# Brain fingerprinting with MEG connectivity

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Recent studies have shown that human brain connectivity data can be used as a "fingerprint" to identify a given individual from a population. This discovery has become a burgeoning research area in neuroscience. Recent studies have identified the possibility to extract these brain signatures from the temporal rich dynamics of resting-state magnetoencephalography (MEG) recordings. However, to what extent MEG signatures constitute a marker of human identifiability when engaged in task-related behavior opens several questions: Does the engagement in tasks influence identifiability? What is the relation across brain fingerprints during different tasks? Here, using MEG data from classical neurophysiological tasks and from naturalistic tasks, we show that identification from connectivity matrices improves in tasks relative to resting-state, providing compelling evidence for a task-dependent axis of MEG signatures. Notably, improvements in identifiability were more prominent in strictly controlled tasks. Lastly, the brain regions contributing most towards individual identification were also modified when engaged in task activities. Results from this study pave new ways for understanding the driving factors behind brain identification from MEG signals.