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3D Printed Mouse Bed for Magnetic Resonance Imaging

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Magnetic resonance imaging requires the sample to be stationary and centered in the magnetic field in order to have the best quality image. After a recent construction period, many pieces of equipment in the lab were lost. Thus we had difficulty imaging live mouse brain with their heads remaining stationary and centered in the magnet. A 3D printed radiofrequency (RF) coil holder attached to a mouse bed was created to center the RF coil, and thus the mouse brain, while keeping the mouse stationary and allowing for the physiological monitoring devices and water warming bed to rest in proper locations to allow for live imaging. The bed was printed with EcoTough PLA. Images of tubes of water were created with and without the mouse bed to assess for artifacts from motion and due to magnetic susceptibility differences. In these images, the signal from all voxels in the water tubes were measured and plotted in a histogram. These signal data were then fitted to a Gaussian. The average signal intensity in arbitrary units for both images were comparable at 0.6 and 0.5. The full width at half maximum (FWHM) for the images using the 3D printed water bed and the image without the water bed was at 1.1 and 1.5, respectively. Both were comparable, with the 3D printed bed being slightly better indicating a more uniform image. Less uniformity could be due to motion, given that the RF coil was not secured as well without the printed mouse bed. With the bed created we are now able to begin live mouse imaging with the mouse brain and coil better secured.

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Authors: Ms ANDERSON, Melissa (University of Winnipeg); Dr HERRERA, Sheryl (University of Winnipeg, Cubresa Inc.)

Co-author: MARTIN, Melanie (University of Winnipeg)

Presenter: Ms ANDERSON, Melissa (University of Winnipeg)

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