

# Reproducible neuroimaging for everyone – how NeuroDesk uses software containers to make neuroimaging more accessible, portable, and reproducible

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## **ABSTRACT**

Neuroimaging data analysis requires a diverse collection of bespoke command-line and graphical tools. Installing and maintaining a neuroimaging software setup is challenging and often results in un-reproducible environments. We developed NeuroDesk, a platform built on container technology for processing and analysing neuroimaging data with the aim to lower the barrier of using various neuroimaging software in a reproducible environment. We developed a modular and open analysis environment consisting of a continuous integration system on Github to automatically build neuroimaging software containers based on community input. We also developed a toolset around software containers to make them easy to use. We provide all tools within a lightweight Linux desktop container accessible via a browser interface that runs on any operating system supporting Docker. Our open-source project (<https://www.neurodesk.org>) enables researchers and clinicians to use various neuroimaging software on any operating system. We developed a scalable and interoperable way of running scientific tools on any compute platform accessible to researchers and clinicians. The benefits of this setup are an easy-to-use and reproducible environment for neuroimaging data analysis. NeuroDesk enables to run a fully reproducible environment on cloud, on windows/mac or on a high-performance computing system and seamlessly transition between different hardware setups.