# Neuromap Toolbox Revolutionizes Brain-Mapping Data Interpretation

Dawn Elliott Knapp, PA-C, for Medscape

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*The report covered in this summary was published in bioRxiv.org as a preprint and has not yet been peer reviewed.*

## Key Takeaways

- Researchers have developed an open-source Python software package, Neuromaps, giving human brain–mapping researchers a set of standardized workflows to aid interpretation of their data and facilitate interdisciplinary collaboration.
- This software allows researchers to examine relationships between brain maps, upload their own data, perform calculations, and share findings in a standardized yet flexible framework.

## Why This Matters

- Brain maps ("blueprints" of brain structure and function) are widely used by researchers, but sharing and subsequent accurate interpretation have been problematic. This comprehensive open-source software package helps provide solutions to inconsistencies and nonstandardization.
- The Neuromaps toolbox simplifies the use of existing and new brain maps and provides easy sharing of maps within the neuroimaging community.

## Product Design

- Researchers designed a three-pronged enrichment tool for neuroimaging that would account for multiple coordinated systems, contain a brain map repository, and allow for spatial autocorrelation between maps.
- A set of group-level transformations between four standard coordinate systems widely used in neuroimaging (MNI 152, fsaverage, fsLR, and CIVET) was generated and integrated via a set of accessible, uniform interfaces.
- Over 40 reference brain maps from literature published over the past decade were curated and added to the repository.
- Nine spatial autocorrelation-preserving null models for statistical comparison between brain maps were integrated into the software, helping researchers perform standardized, reproducible analyses.
- Twenty brain maps were transformed into every other coordinate system and correlated. Every target coordinate system and data resolution were tested, and spatial null models were used to assess the significance of all correlations.

## Key Results

- The Neuromaps toolbox provides programmatic access to templates for four standard coordinate systems, encompassing multiple modes of data collection.
- Its brain map repository contains over 10 years' worth of human brain–mapping research utilizing multiple imaging techniques, an invaluable resource.
- The authors assert that the toolbox can serve as a widely used, easily accessible tool in brain-mapping research.

## Limitations

- Transformations between coordinate systems should only be used for group-level data.
- If subject-level data are used, they should be reprocessed in the desired coordinate system instead of transforming group-level aggregate data.

## Report Disclosures


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*This is a summary of a preprint research study, "Neuromaps: Structural and Functional Interpretations of Brain Maps," by Ross D. Markello from Montreal Neurological Institute, McGill University, and colleagues on bioRxiv, provided to you by Medscape. This study has not yet been peer reviewed. The full text of the study can be found on bioRxiv.org.*

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