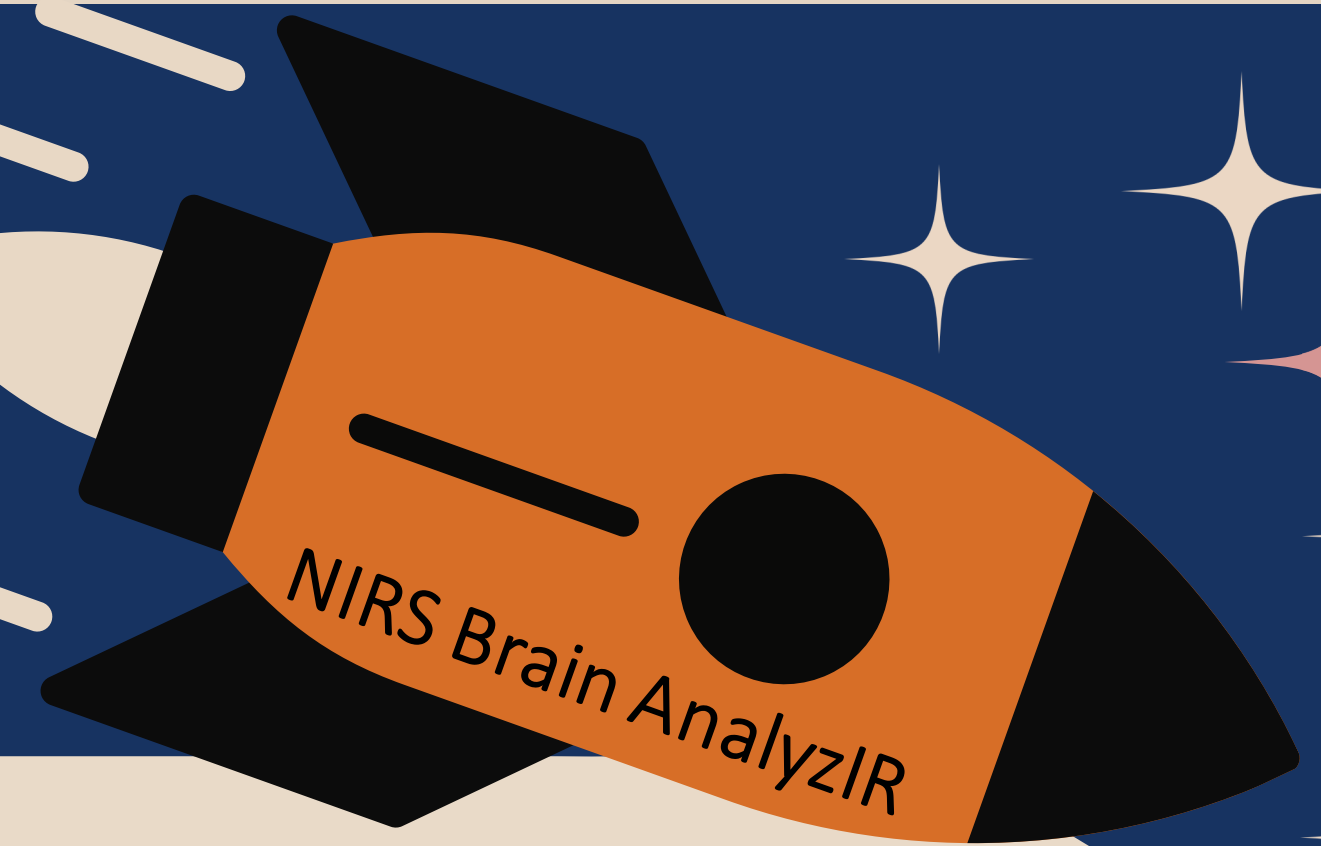
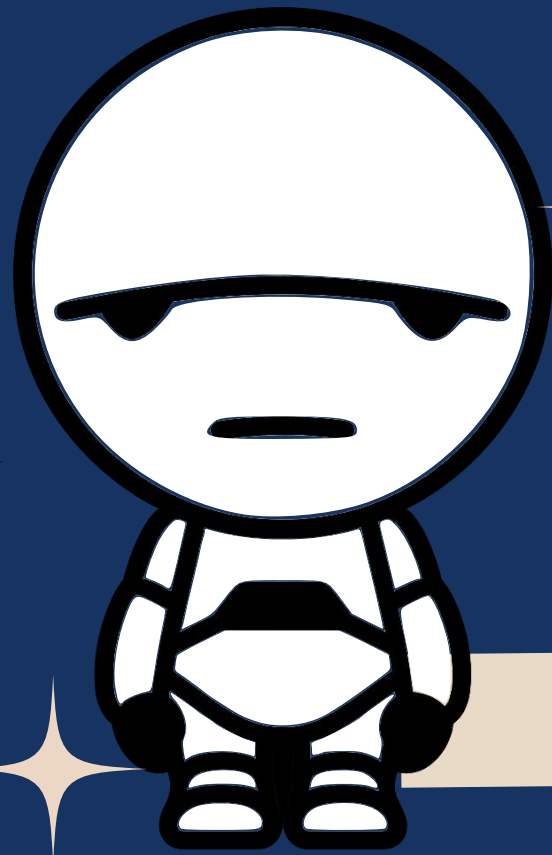


D O N ' T P A N I C !

A H I T C H H I K E R ' S G U I D E T O f N I R S D A T A A N A L Y S I S F O R B L O C K - D E S I G N P A R A D I G M S

Franziska Klein, Katharina Stute, David M.A. Mehler, Beatrix Barth, Christina Artemenko, Xu Wu, Mojtaba Soltanlou, Hendrik Santosa & Theodore Huppert

Data analysis?
Don't talk to
me about data
analysis!



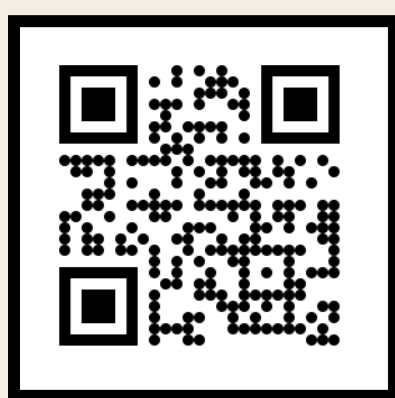
Don't Panic - It's just fNIRS!

New to functional near-infrared spectroscopy (fNIRS)? Not sure where to start or how to analyze your data?

You are not alone! And: We are working on a practical guide based on a block-design fNIRS analysis to help you get started.

What you can expect:

- A hands-on fNIRS preprocessing walkthrough
- Analysis scripts using the NIRS Brain AnalyzIR Toolbox (Santosa et al., 2018)
- An open dataset to follow along



Check our OSF page for updates. It may not answer life's biggest questions, but it will help with your data.

Standardization: Because chaos isn't reproducible

BIDS (Brain Imaging Data Structure):

A standard file structure for organizing neuroimaging and behavioral data - so your files don't wander off into deep space.

SNIRF (Shared NIRS Format):

A standardized format for fNIRS data, built to make storage, sharing, and reproducibility less painful and more possible.

Signal Preprocessing: Your Babel Fish for fNIRS data

This guide offers a hands-on walkthrough for preprocessing block-design fNIRS data, based on field recommendations and best practices (Yücel et al., 2021). Including:

Signal Quality Assessment

- Using the QT-NIRS toolbox and mBLL (raw $\rightarrow$ Δ OD $\rightarrow$ Δ [HbX])
- Motion Artifact Correction: Comparing multiple correction algorithms
- Temporal Filtering: IIR vs. FIR (what works when)
- Systemic Activity Correction: With and without short-distance channel methods

Data Analysis: Making sense of the signals

We cover the two most commonly used analysis approaches for block-design fNIRS paradigms:

Block Averaging

A straightforward way to estimate task-related responses

General Linear Model (GLM)

Compare predefined basis functions vs. flexible deconvolution models

Because even in a mostly harmless universe, your stats should make sense.

MOTION
ARTIFACTS

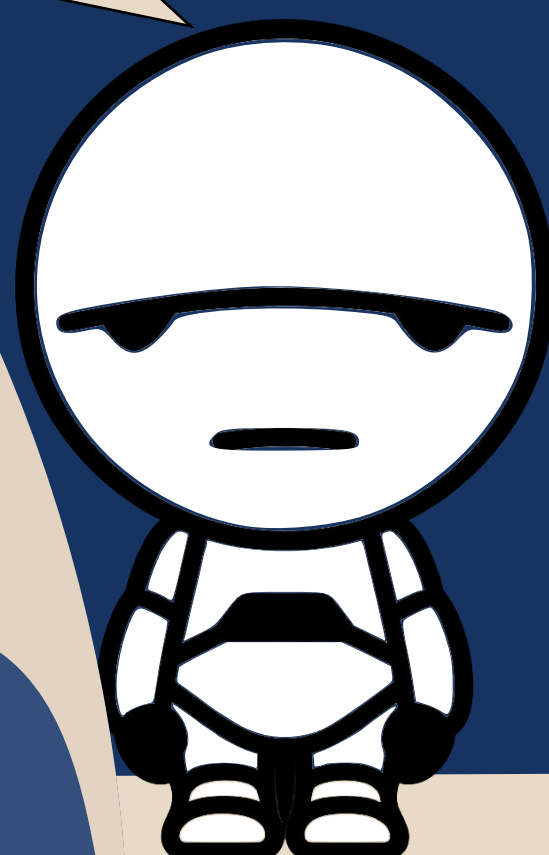
EXTRACEREBRAL
SYSTEMIC ACTIVITY

PHYSIOLOGICAL
NOISE

GLM

BLOCK
AVERAGING

Well... I suppose block averaging isn't entirely pointless. And the GLM at least respects my processing power.



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