Scintica

ICONEUS
REVEALING THE BRAIN

Iconeus One

Functional ultrasound platform for high-resolution imaging of brain function and vasculature

Plug-and-play functional ultrasound imaging

Iconeus One uses revolutionary functional ultrasound (fUS) technology to image cerebral blood flow and microvasculature, all within an easy-to-use platform.

Whether you want to image minor blood vessels in small mammalian brains, or help pioneer clinical applications, Iconeus One offers everything you need:

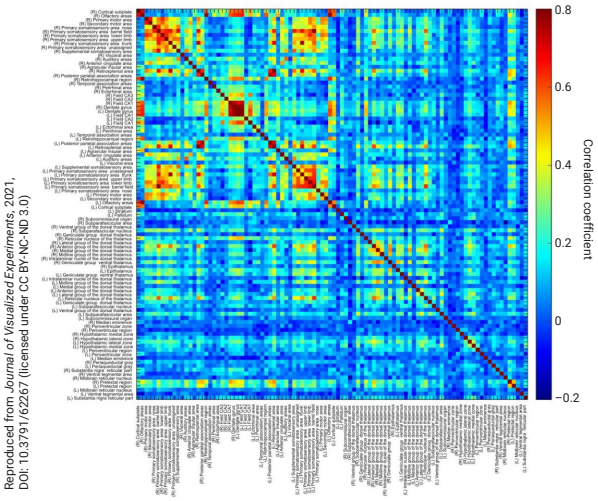
- **High resolution** – You can image blood vessels down to 100 µm, or even lower with our Ultrasound Localization Microscopy (ULM) option.
- **Sensitivity** – You can resolve even minor changes in neuronal activity.
- **Fast acquisition** – You can take a 2D scan of a rodent brain in a few seconds.
- **Versatility** – Our probes work on awake, asleep, moving and resting animals.
- **Adaptability** – The setup can be precisely tailored to your animal, from rodents to primates (and we're now investing in and supporting exciting new clinical research applications).

What you can do with Iconeus One

Functional ultrasound has many applications in neuroscience, including in fundamental brain research, drug development, and investigations into neurodegenerative disorders and stroke.

Resting-state functional connectivity

In an analogous fashion to fMRI, fUS can be used to map intrinsic brain connectivity by detecting correlated fluctuations of spontaneous blood flow.

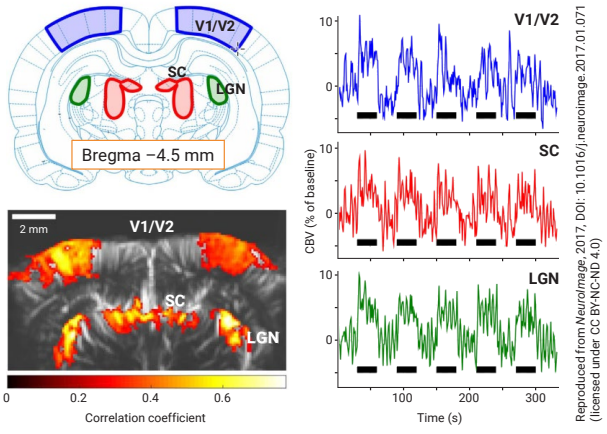


Reproduced from *Journal of Visualized Experiments*, 2021, DOI: 10.3791/62267 (licensed under CC BY-NC-ND 3.0)

3D connectivity matrix for a mouse model, showing strong interhemispheric connectivity patterns between four slices.

Functional neuroimaging

The high spatial resolution of fUS allows task-based neuroimaging to be used very successfully to investigate brain responses to various stimuli, including visual and auditory inputs.



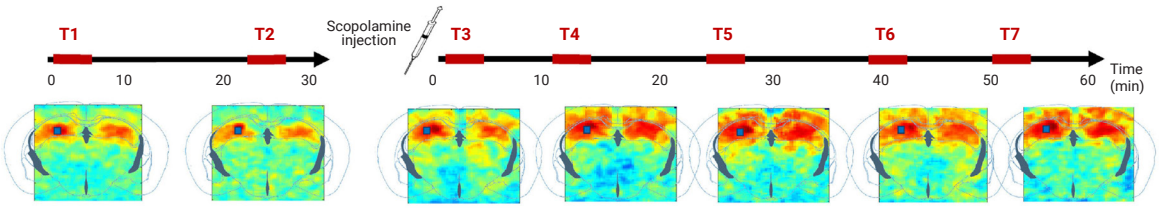
Reproduced from *NeuroImage*, 2017, DOI: 10.1016/j.neuroimage.2017.01.071 (licensed under CC BY-NC-ND 4.0)

This activation map on a rat model, obtained with fUS, shows the result of exposure to a flickering screen, and indicates significant activation in the primary visual cortices (V1, V2) and superior colliculi (SC).

Neuropharmacology

fUS can be used in neuropharmacology studies to determine time- and dose-dependent effects of drugs on the brain, quickly and with high sensitivity.

But unlike fMRI, this 'pharmaco-fUS' approach is more sensitive, faster, more reproducible, and compatible with awake animals (eliminating the bias of anesthesia).



Reproduced from *NeuroImage*, 2020, DOI: 10.1016/j.neuroimage.2020.117231 (licensed under CC BY 4.0)

This study, carried out in awake, freely-moving mice without the bias of anesthesia, shows that scopolamine treatment leads to enhanced functional connectivity between the hippocampus and cortical regions, as indicated by both seed-based and ROI-based connectivity analysis. Data was acquired non-invasively and within a single coronal plane.

Vascular imaging

The sensitivity of fUS to blood flow means that you can visualize the whole vascular tree, from cerebral arteries down to minor arterioles, quickly and easily.

Whole-brain microvascular network in an anesthetized rat, acquired in just 30 minutes by stacking a succession of 2D 'slices'. You can do even better with our Ultrasound Localization Microscopy (ULM) option, which uses fUS to track injected microbubbles within blood vessels, providing images with a resolution as low as 5 µm.

Everything you need for fUS

Iconeus One is designed by neuroscientists for neuroscientists – so when it comes to the practical aspects of fUS, we've got it covered.

What do you get with Iconeus One?

- **A portable imaging station**, featuring our plane-wave ultrasound technology.
- A height-adjustable **keyboard** and **monitor**.
- An application-optimized **ultrasound probe**.
- A four-axis **motorized scanning platform** for imaging head-fixed animals.
- Easy-to-use **software** with an interactive live viewer, mouse brain reference atlas, and three additional licenses for off-line data analysis.
- **Installation, training, ongoing support**, and a one-year warranty.

> "**Functional ultrasound is an amazing technology**, taking neuroimaging to a whole new level.
>
> Coming from the MRI world, the small footprint, open setup and sensitive miniature sensor of fUS unlocks capabilities that were previously unavailable to us and our clients."
>
> **Artem Shatillo, M.D.**
> Charles River Laboratories, Finland

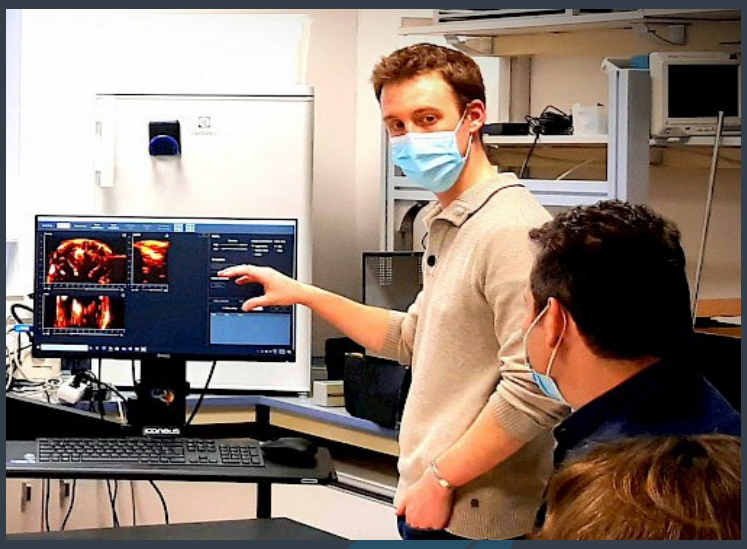
About Iconeus

Welcome to the future of brain imaging

We're Iconeus – a Paris-based company helping researchers to gain new insights into neuroscience using our groundbreaking functional ultrasound technology.

Our team of over 30 neuroscientists, software engineers and ultrasound physicists is dedicated to ensuring functional ultrasound achieves its full potential, by helping you integrate it into your research.

We look forward to hearing from you!



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