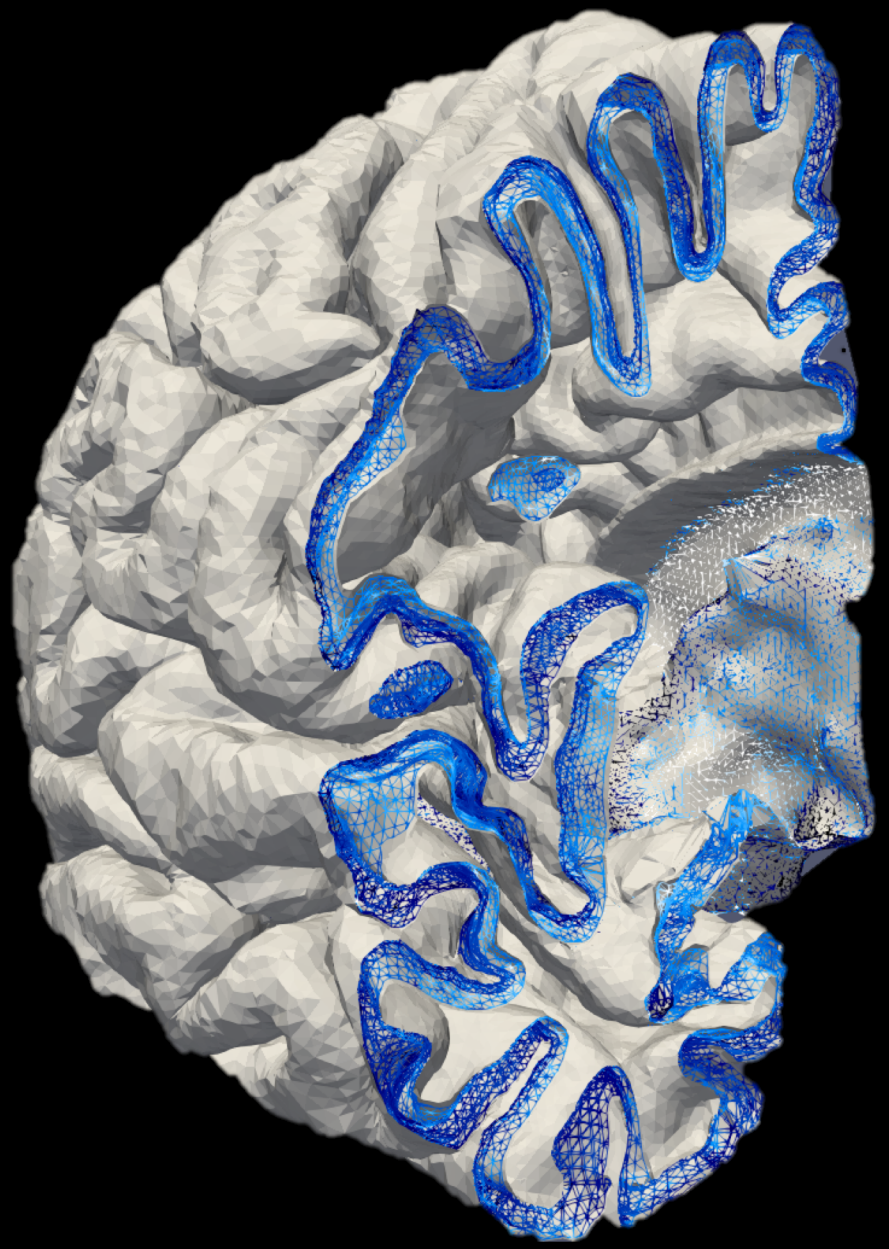

Large-scale cortical gradients revealed by intracortical microstructure

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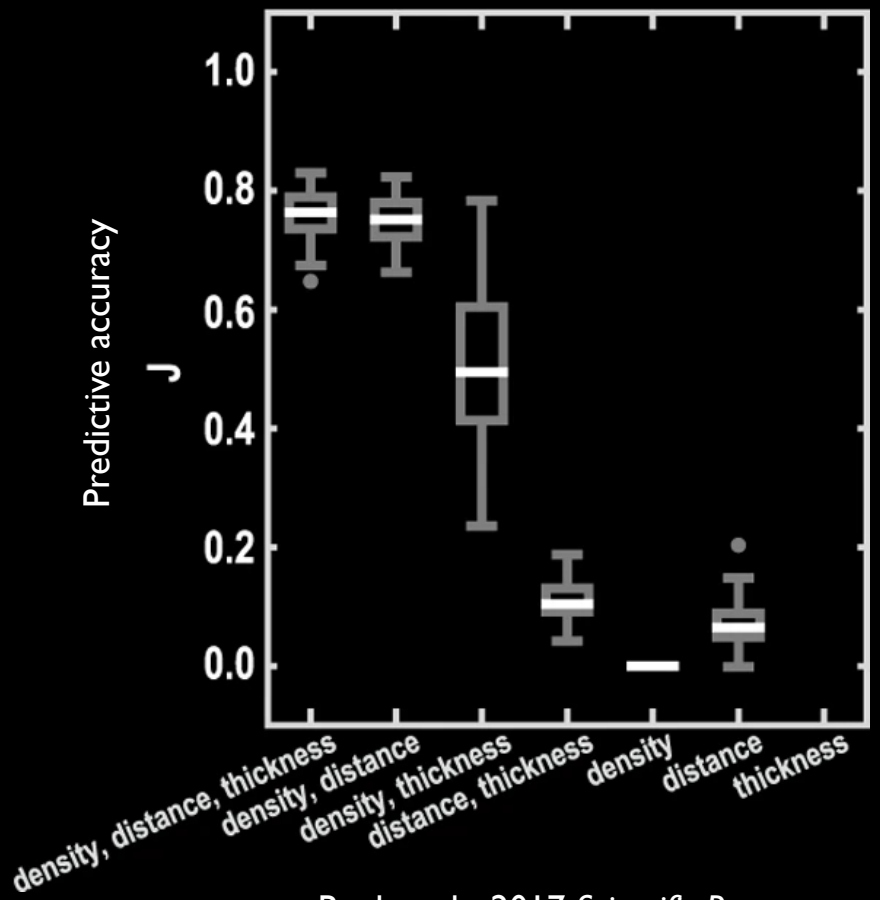
The Neuro
McGill University

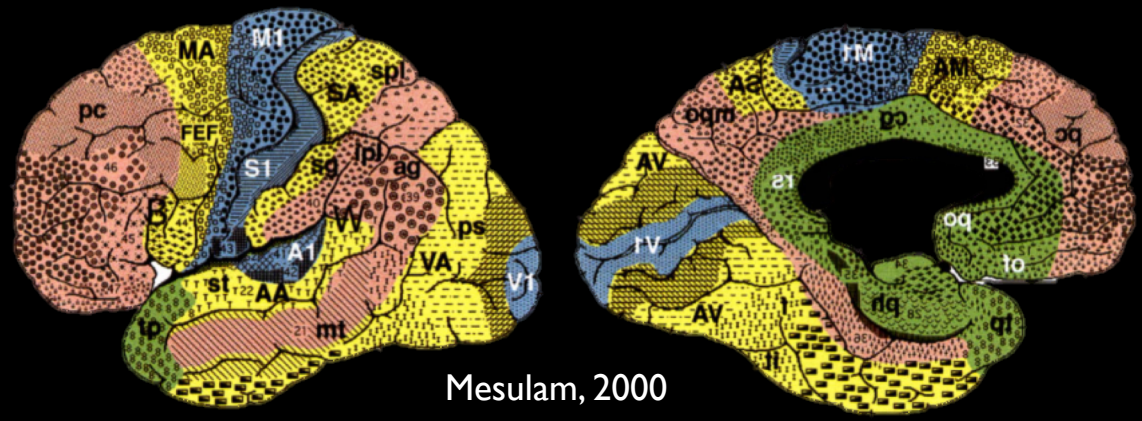
HIBALL Launch Workshop

MICA neuro Montreal Neurological Institute-Hospital HIBALL HELMHOLTZ International BigBrain Analytics & Learning Laboratory

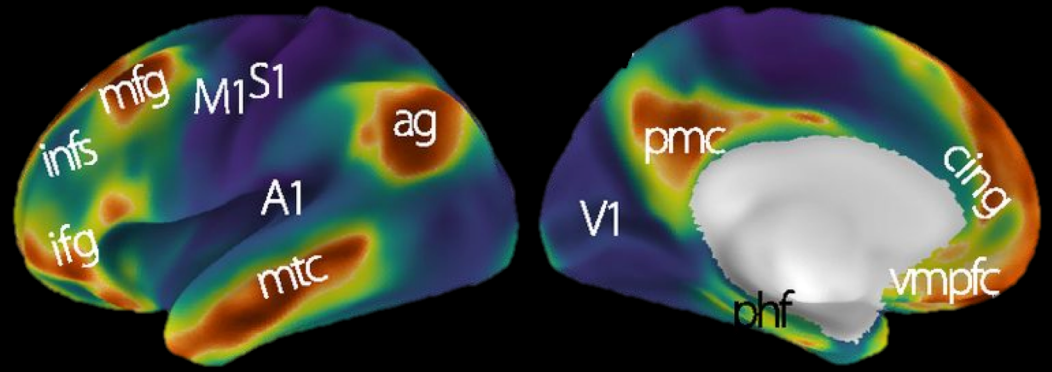
Coupling of Microstructure with Function



Beul et al.,, 2017 *Scientific Reports*

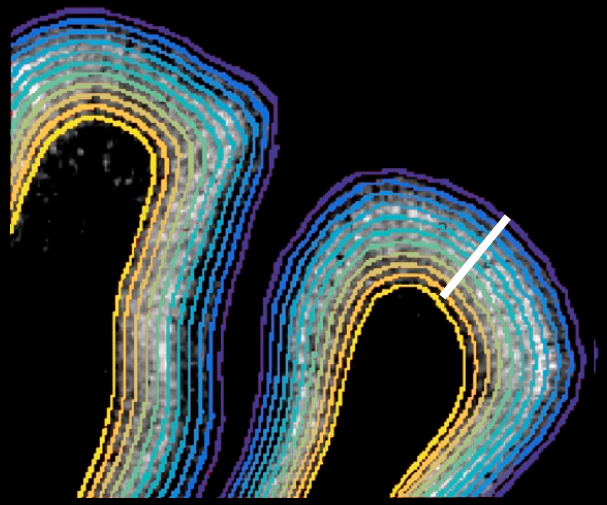


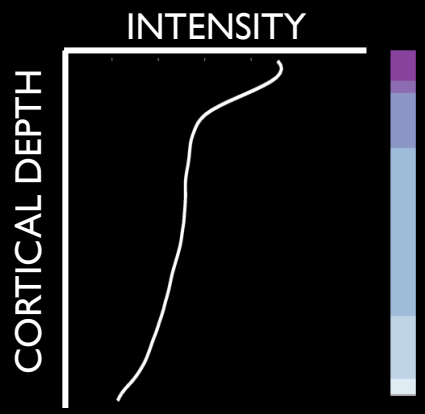
Mesulam, 2000

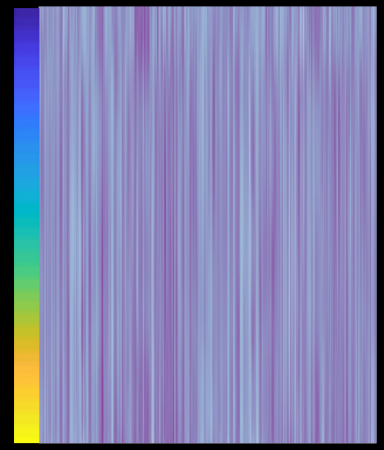


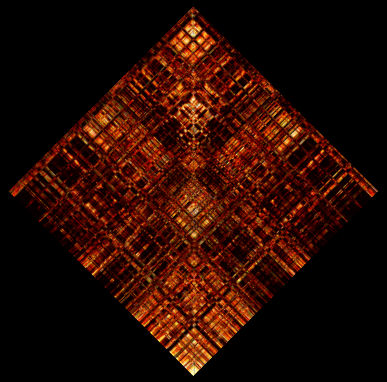
Margulies et al., 2016 *PNAS*

Observer-Independent Determination of Principle Cytoarchitectural Axis

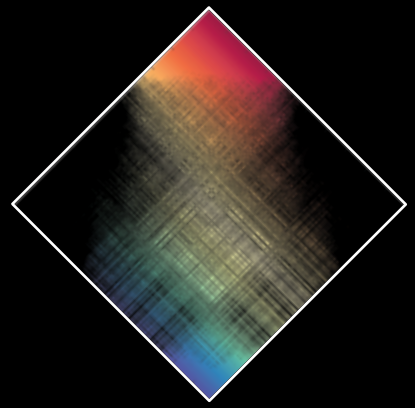


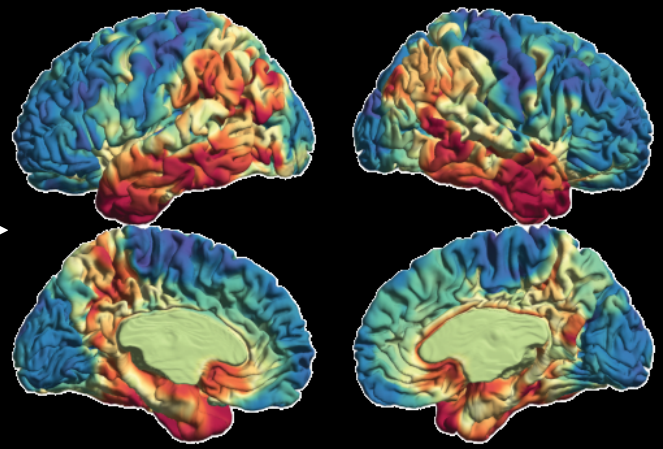




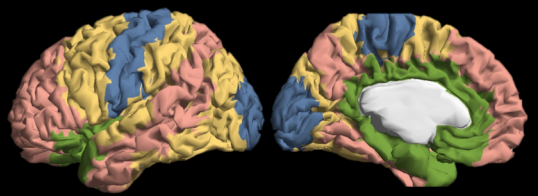


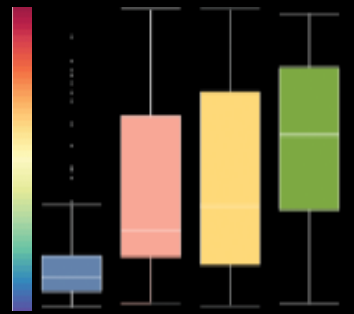
Microstructure Profile Covariance





Low gradient value — High gradient value

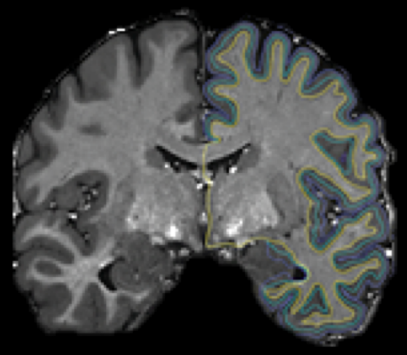




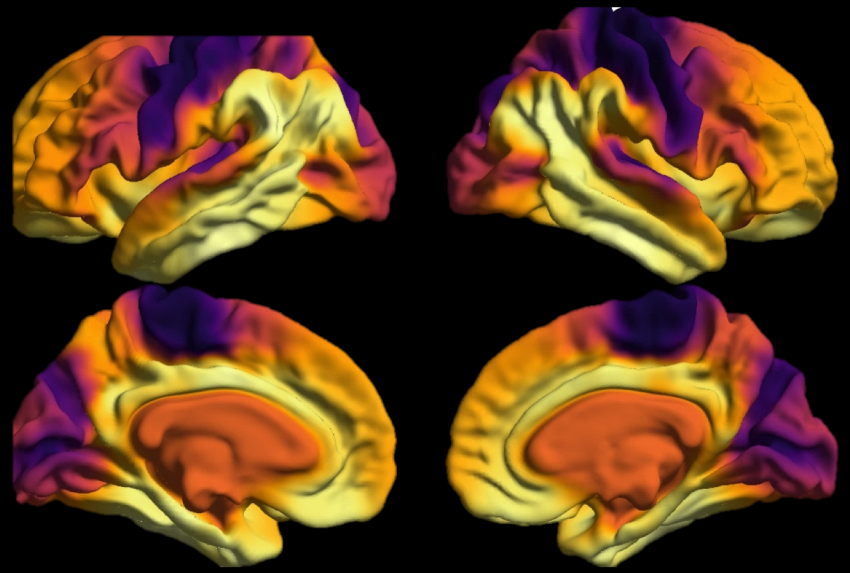
Levels of laminar differentiation

Paquola et al., 2019 *Plos Bio*

In-vivo Microstructural Gradient

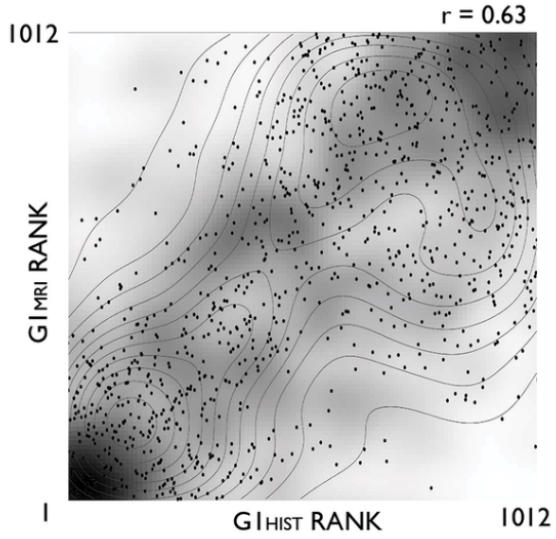


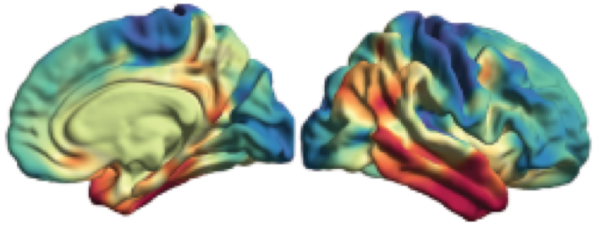
Dataset 1: Human Connectome Project, T1w/T2w
Dataset 2: NSPN healthy adolescents, MT
Dataset 3: MICs healthy adults, qT1

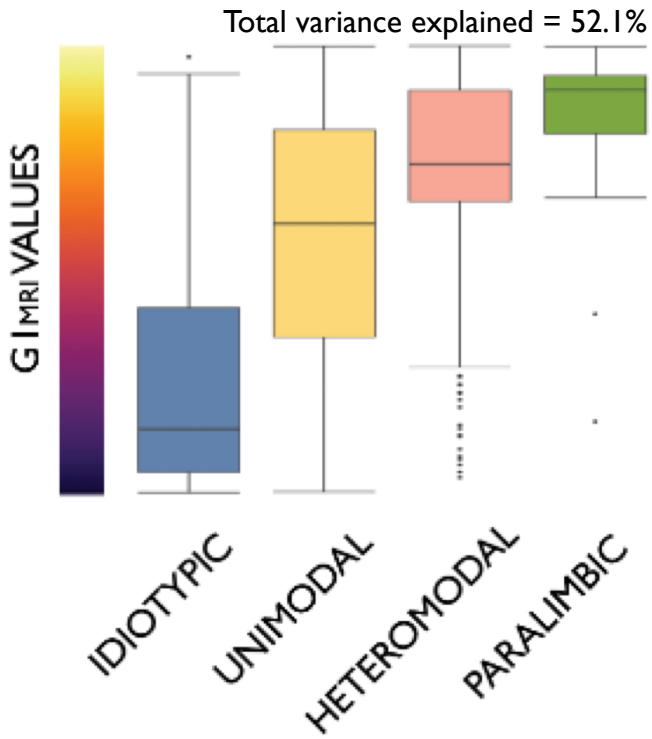


Low gradient value — High gradient value

Conforms with BigBrain Gradient







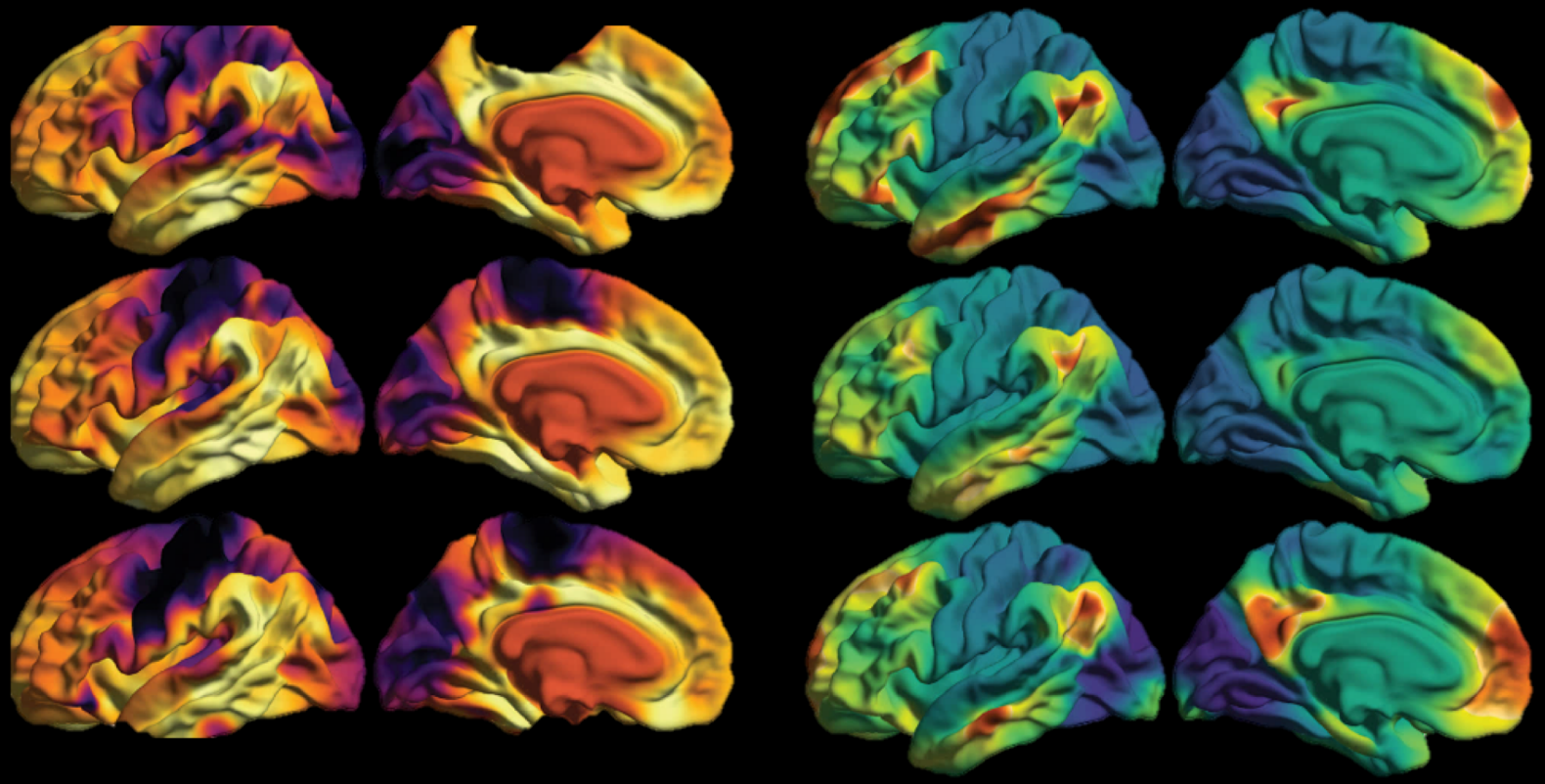
Paquola et al., 2019 *Plos Bio*

Topographical relationship of microstructure and function

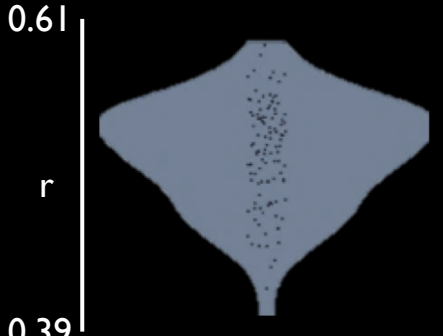
Subject 1

Subject 2

Subject 3



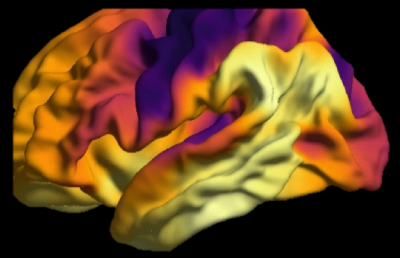
Individual correlation coefficients



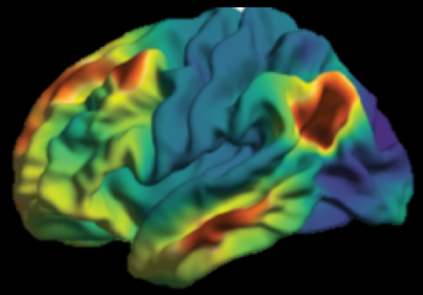
Paquola et al., 2019 *Plos Bio*

COMMON SENSORY-FUGAL GRADIENT WITH INFORMATIVE DIVERGENCES

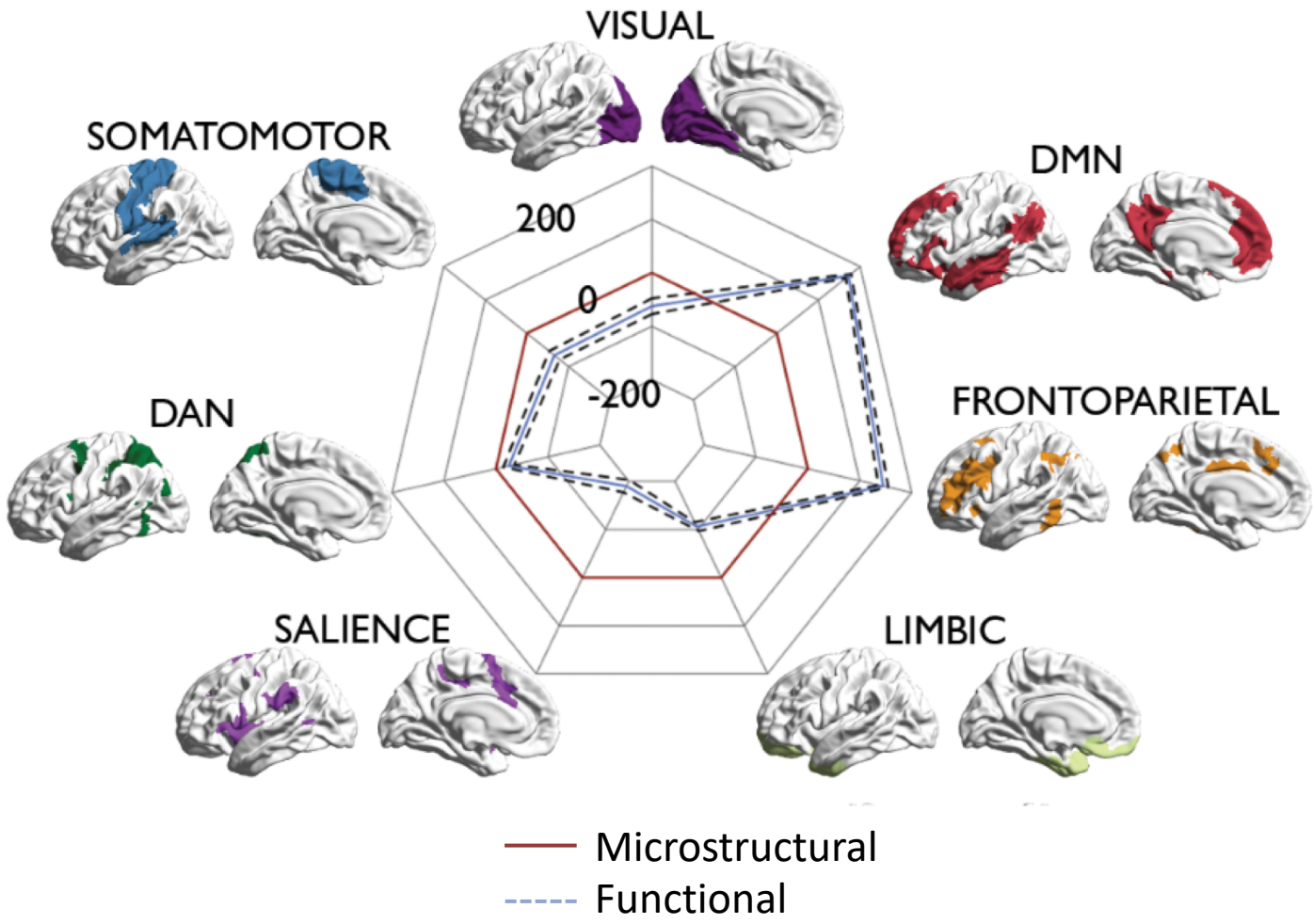
CYTOARCHITECTURAL



IN-VIVO MICROSTRUCTURAL

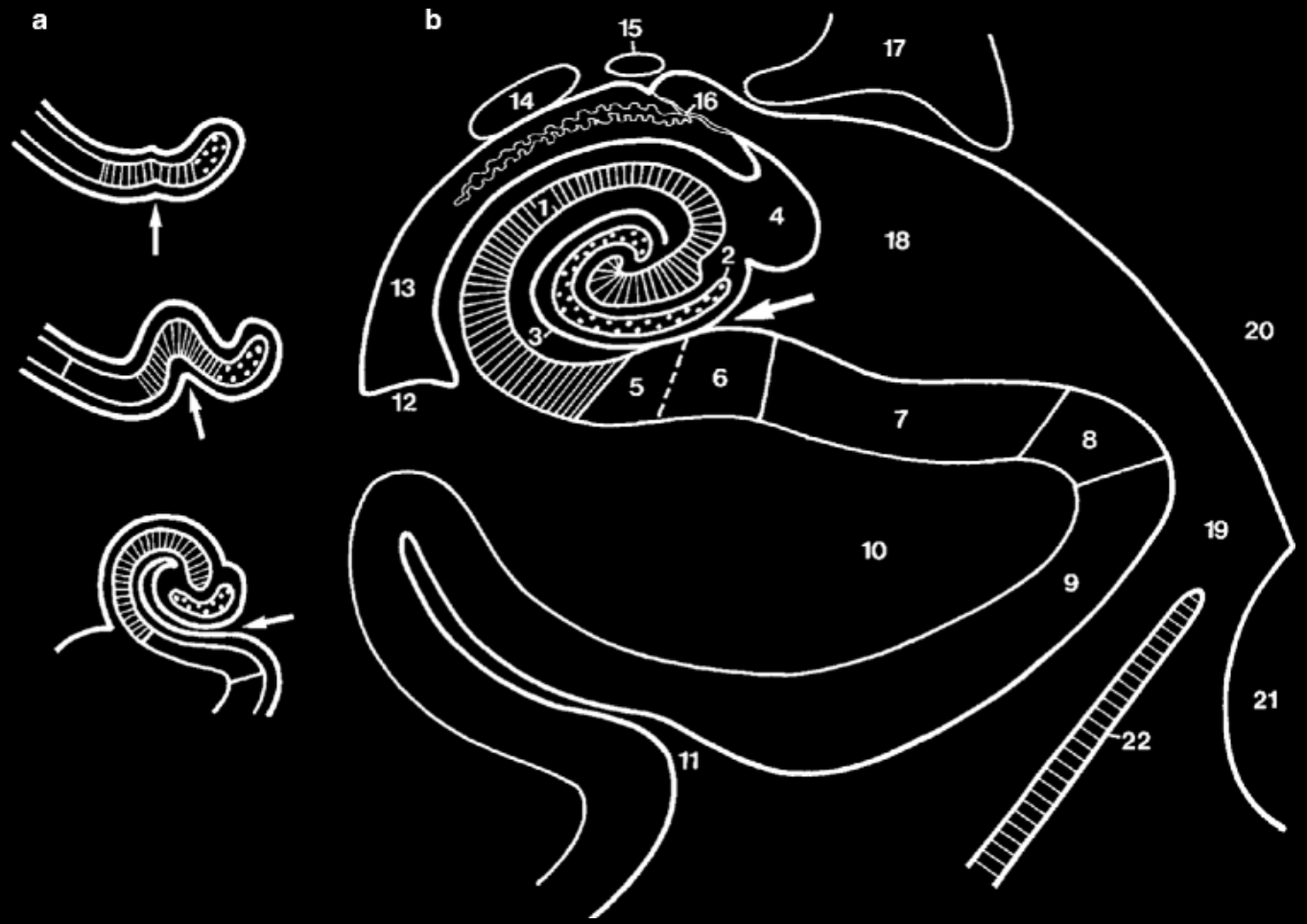


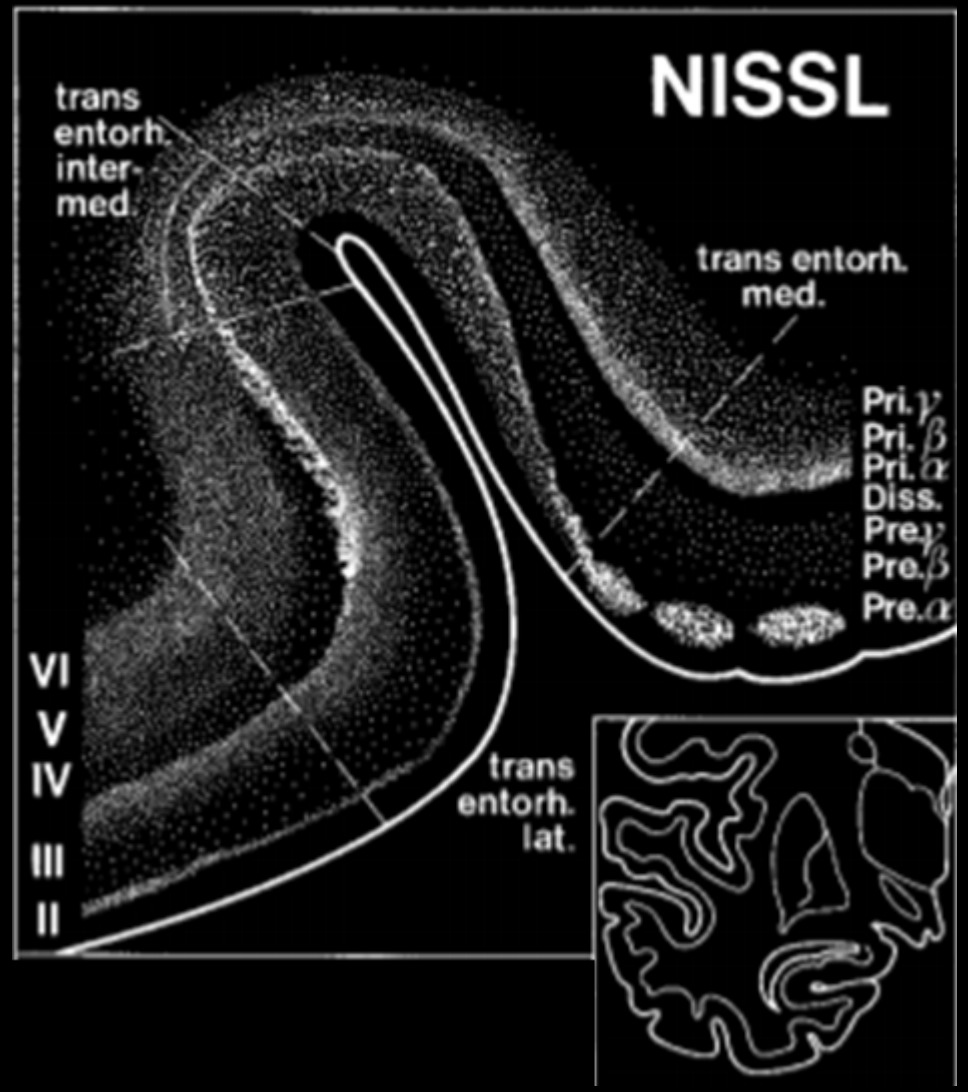
FUNCTIONAL



Paquola et al., 2019 *Plos Bio*

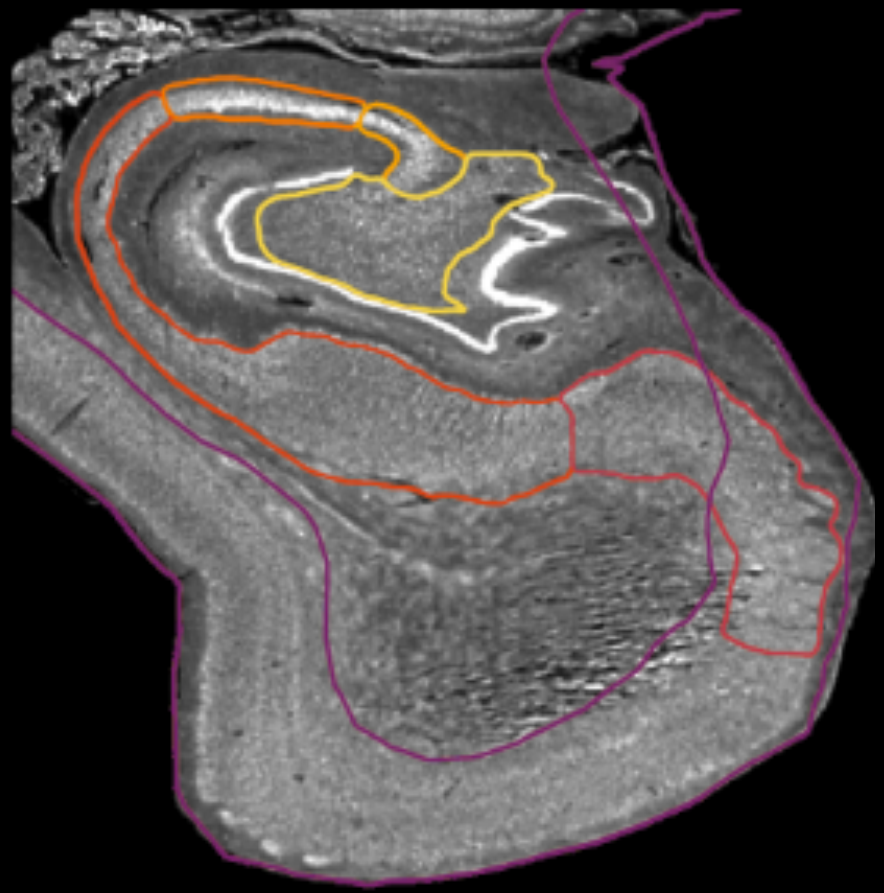
Unique Form and Cytoarchitecture of the Mesiotemporal Lobe (MTL)



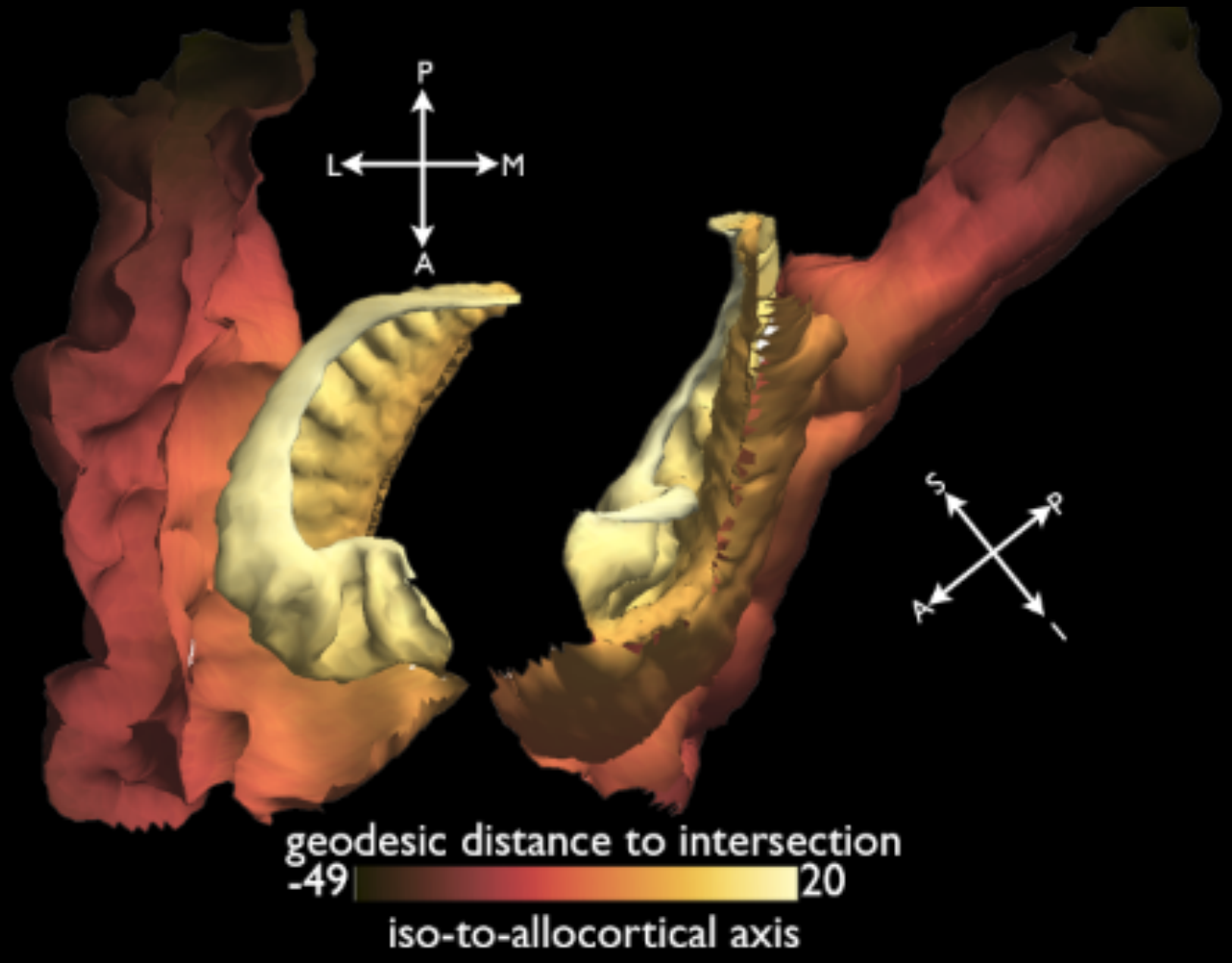


Duvernoy et al., 2013; Braak & Braak, 1985

A New Cohesive Surface Model of the Mesiotemporal Lobe

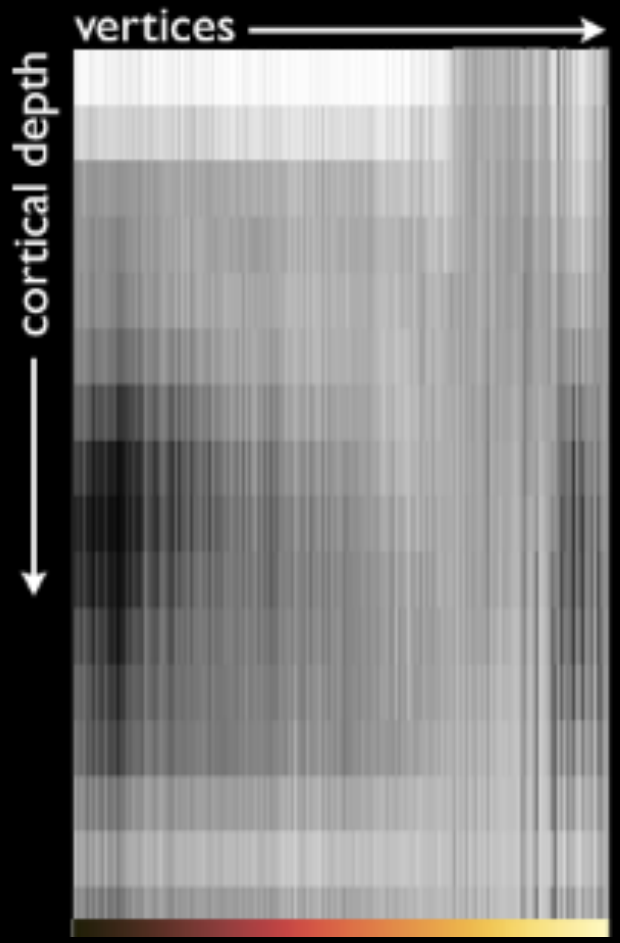


Lateral ⟷ Medial

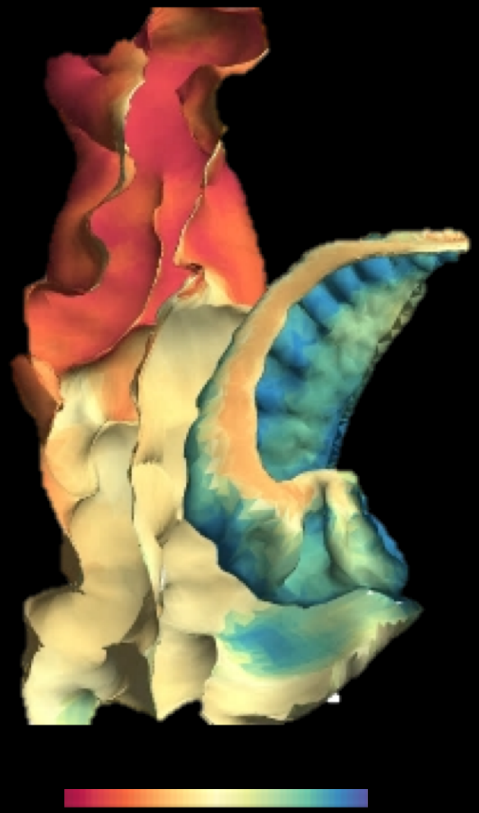


Paquola et al., 2020 *bioRxiv*

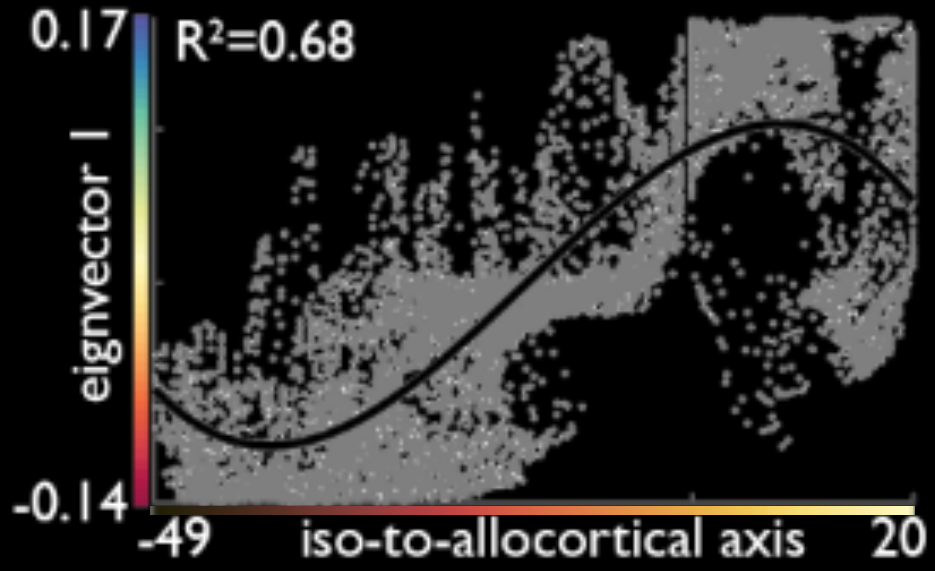
The Iso-to-Allocortical Cytoarchitectural Gradient



iso-to-allocortical axis

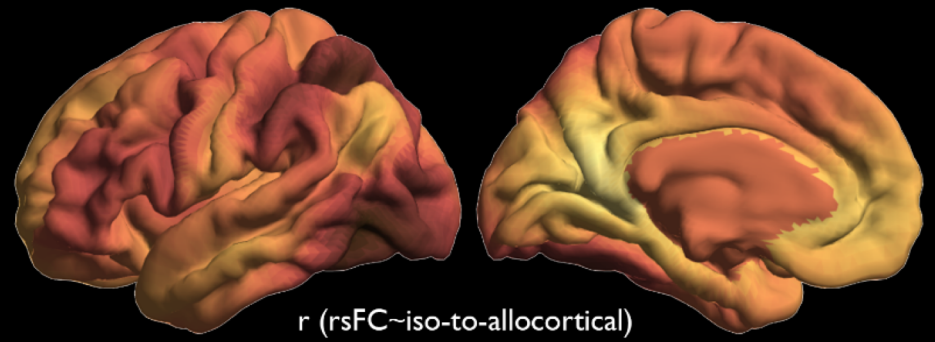


eigenvector 1

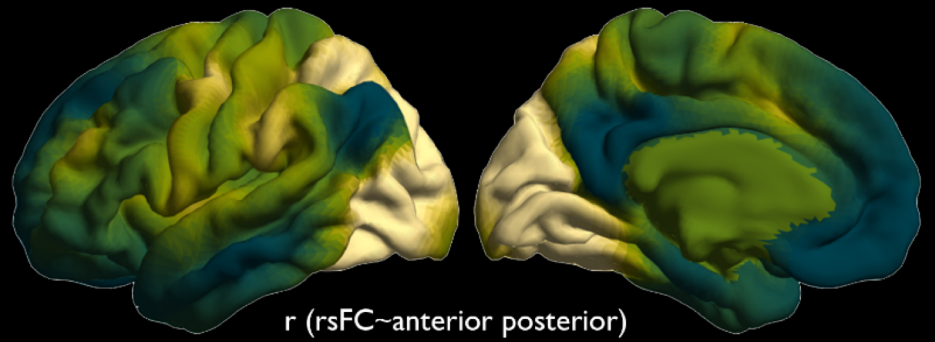


Paquola et al., 2020 *bioRxiv*

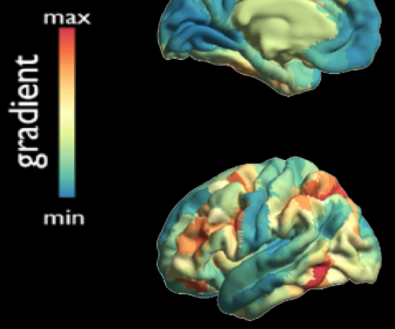
Functional Connectivity Along Axes Correspond to Distinct Isocortical Gradients

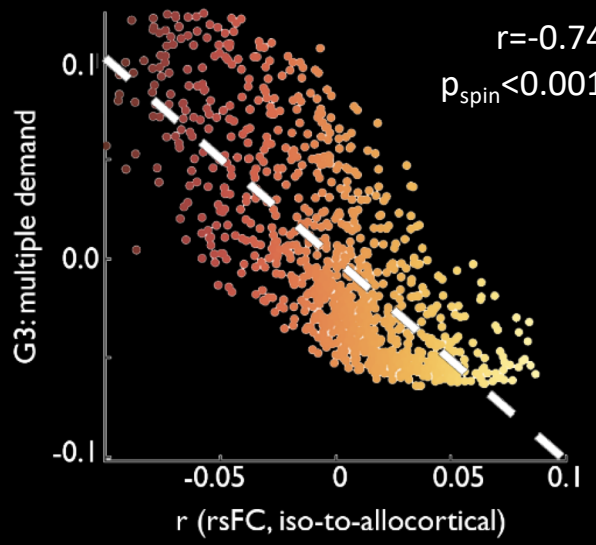


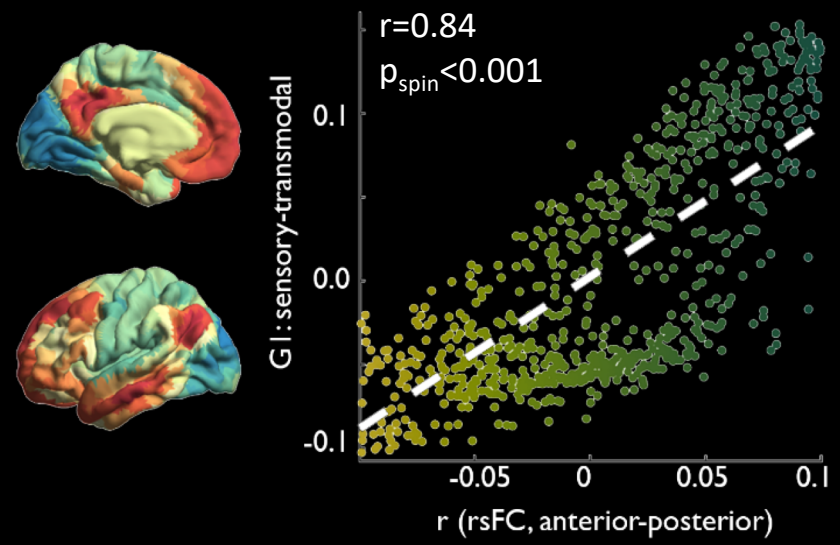
r (rsFC~iso-to-allocortical)



r (rsFC~anterior posterior)

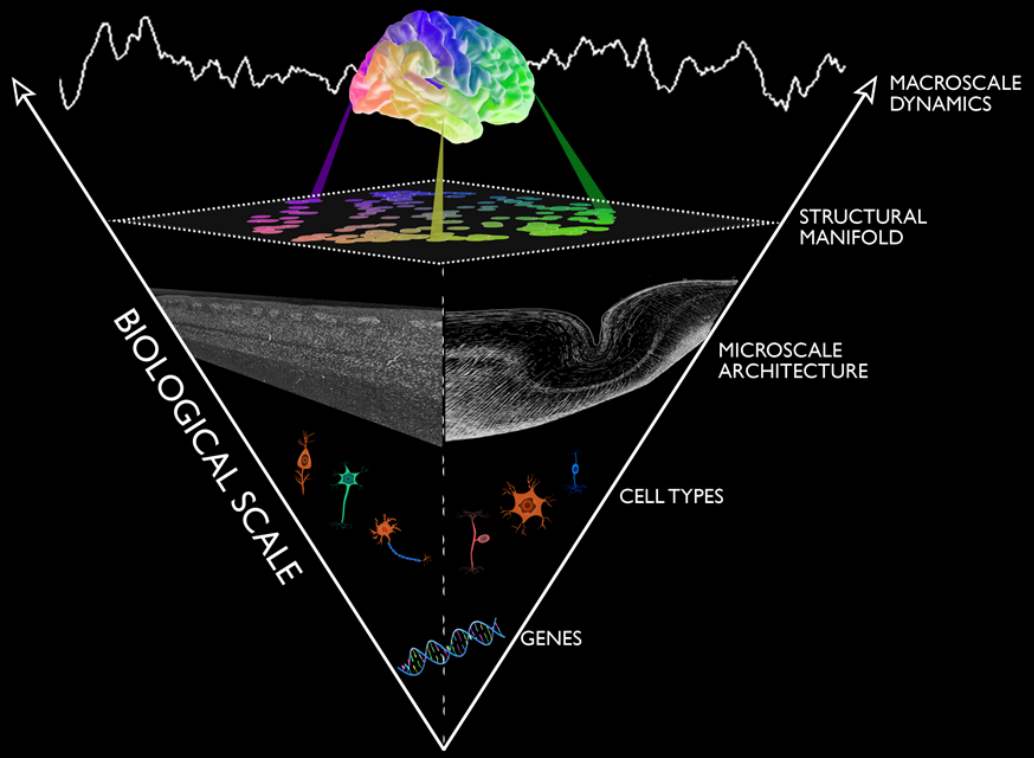




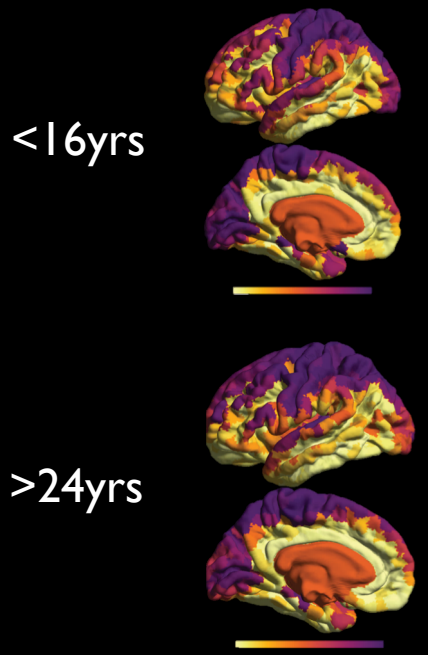


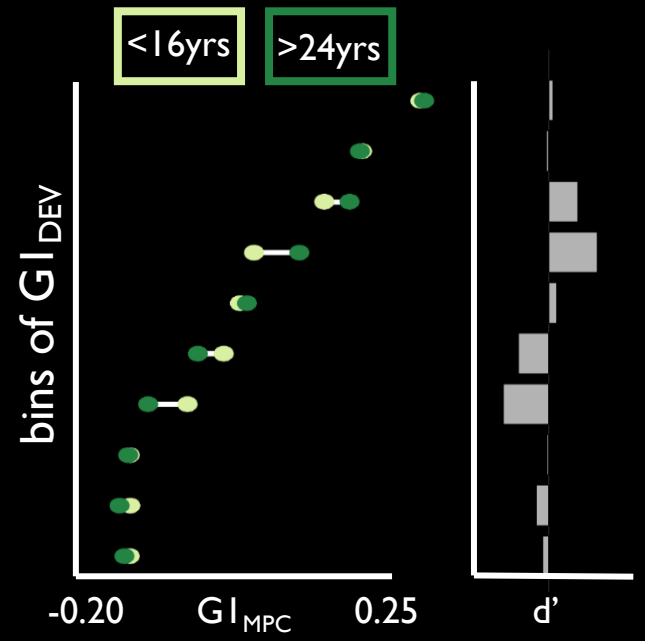
Paquola et al., 2020 *bioRxiv*

Towards Multi-Scale Models in Neurodevelopment



Paquola et al., 2020 *bioRxiv*





Paquola et al., 2019 *eLIife*

ACKNOWLEDGMENTS

Code and data available at:
https://github.com/MICA-MNI/micaopen

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Open datasets

BigBrain
Human Connectome Project

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