komarnyckyj, Retzler, Whelan, Young, Fouragnan, Murphy
Addiction Neuroscience 8, 100116
- [Three-layer model with absorption for conservative estimation of the maximum acoustic transmission coefficient through the human skull for transcranial ultrasound stimulation](#)
Attali, Tiennot, Schafer, Fouragnan, Sallet, Caskey, Chen, ...
Brain Stimulation 16 (1), 48-55