

# Connecting the Dots: Understanding the Claustrum through its connectomic profile

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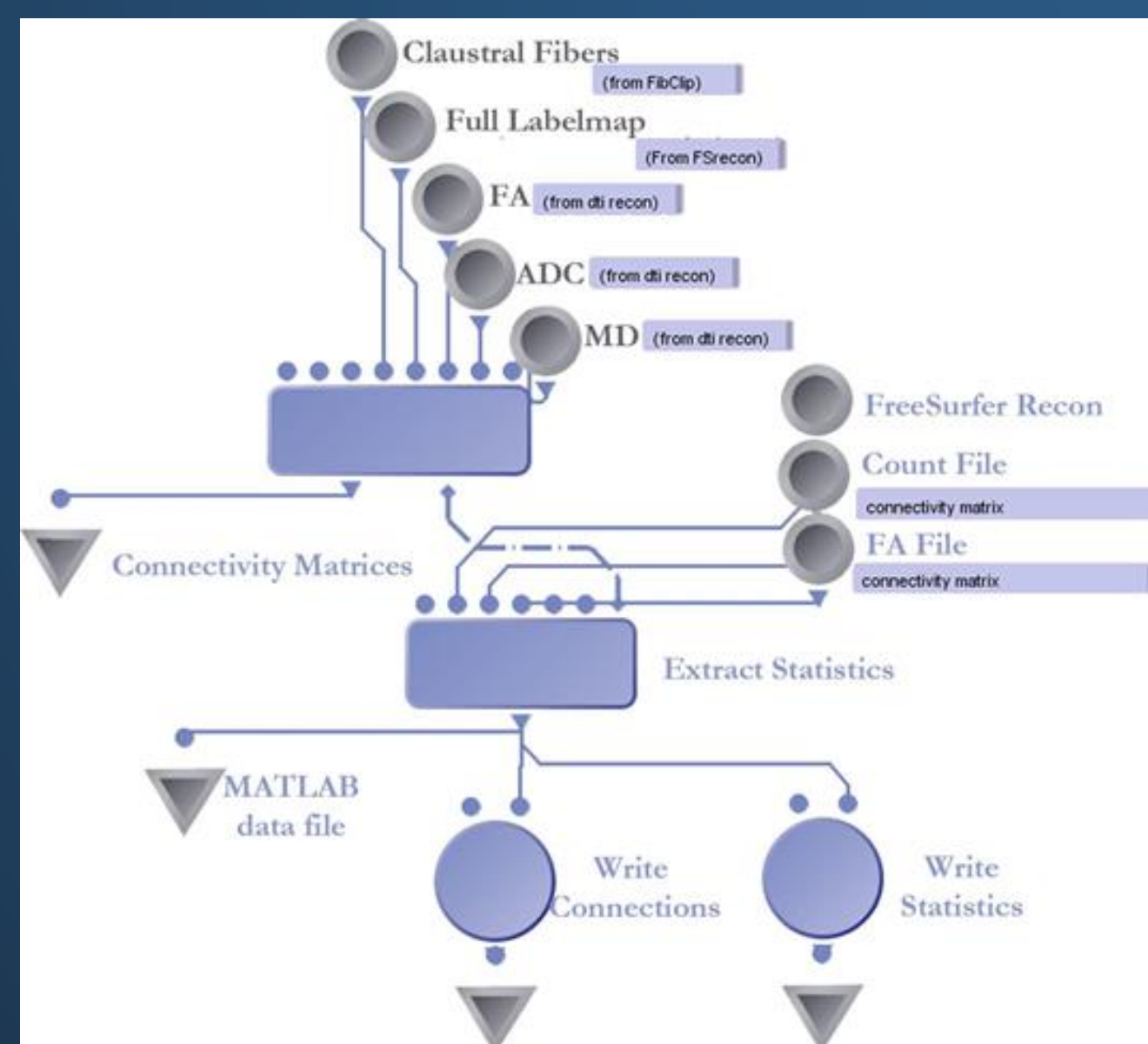


## Introduction

The claustrum consists of a thin band of cells medial to the insular cortex and lateral to the putamen. It contains both cells associated with white matter and grey matter, and can therefore not be classified as either cortical or subcortical. Its size and location make it nearly impossible to study in isolation.

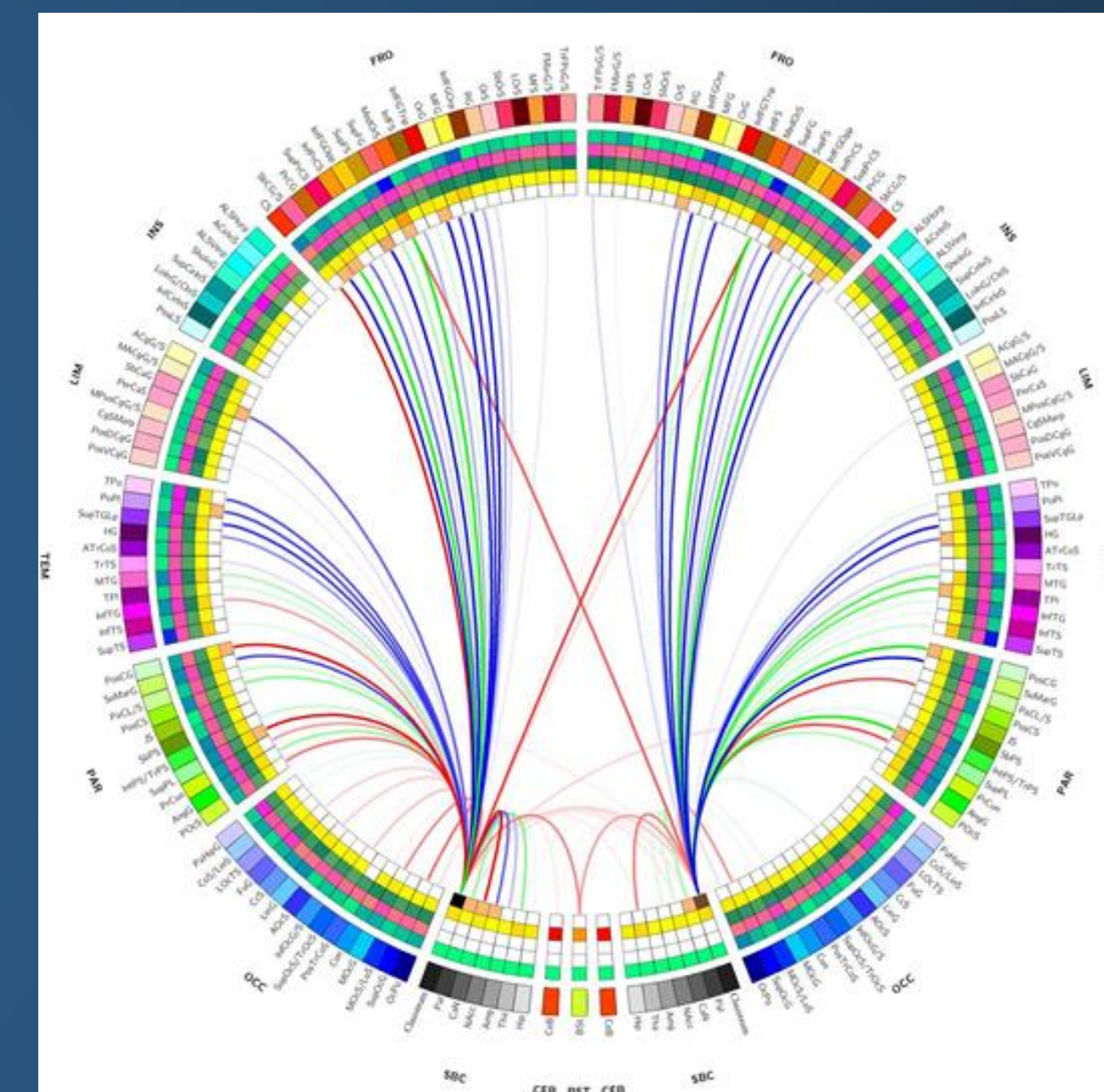
## Methods

In this study, three-dimensional models of the bilateral claustra were obtained from T1-weighted MPAGE structural MRI image volumes. White matter fiber tractography was performed and inter-regional connectivity was computed by determining the relative proportion of extracted fibers initiated or terminated within the boundaries of each anatomical parcel. A set of customized LONI Pipeline workflow (an example is shown below) was created to perform basic preprocessing of all subject data as a prelude to the application of regionally focused processing, atlas creation, and connectomics estimation.



## Results and Discussion

Regional morphometrics for the entire brain are represented as a circular “connectogram.” The measurements for only those fiber pathways which emanate to/from the left and/or right claustra are shown as “heat rings” including, from the outside inward, cortical thickness, regional volume, surface area, and connectivity density. The information contained in the computed connectivity matrix is used here to illustrate the pattern and strength of connections between brain regions.



Line opacity is proportional to connection density, whereas color represents the average FA integrated along all pathways comprising that connection. Red is high average FA, green in medium average FA, and blue if low mean FA, according to the upper, middle, and lowest thirds of the FA distribution.

## References

Further information on connectogram construction and interpretation can be found in:

1. Irimia, Chambers et al. 2012
2. <http://en.wikipedia.org/wiki/Connectogram>

