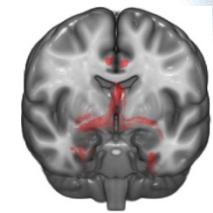
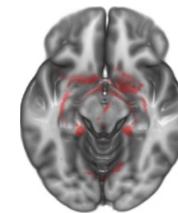


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**PARIS-SUD 11**

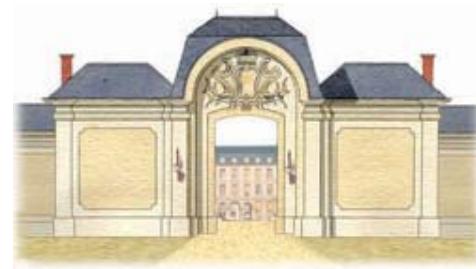


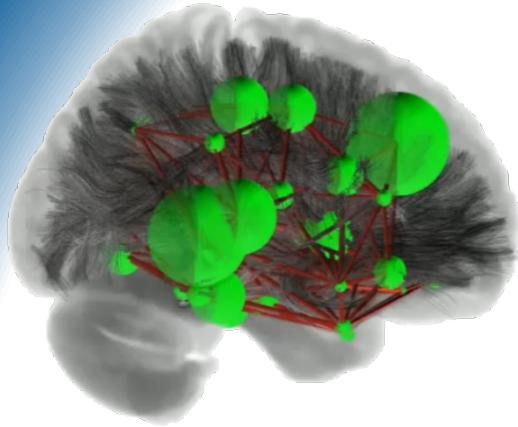
# Emotions processing and behavior related to olfactory environment : Brain functional MRI findings

Pr Denis Ducreux

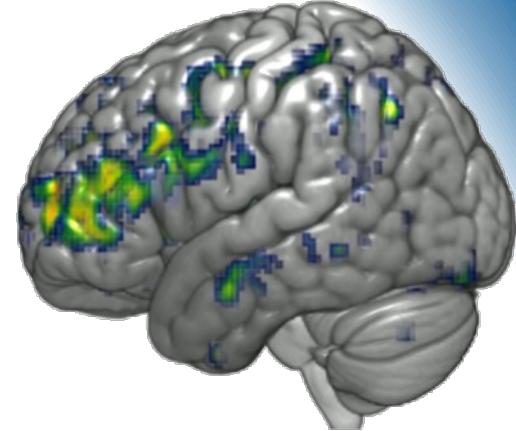
Neuroradiologie, CHU Bicêtre

CNRS IR4M (UMR 8081), Université Paris 11



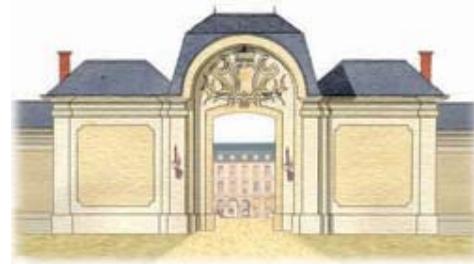
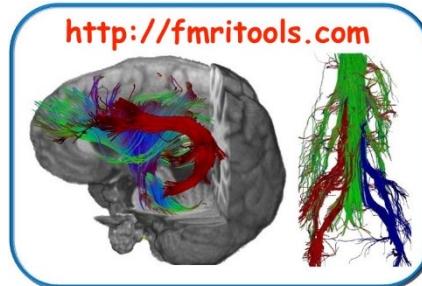


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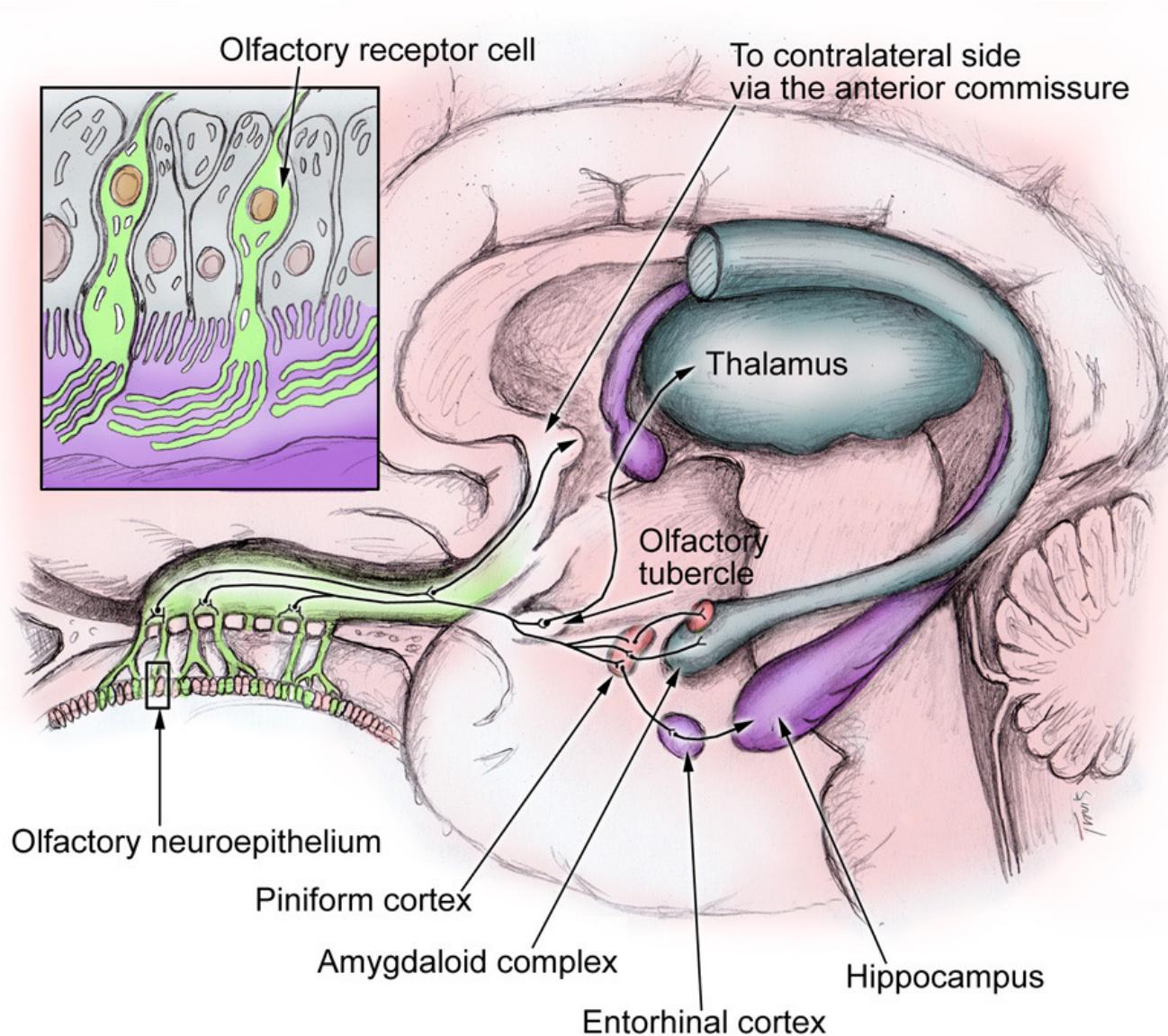


# L'IRM Fonctionnelle Cérébrale au C.H.U. Bicêtre

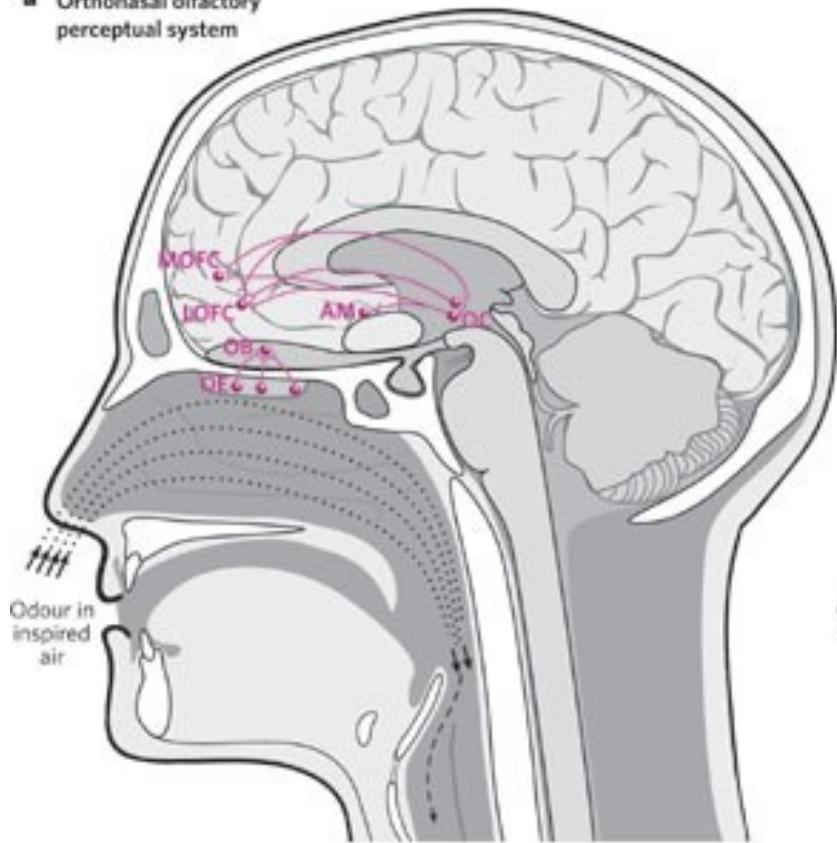
Hôpitaux  
universitaires  
**Paris-Sud**  
Antoine-Béclère Bicêtre Paul-Brousse



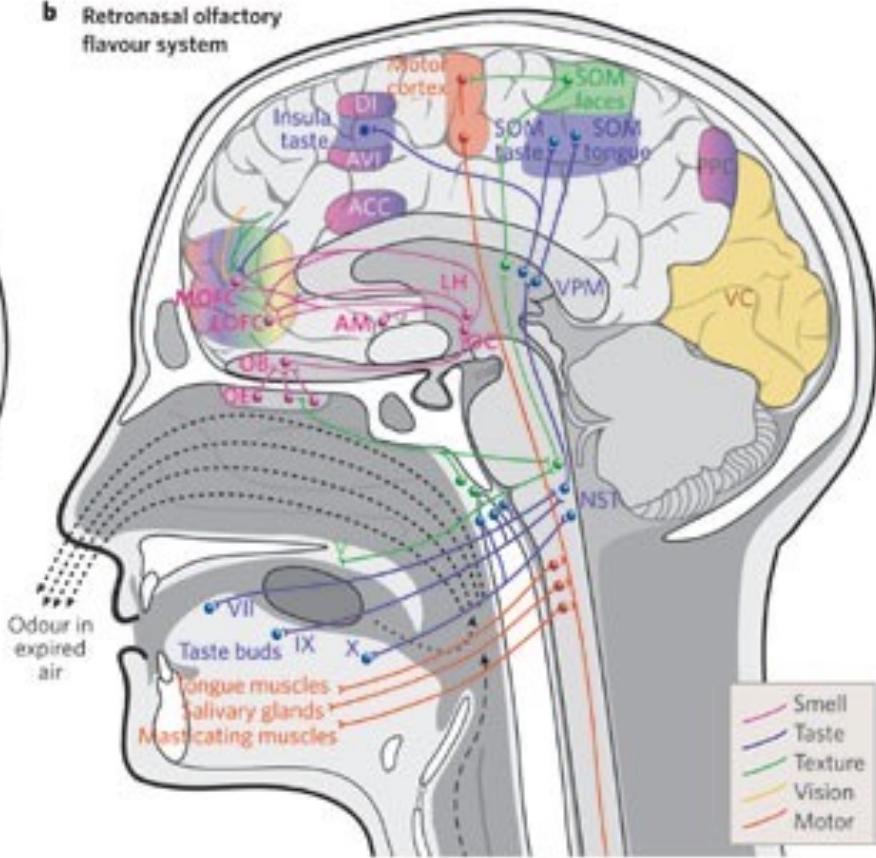


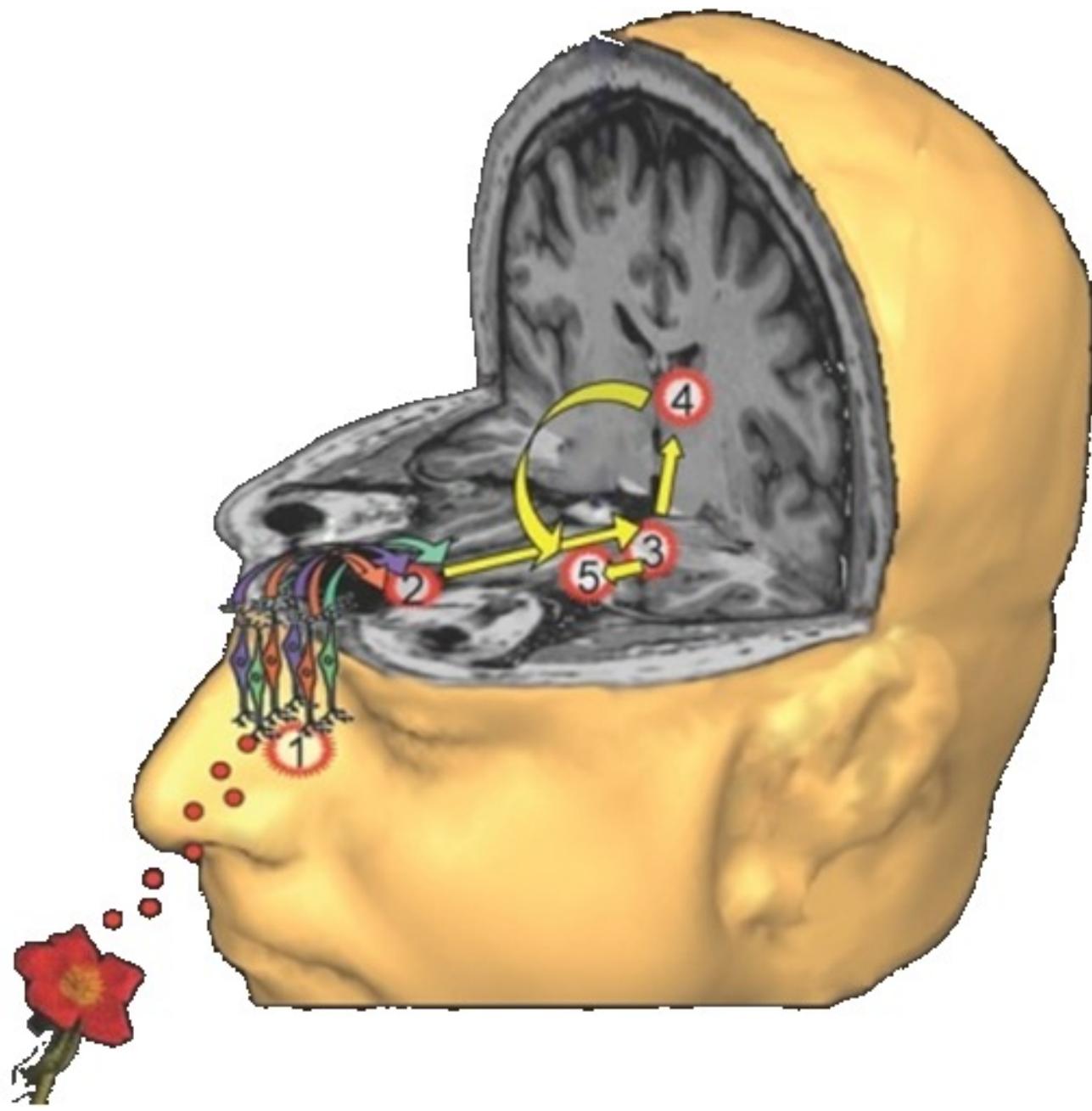


a Orthonasal olfactory perceptual system

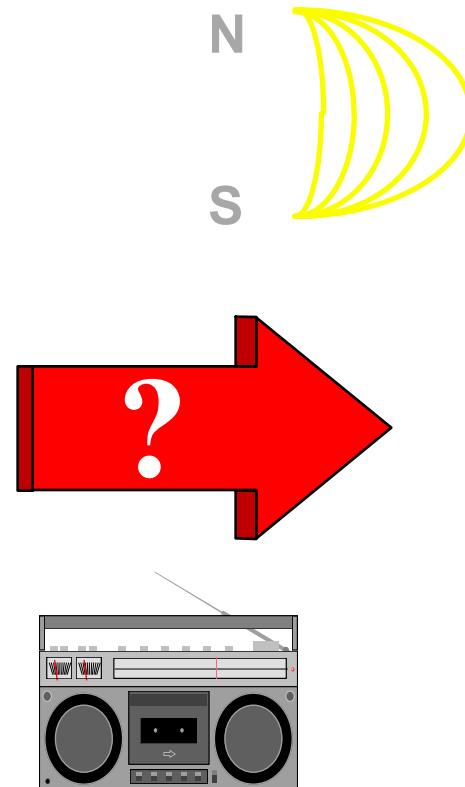
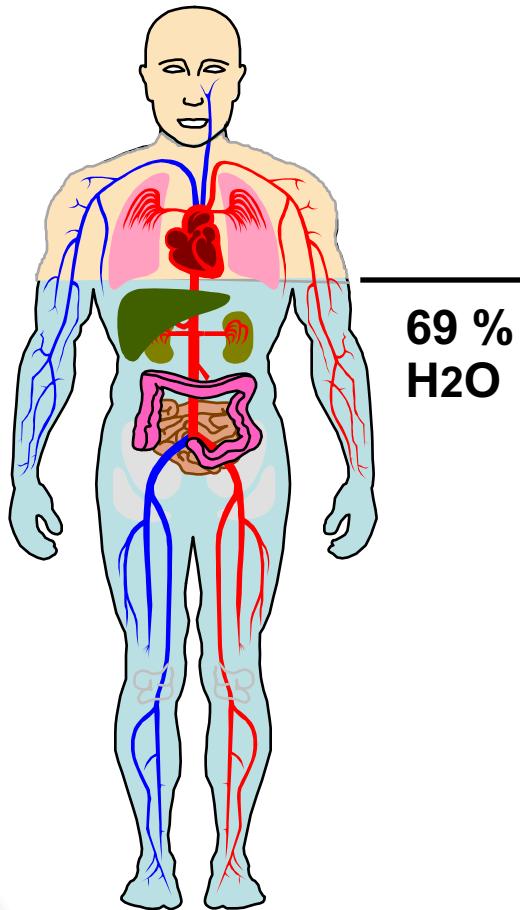


b Retronasal olfactory flavour system





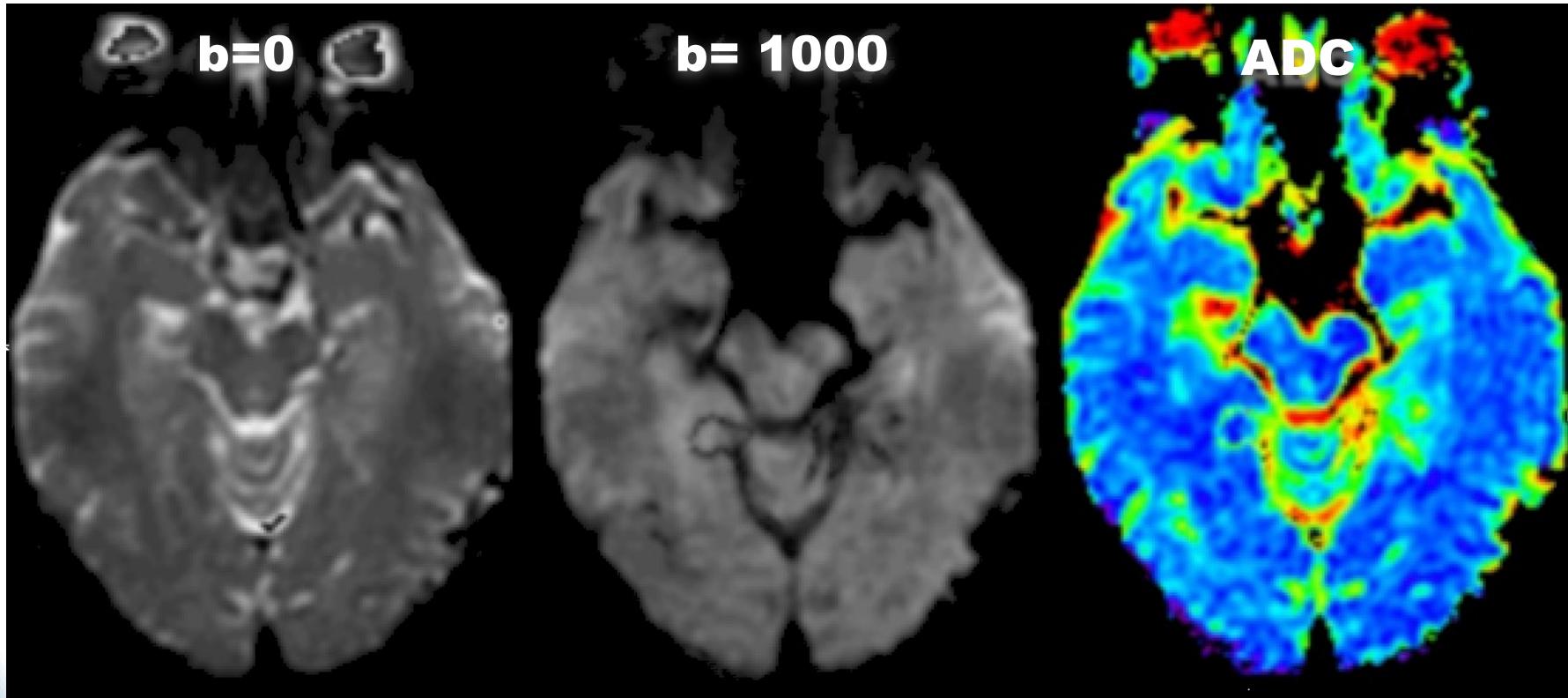
# M.R.I.



# **Diffusion-Weighted MRI**

# DIFFUSION

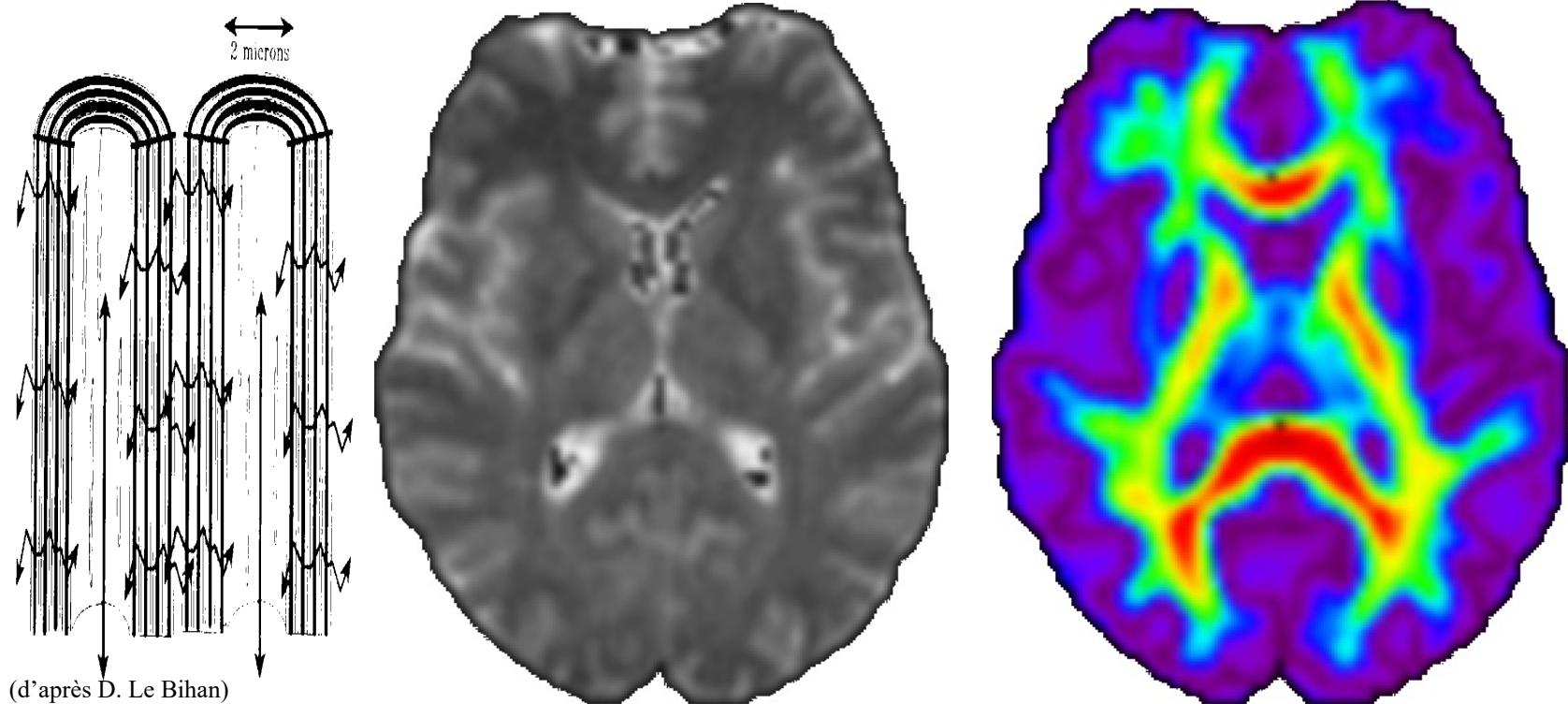
## Apparent Diffusion Coefficient

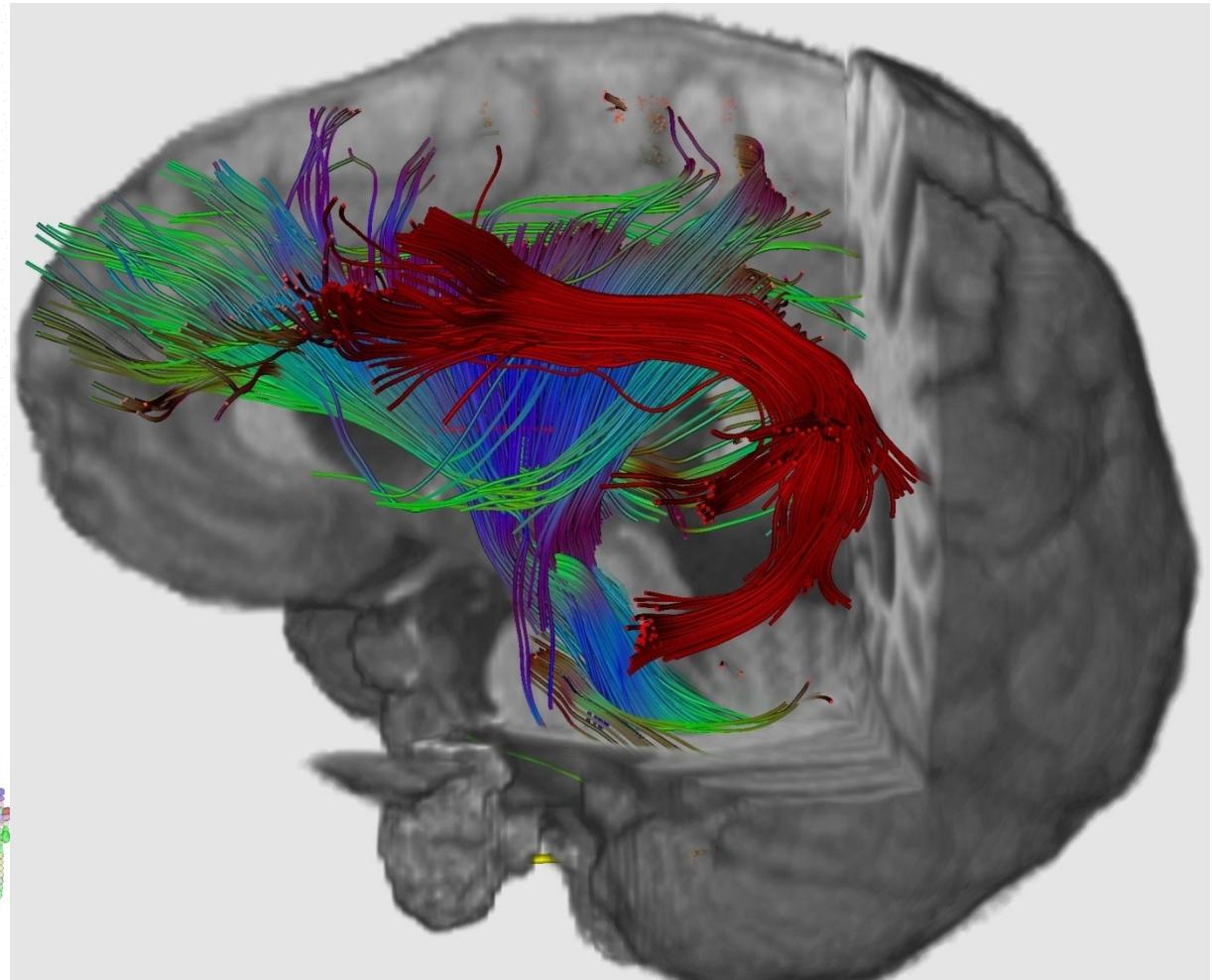
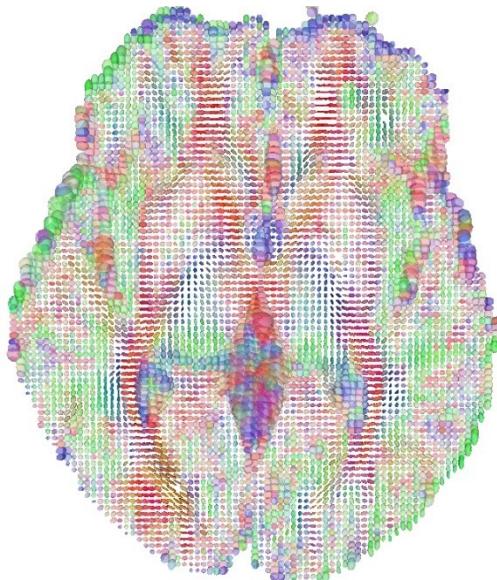
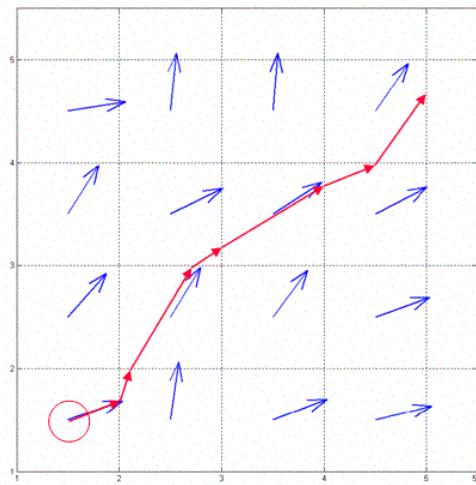


$$SA \approx e^{-b \cdot ADC} = e^{-\gamma^2 G^2 \delta^2 (\Delta - \delta/3) ADC}$$

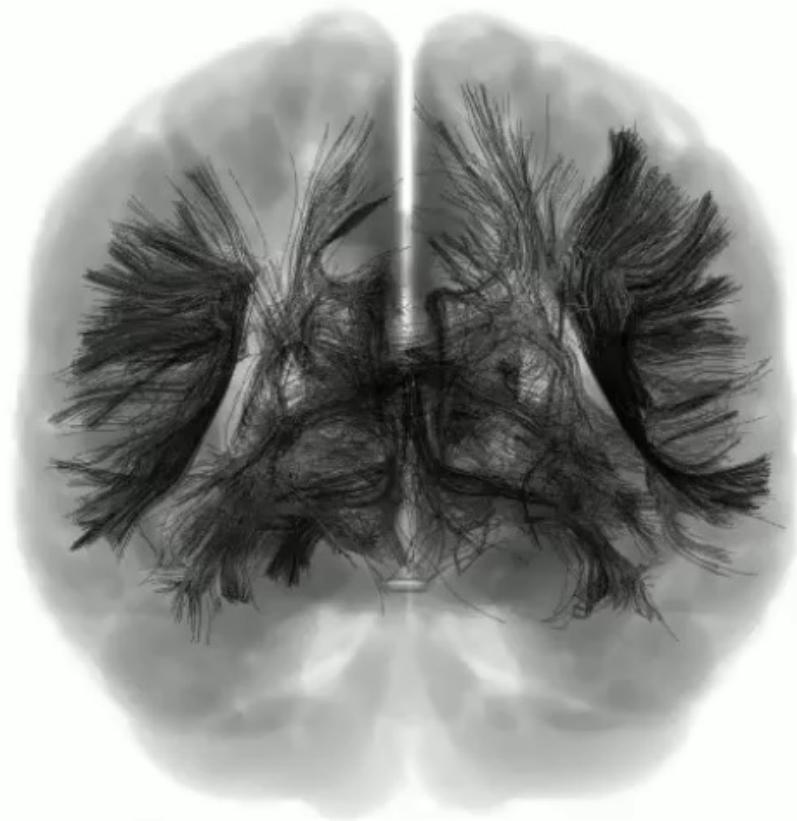
# Diffusion Tensor MRI

## Tractography





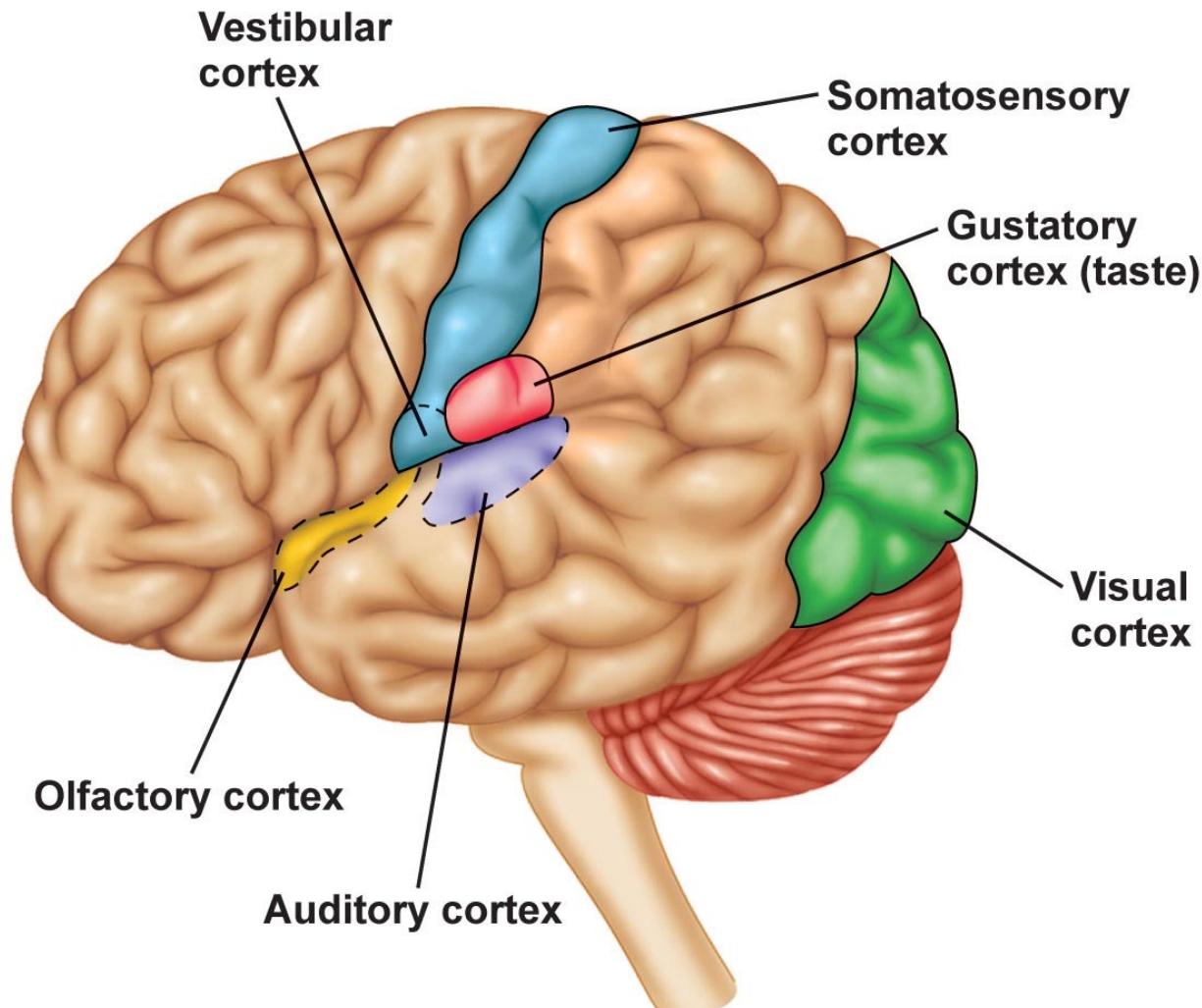
Made with fMRICRoTools



# **Functional MRI**

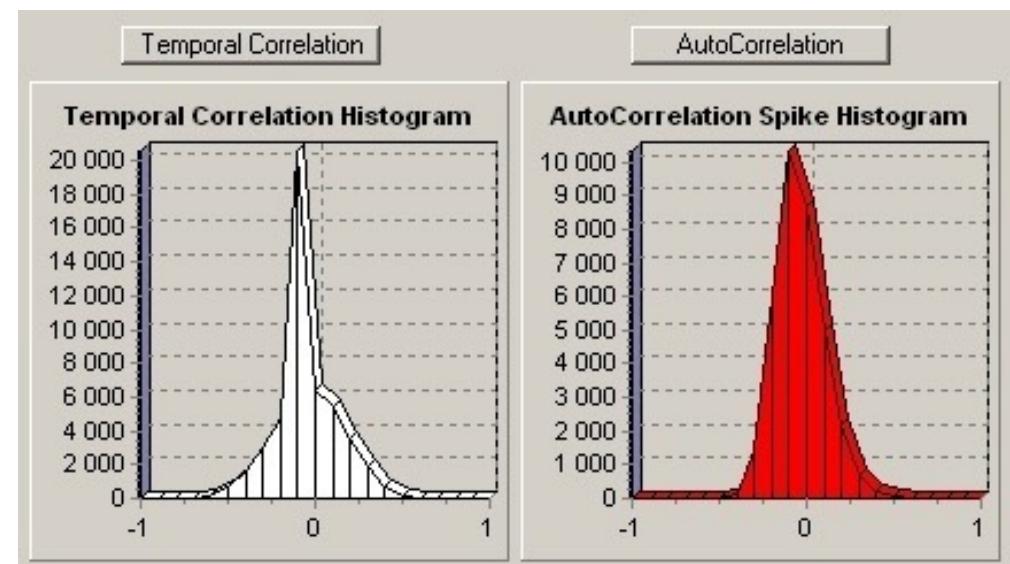
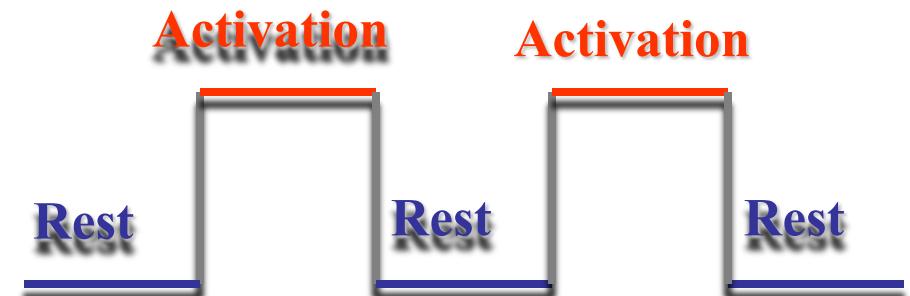
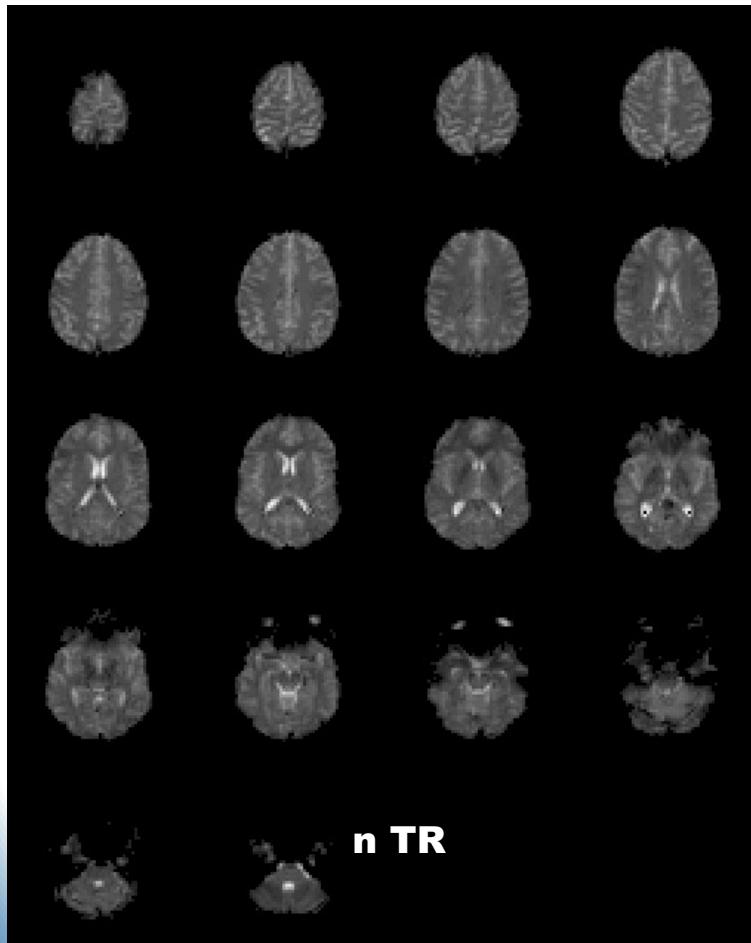
# Functional MRI

## Functional Neuro-Anatomy



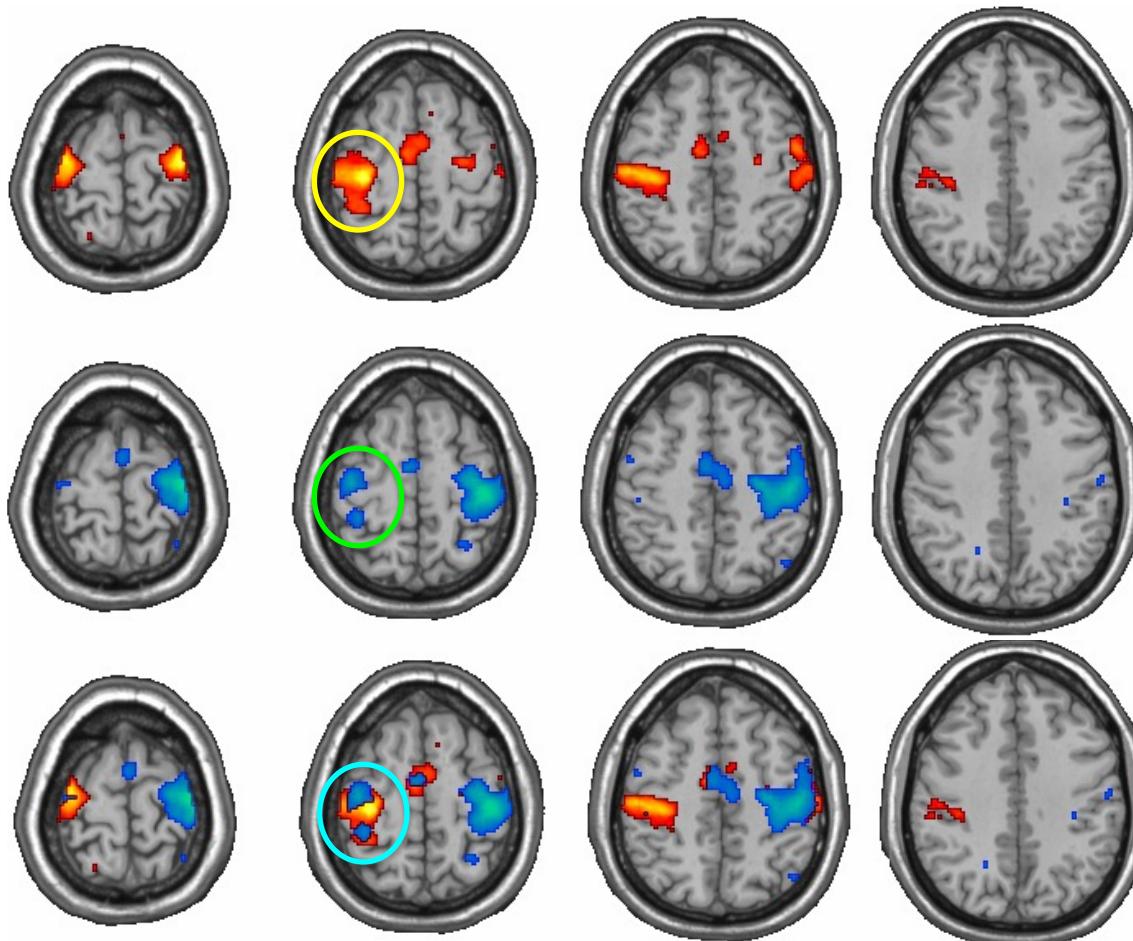
# Functional MRI

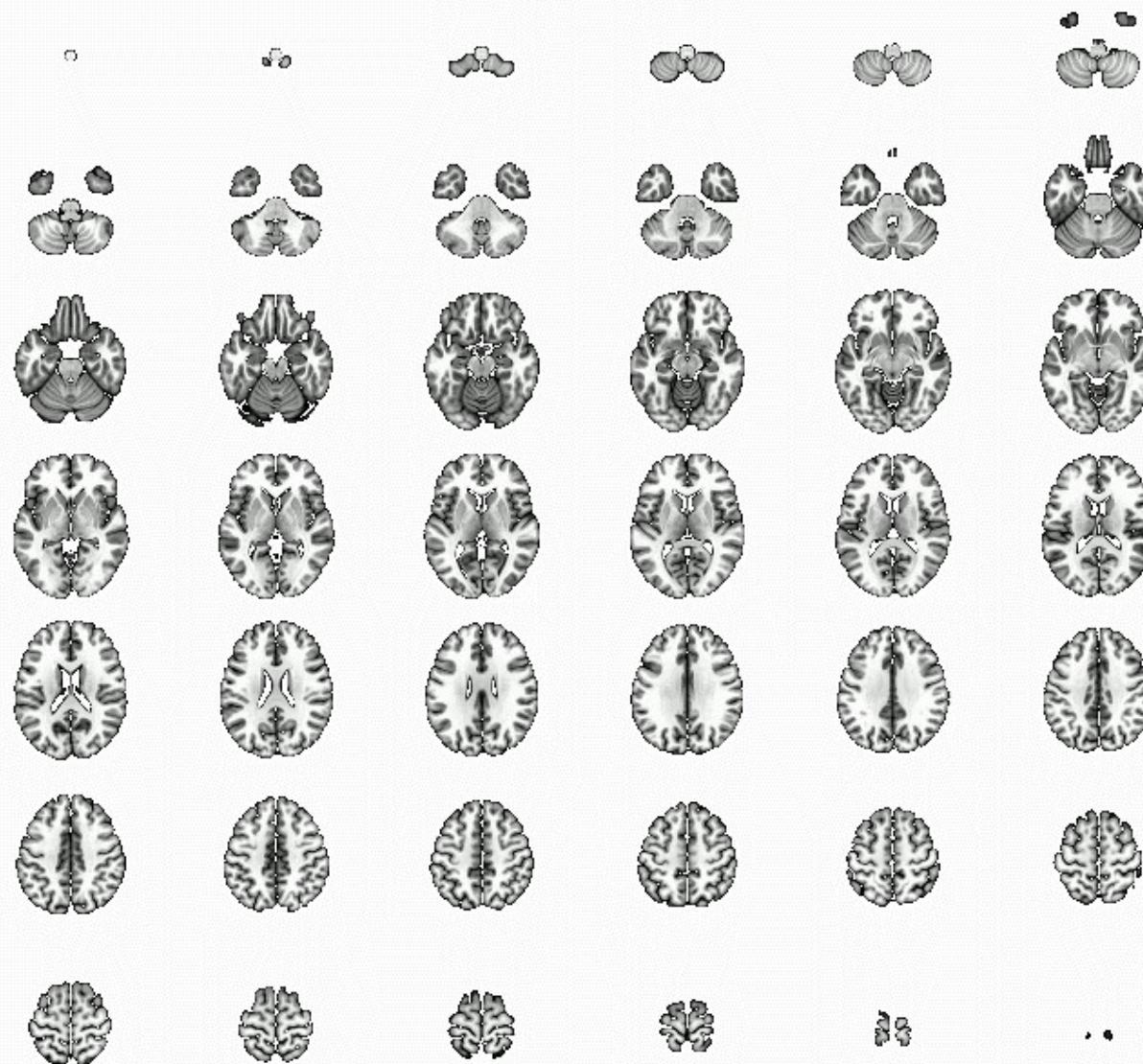
## Image Processing



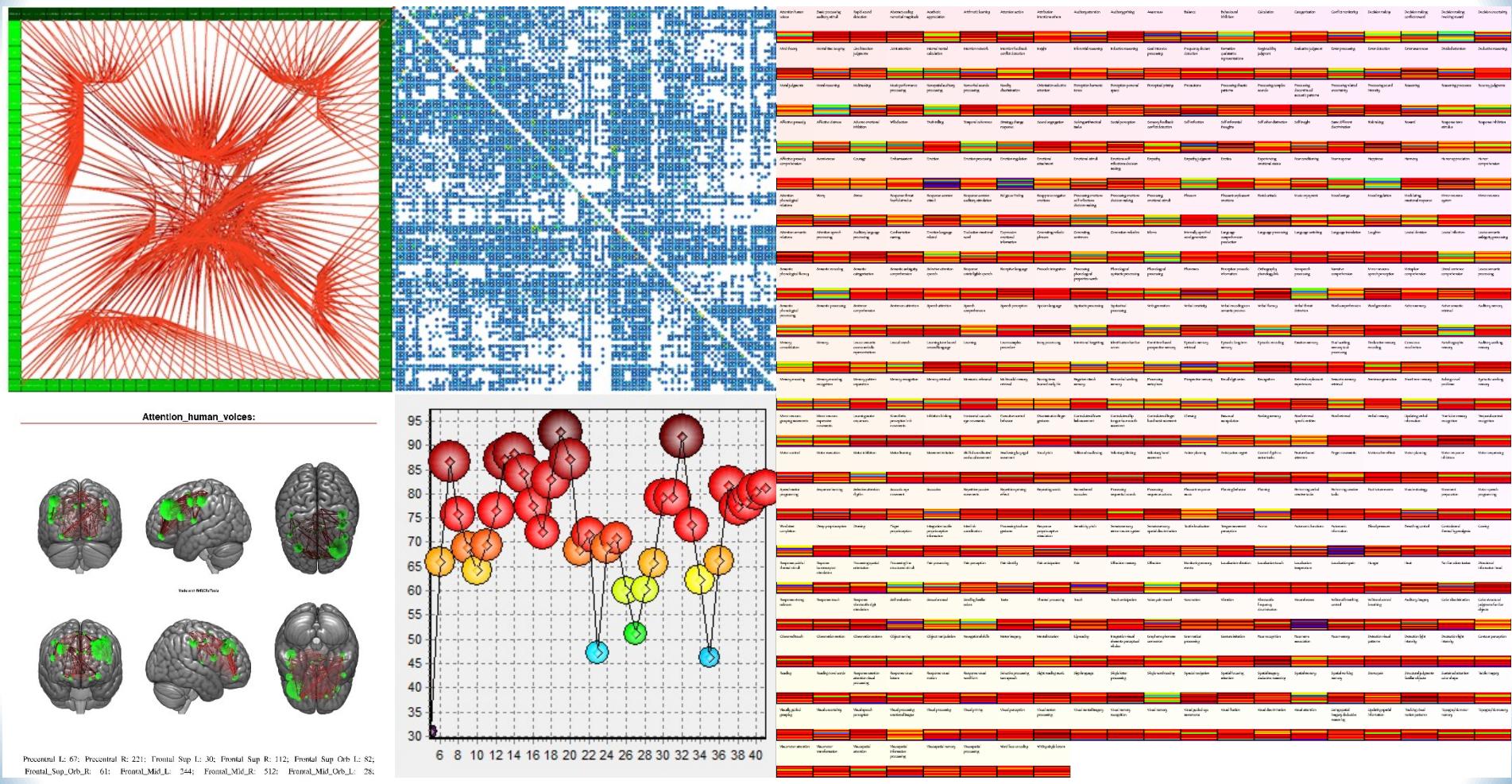
# Functional MRI

## Motor Mental Imaging

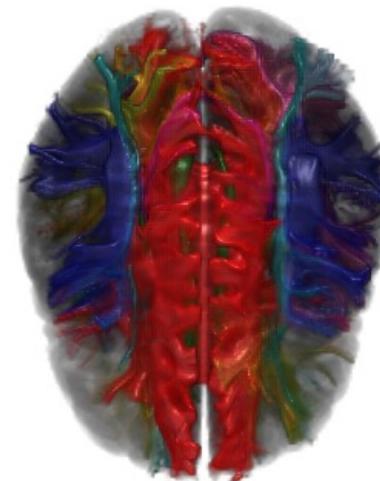
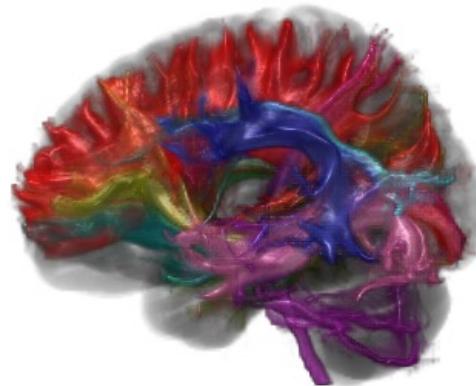
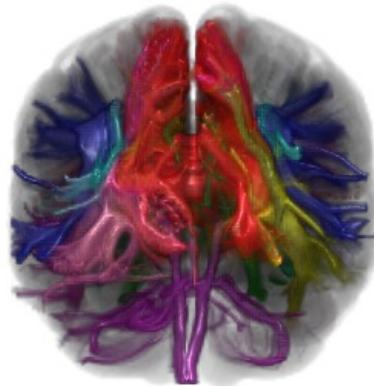




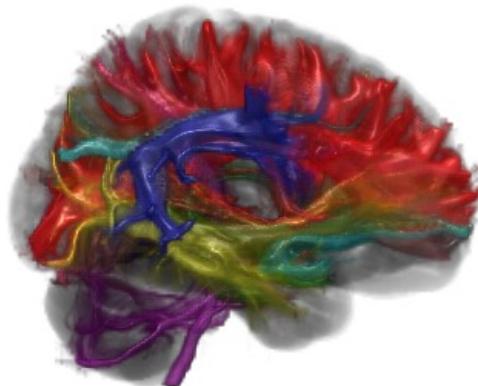
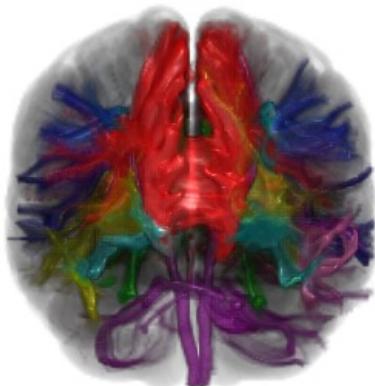
# **Connectomics**



# Morphological Connectomic

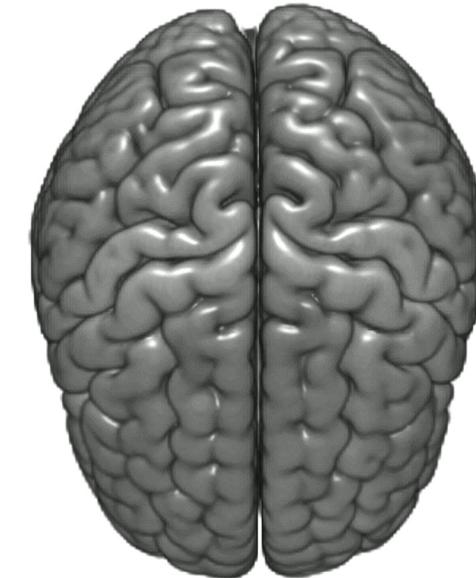
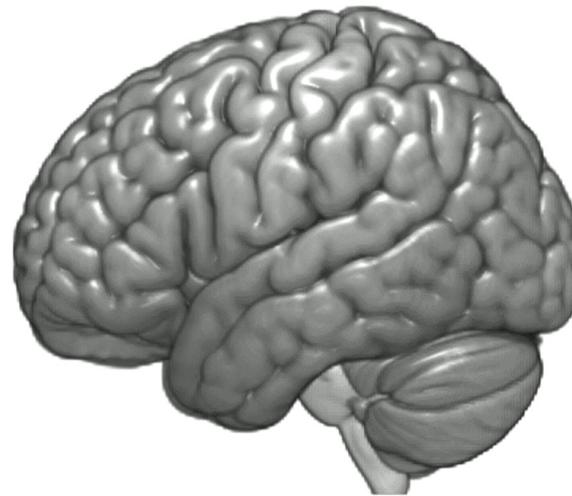
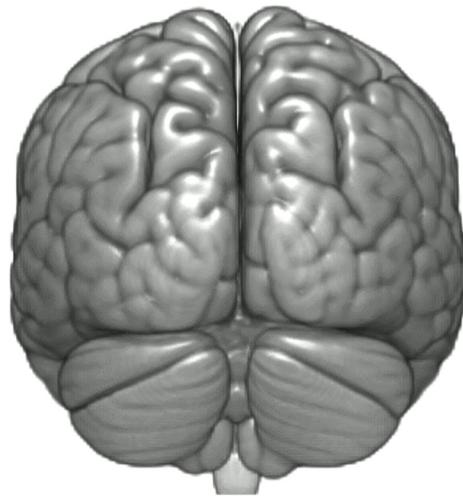


Made with Connectopedia

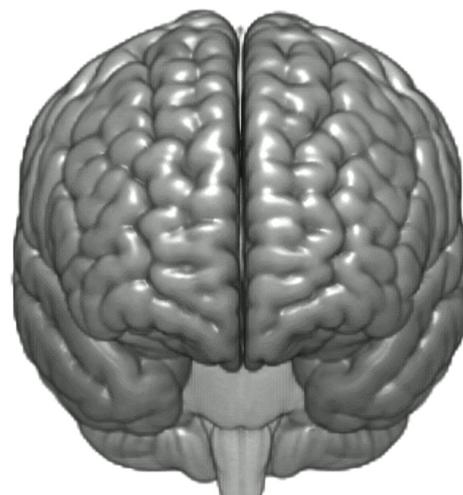




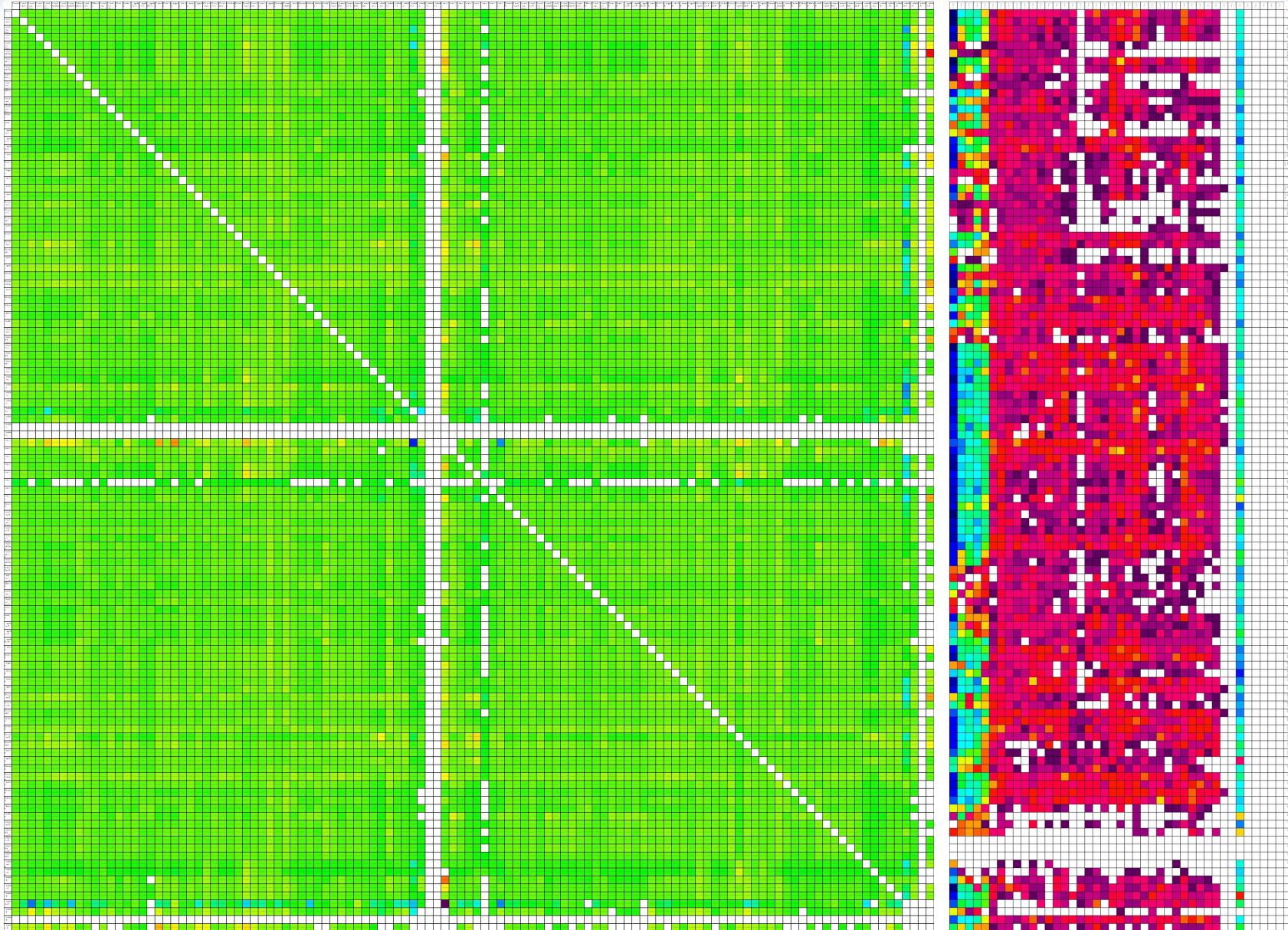




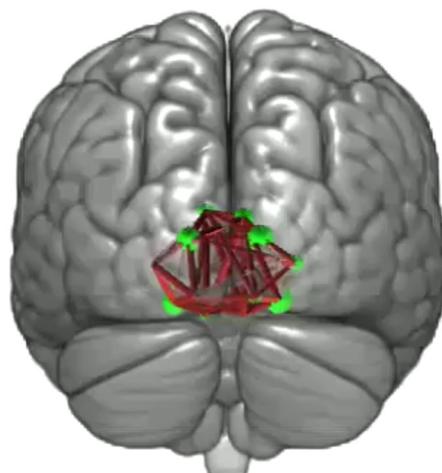
Made with fMRICRoTools



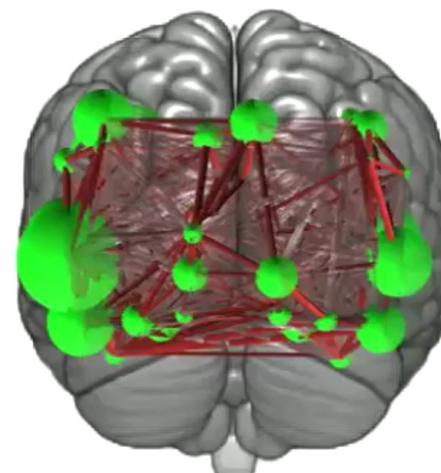
# Functional Connectomic



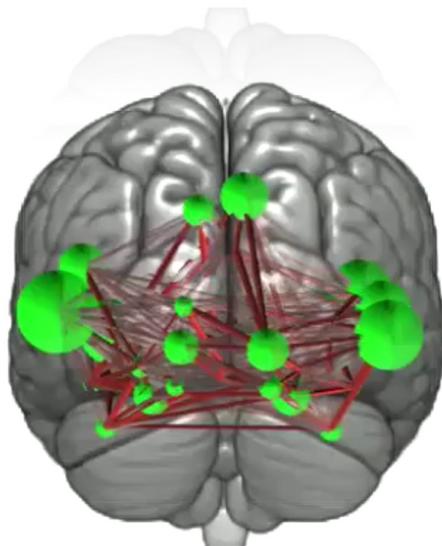
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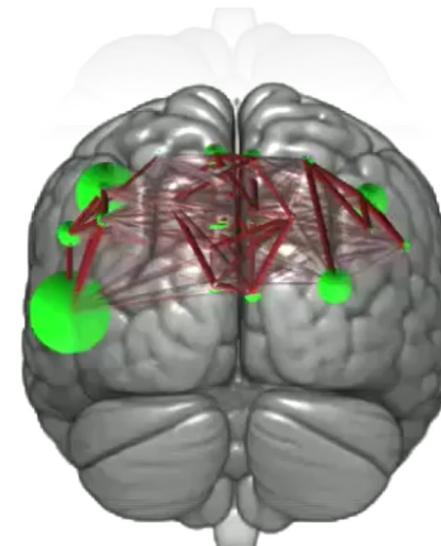
Made with fMRICRoTools



Made with fMRICRoTools



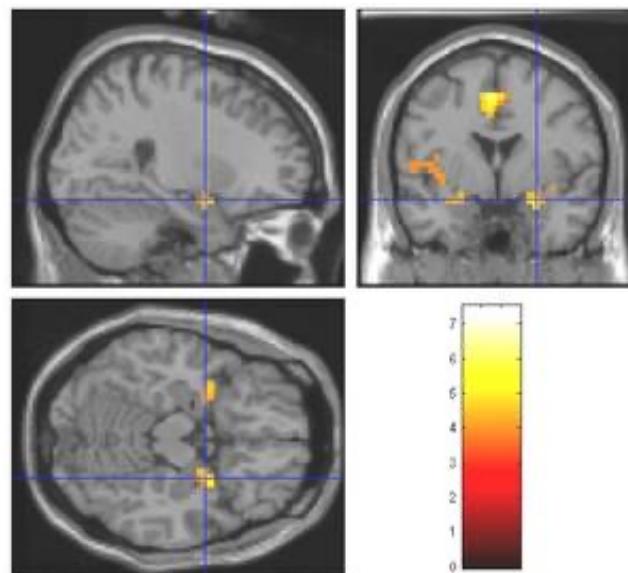
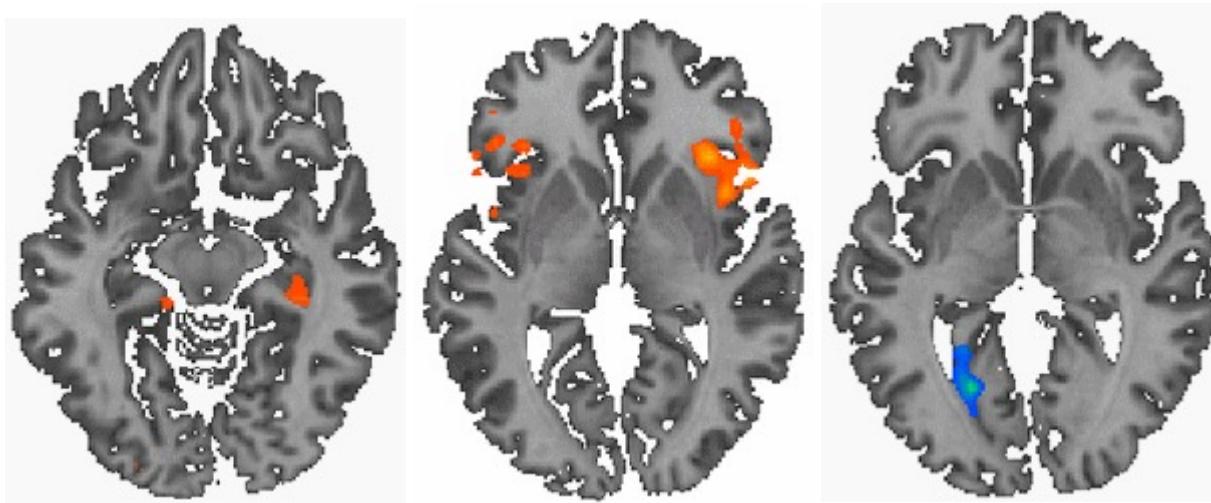
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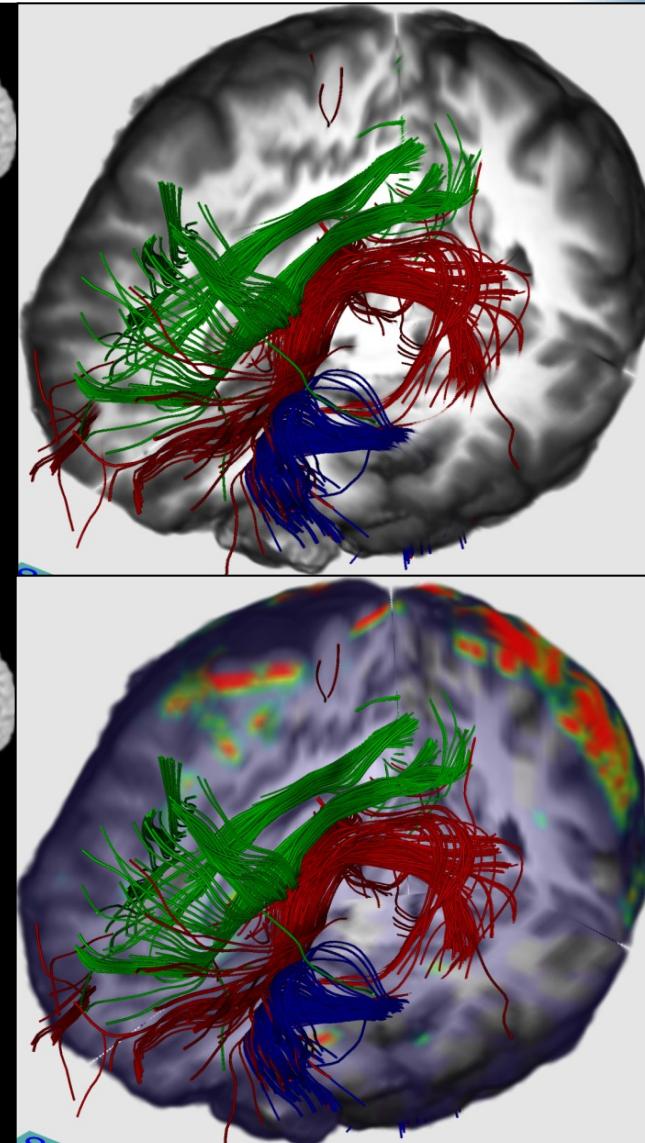
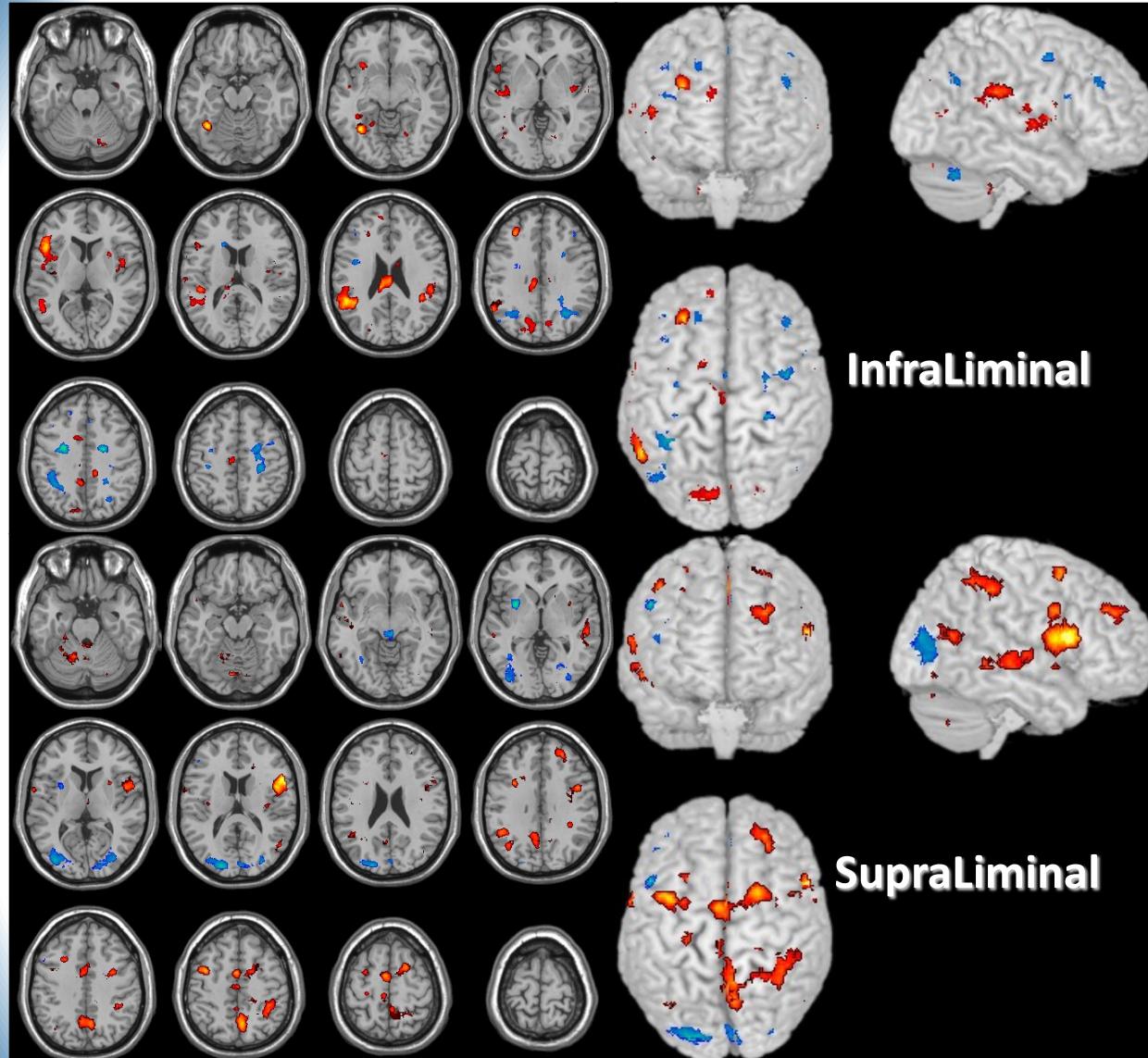


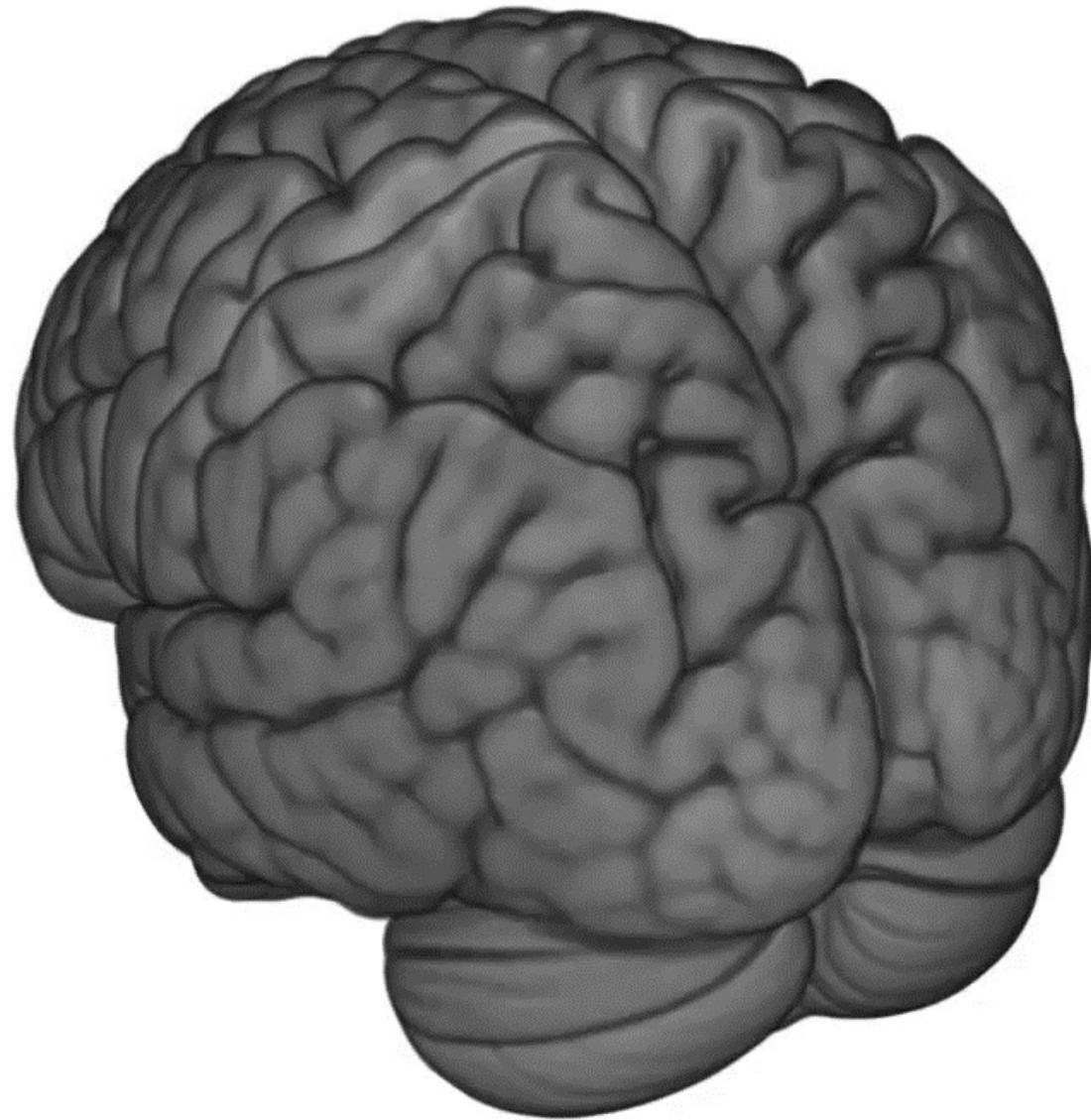
Emotion	Emotion processing	Emotion regulation	Emotional attachment	Emotional stimuli	Emotions self reflections decision making	Empathy	Empathy judgment	Erotica	Experiencing emotional states	Fear conditioning
Response aversive stimuli	Response aversive auditory stimulation	Religious Feeling	Reappraise negative emotions	Processing emotions self reflections decision making	Processing emotions self reflections decision making	Processing emotional stimuli	Pleasure	Pleasant unpleasant emotions	Panick attack	Music enjoyment
Emotion language related	Evaluation emotional word	Expression emotional information	Generating melodic phrases	Generating sentences	Generation melodies	Idioms	Internally specified word generation	Language comprehension production	Language processing	Language switching
Selective attention speech	Response unintelligible speech	Receptive language	Prosodic integration	Processing phonological properties words	Phonological syntactic processing	Phonological processing	Phonemes	Perception prosodic information	Orthography phonology link	Nonspeech processing
Speech attention	Speech comprehension	Speech perception	Spoken language	Syntactic processing	Syntactical processing	Verb generation	Verbal creativity	Verbal encoding non semantic process	Verbal fluency	Verbal threat detection
Learning tone based second language	Learning	Learn complex procedure	Irony processing	Intentional forgetting	Identification familiar voices	Event time based prospective memory	Episodic memory retrieval	Episodic long term memory	Episodic encoding	Emotion memory
Memory retrieval	Mnemonic rehearsal	Multimodal memory retrieval	Naming items learned early life	Negative stimuli memory	Non verbal working memory	Processing metaphors	Prospective memory	Recall digit series	Recognition	Retrieval unpleasant experiences
Inhibition blinking	Horizontal saccadic eye movements	Executive control behavior	Discrimination finger gestures	Contralateral lower limb movement	Contralateral lip tongue face mouth movement	Contralateral finger hand wrist movement	Chewing	Bimanual manipulation	Working memory	Word retrieval specific entities

# Clinical Scope

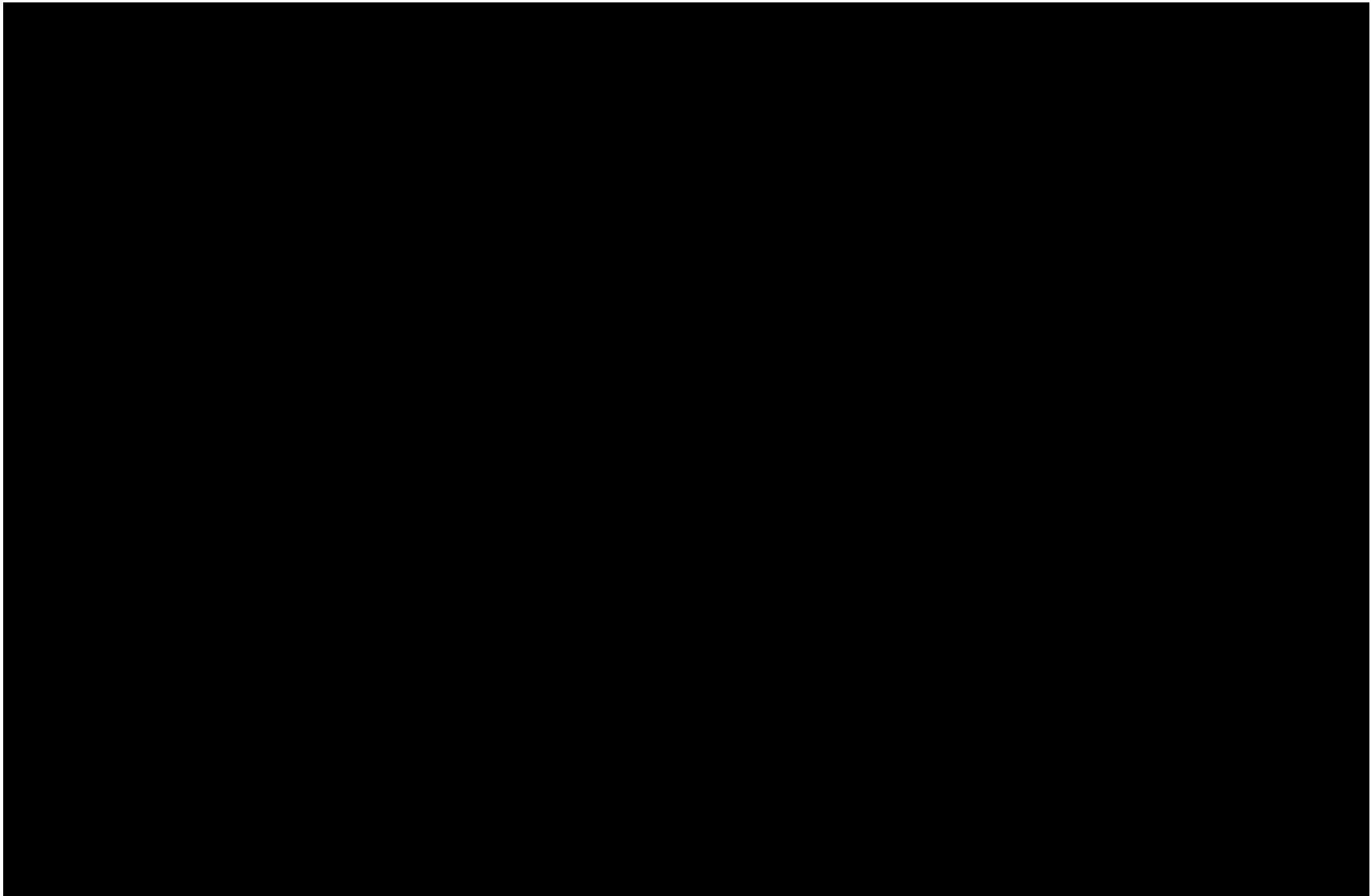


(1) : Plailly et al, HBM 2012

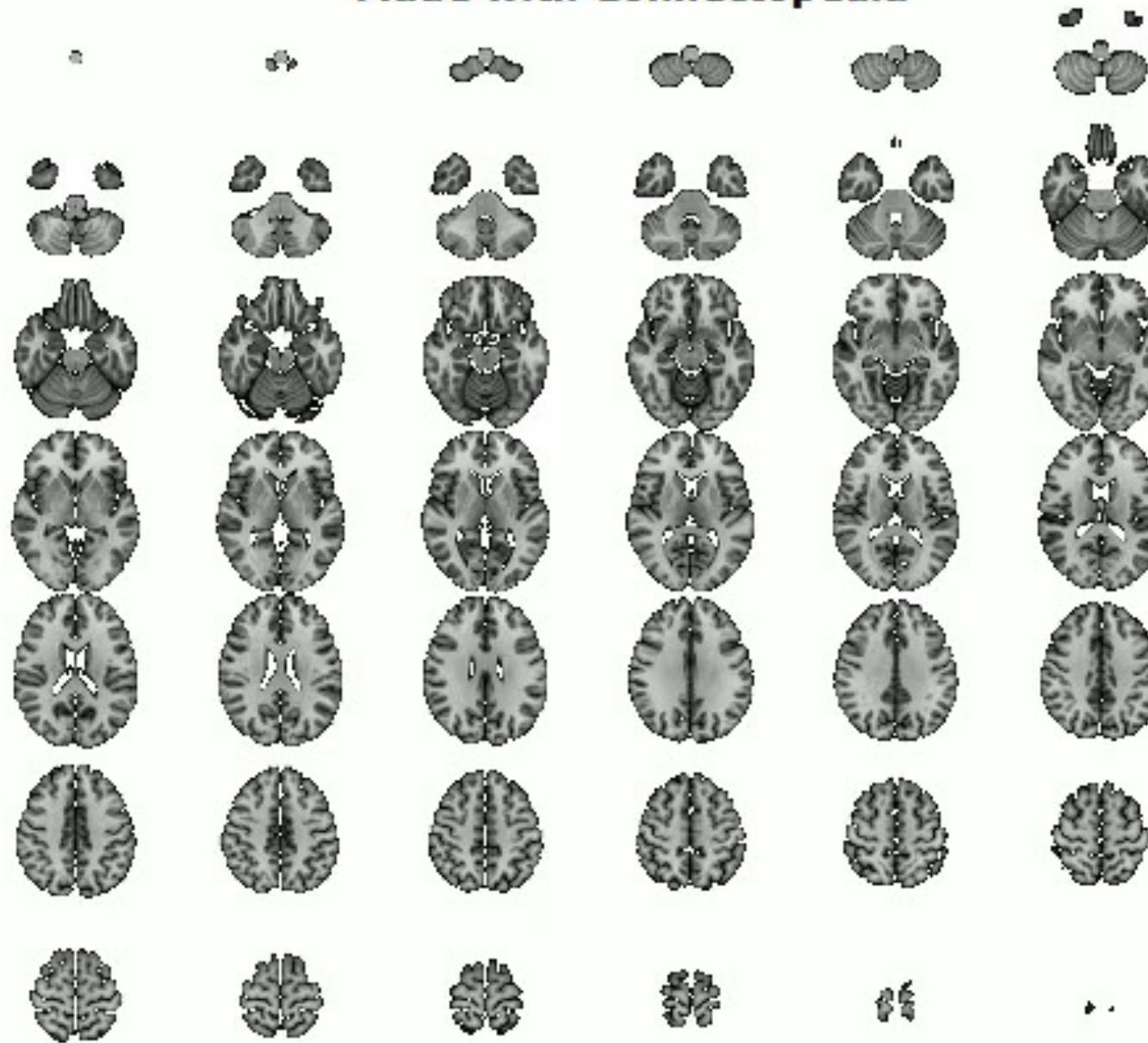




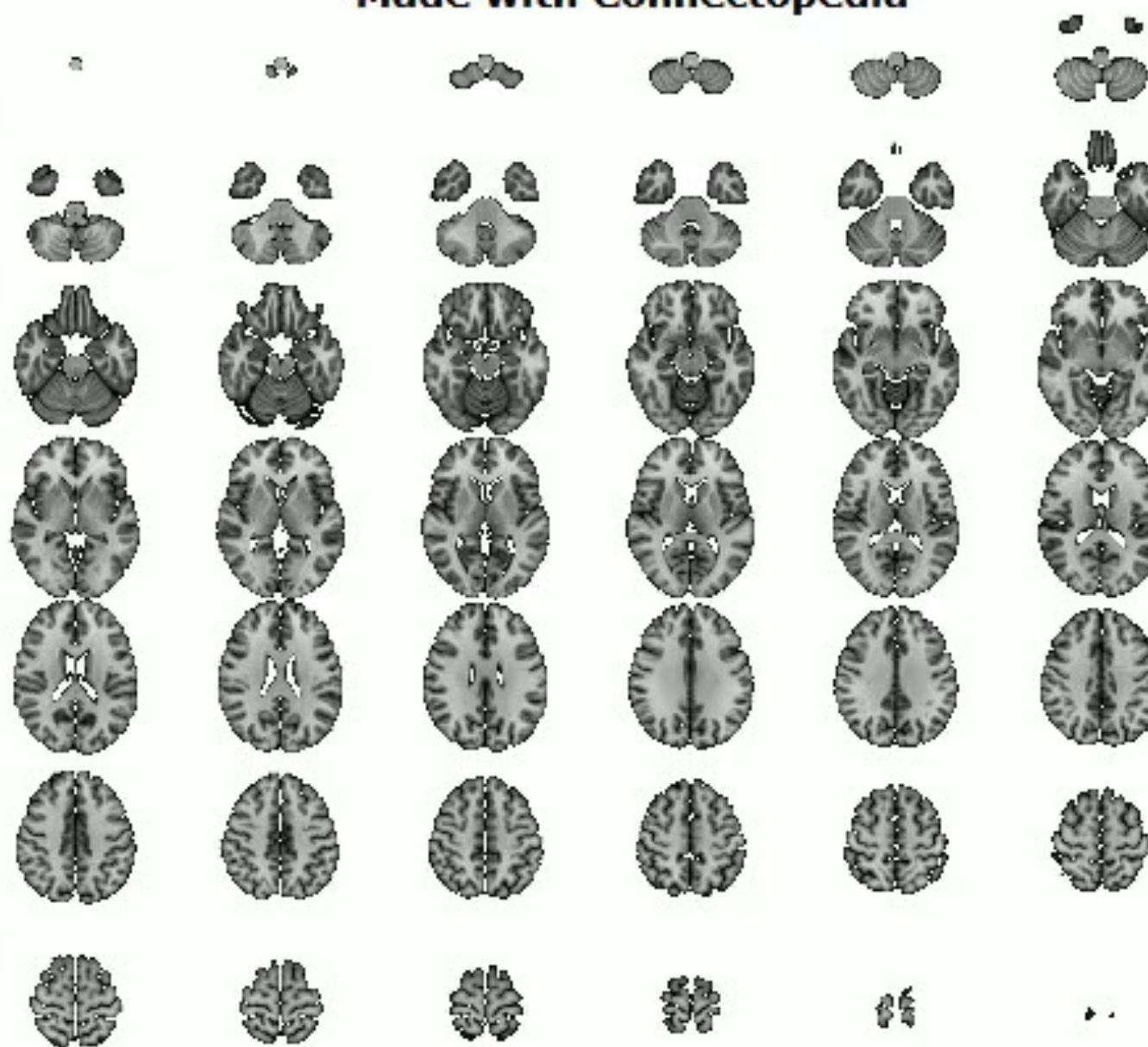
# **DEP-ARREST Mint vs Wine Lees**

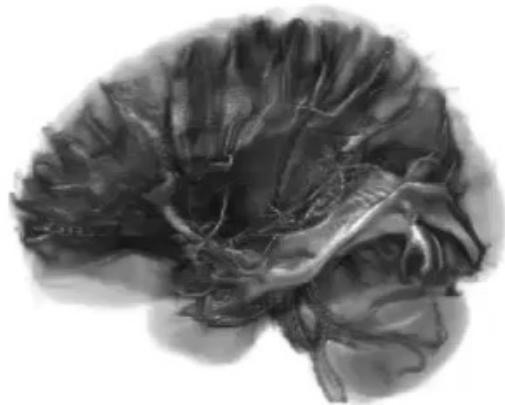
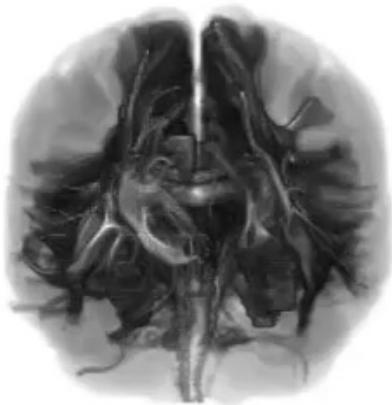


# Made with Connectopedia

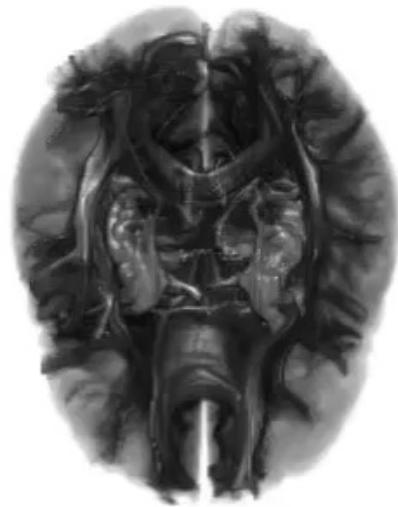
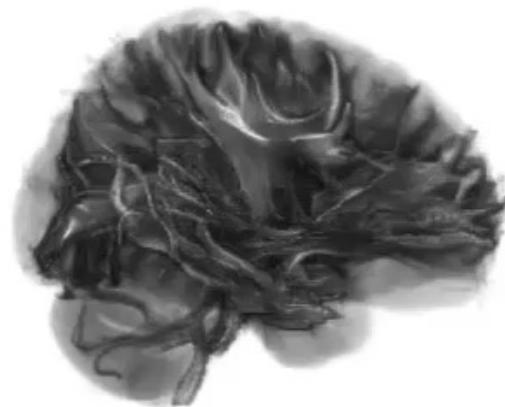
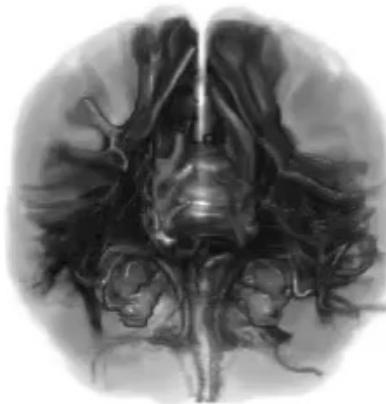


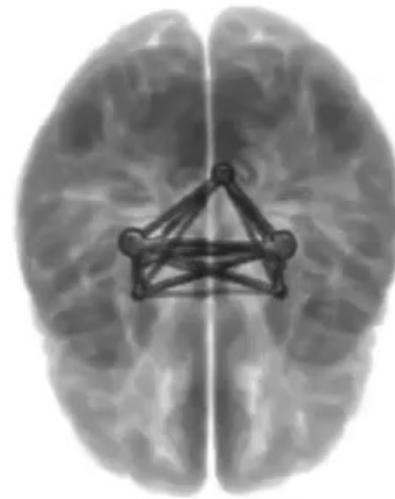
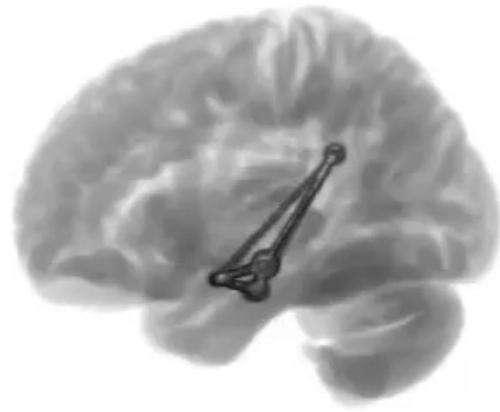
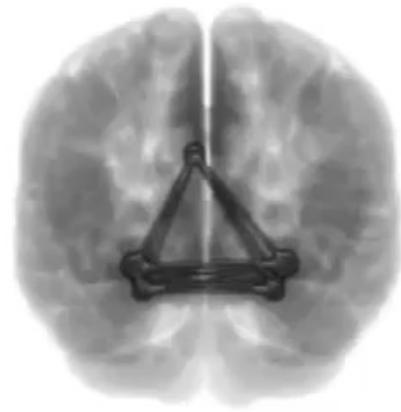
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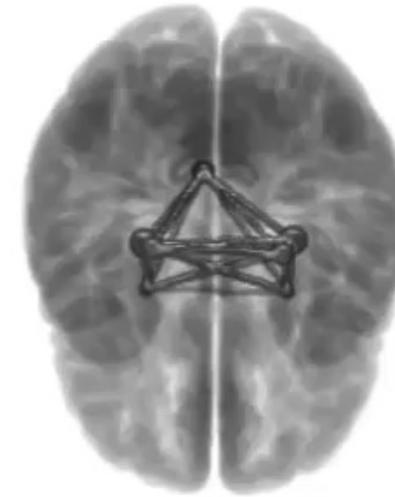
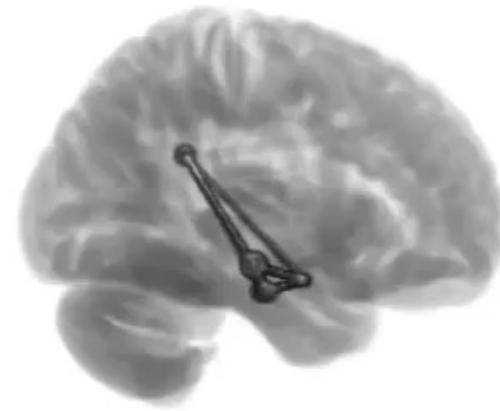
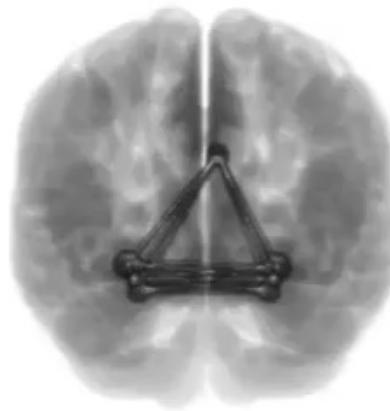


**Made with Connectopedia**



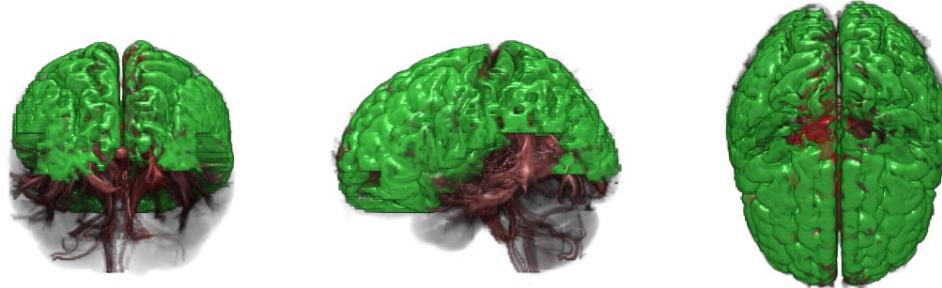


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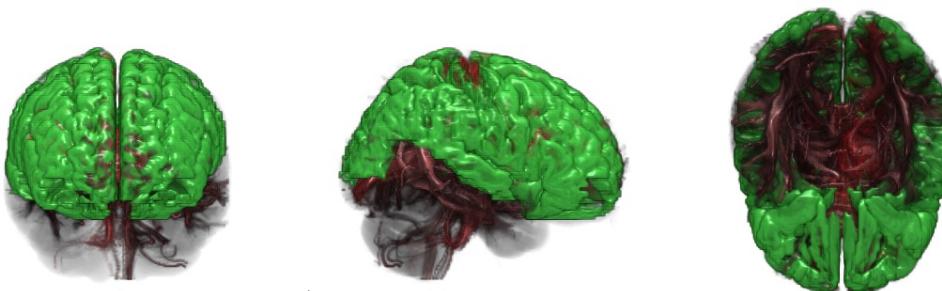


Occurrence(s):

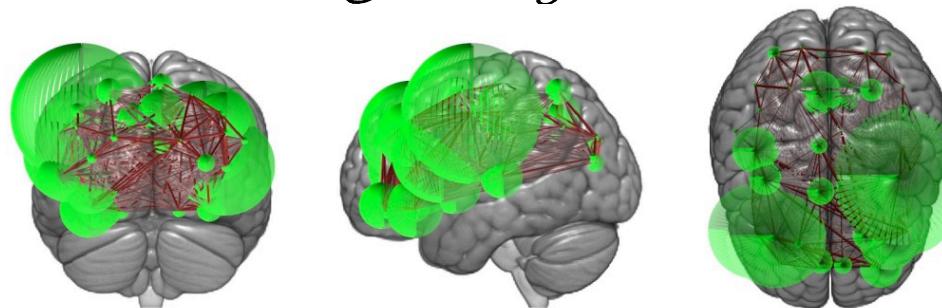




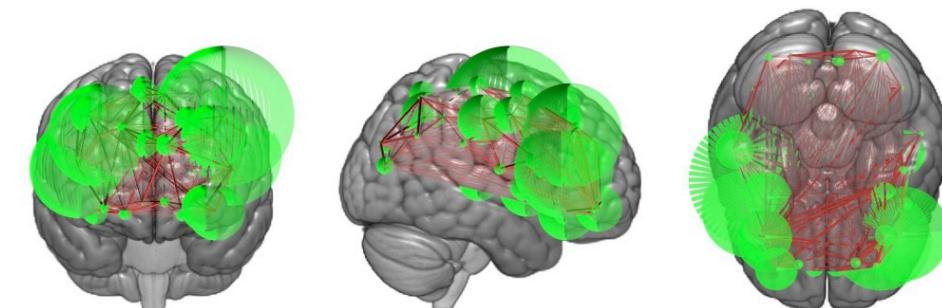
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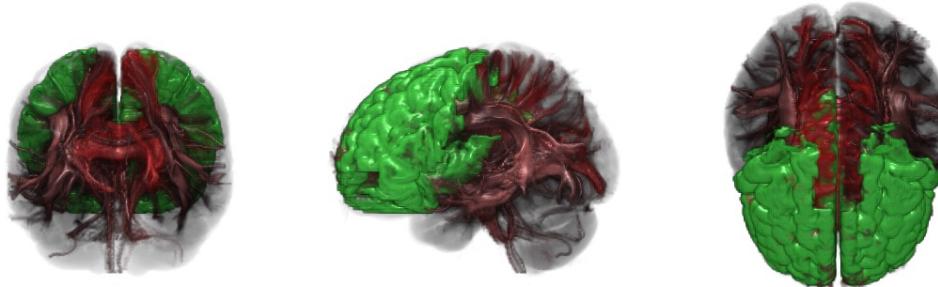


*Working Memory : 2,756 %*

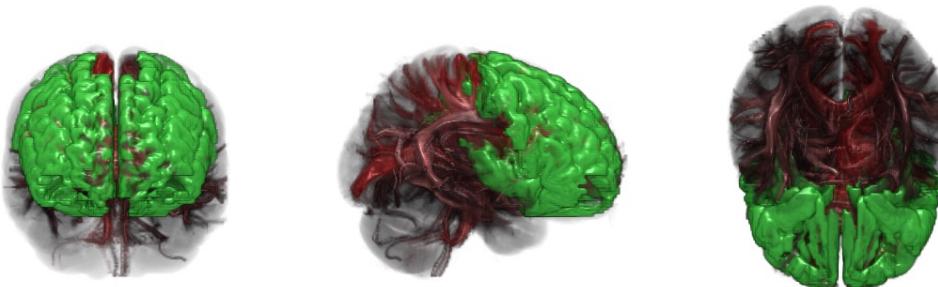


Made with fMRIcRoTools

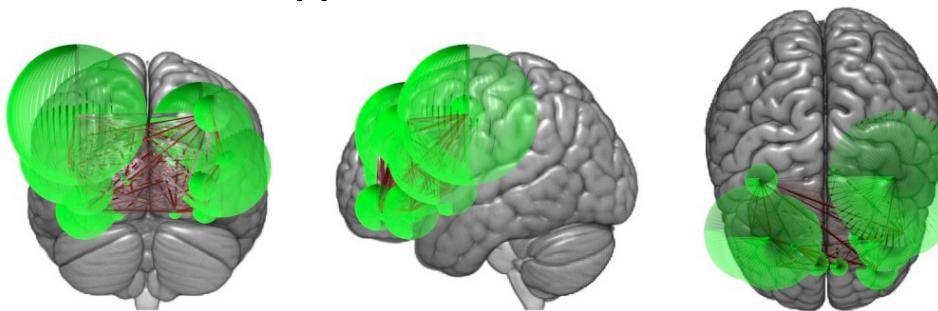




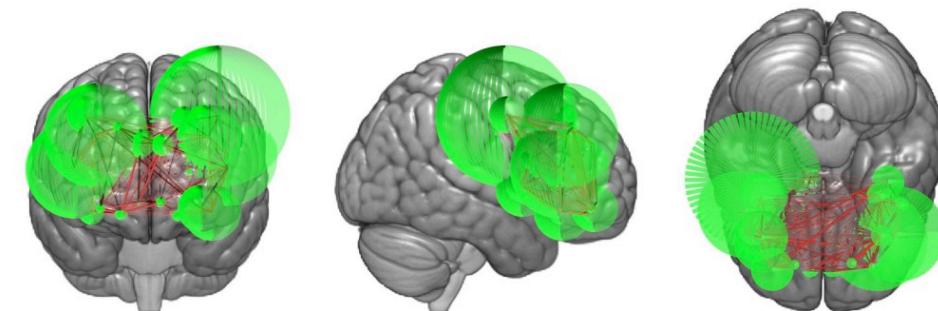
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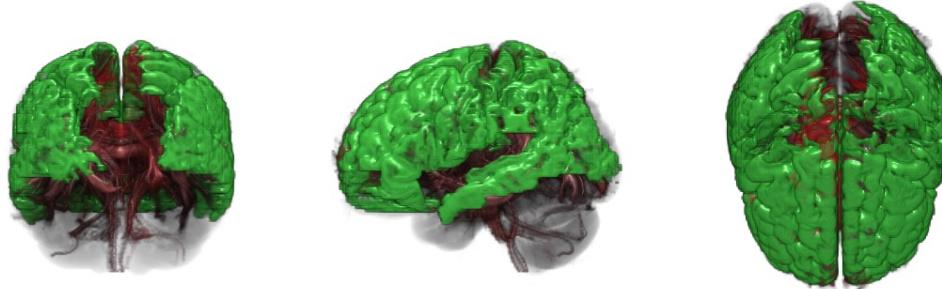


*Smelling Familiar Odor: 1,551 %*

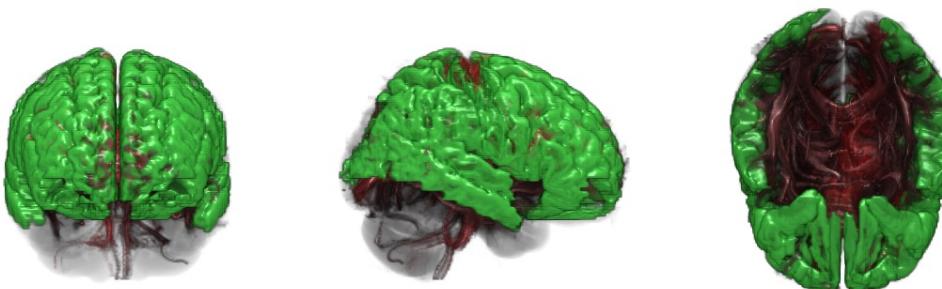


Made with fMRIcRoTools

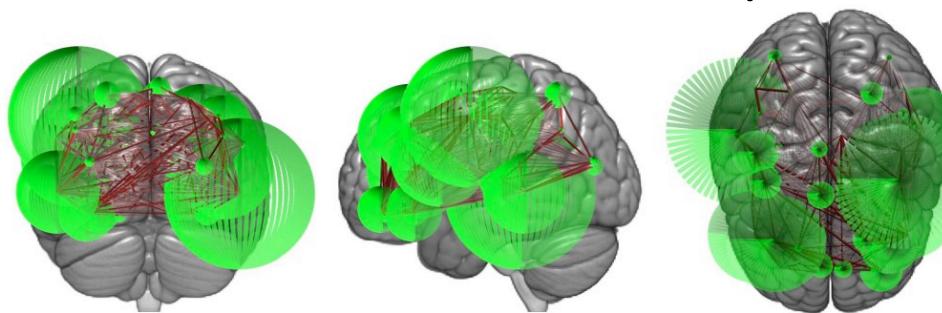




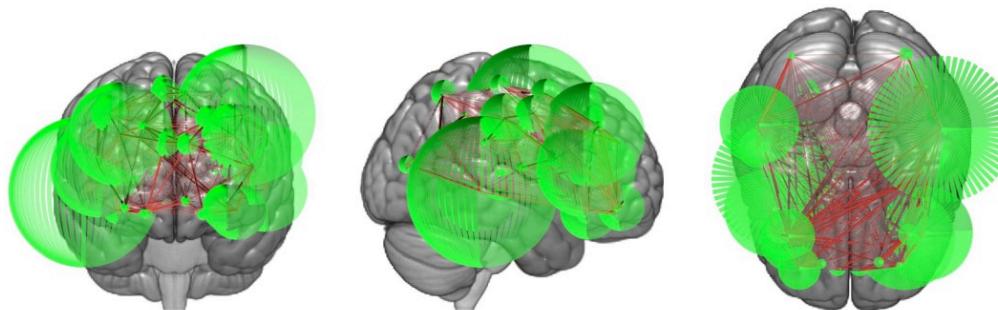
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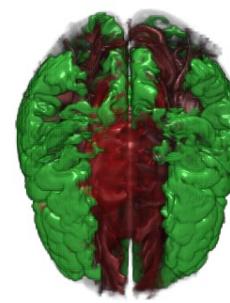
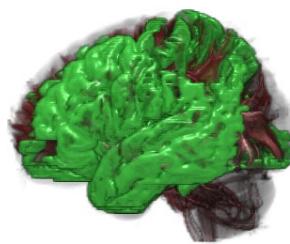
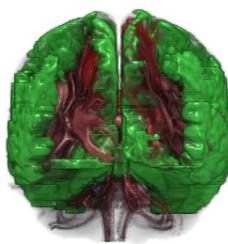


*Executive Control Behavior: 1,551 %*

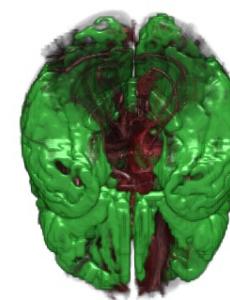
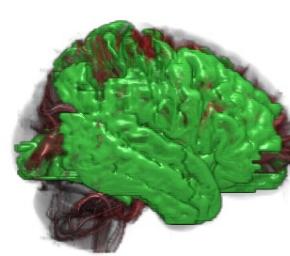
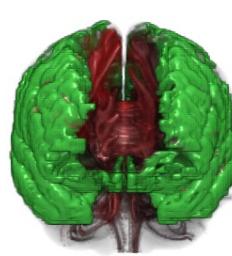


Made with fMRIcRoTools

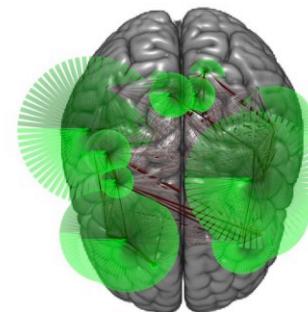
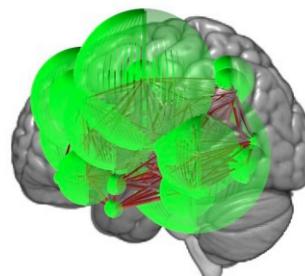
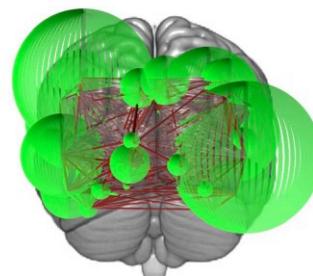




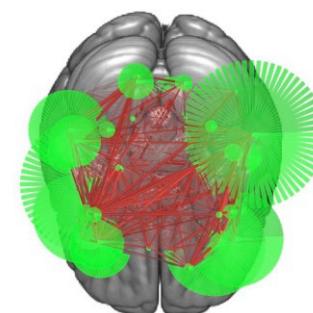
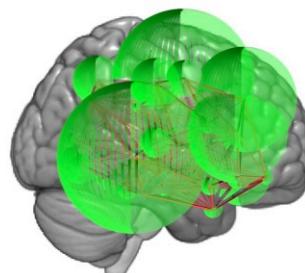
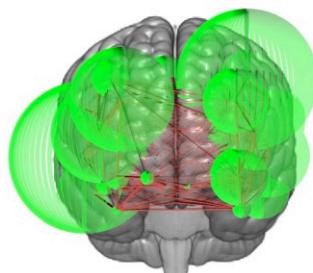
Made with Connectopedia



*Emotion Processing: 1,573 %*

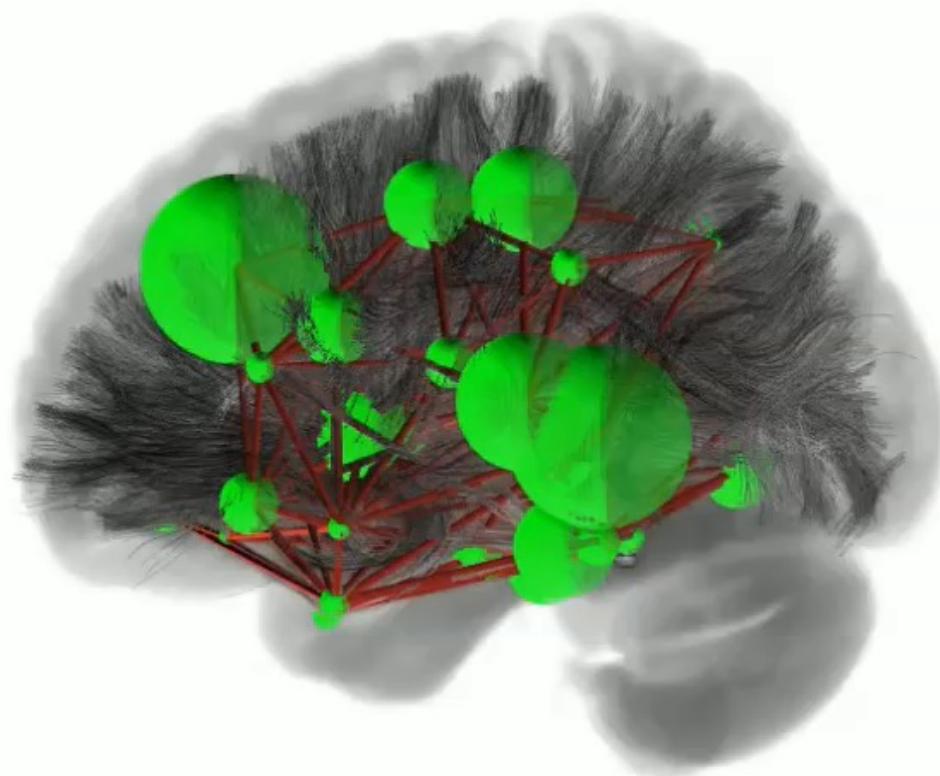


Made with fMRIICRoTools



# **Conclusions**

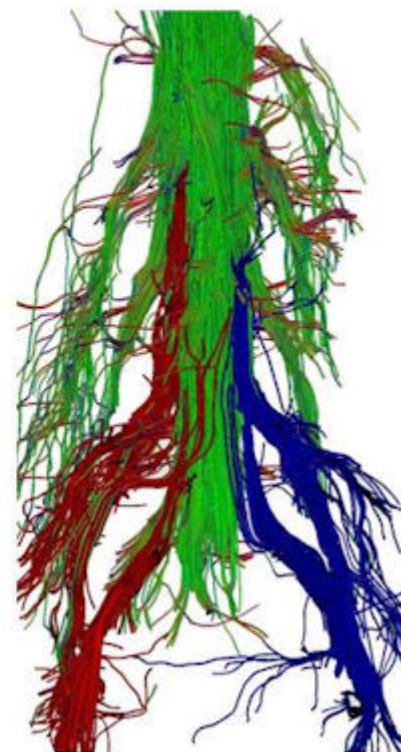
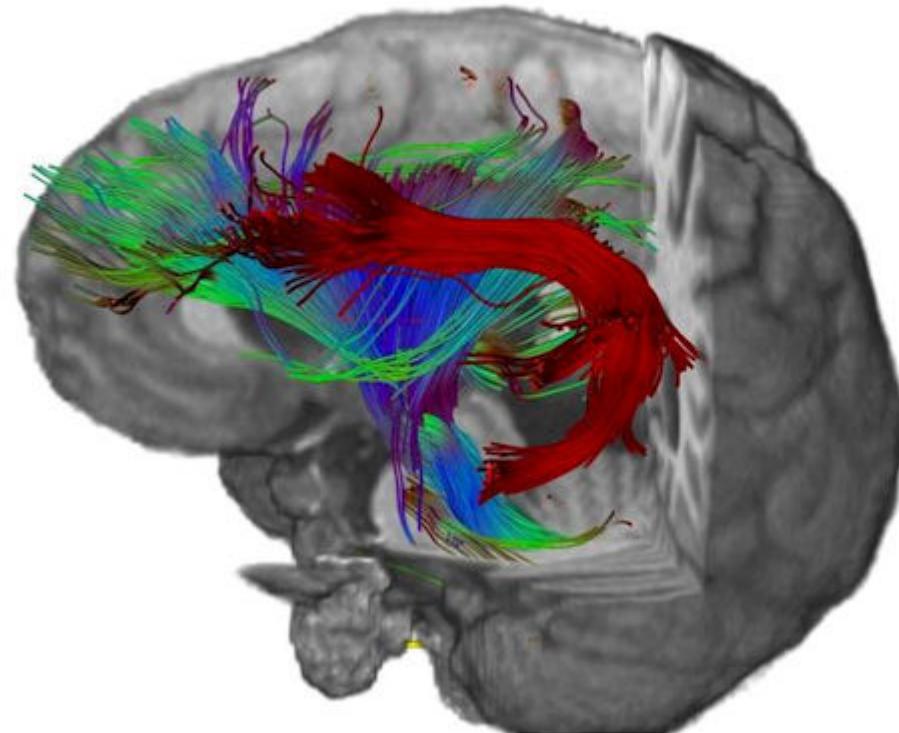
Made with fMRICRoTools



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fMRI Tools



<http://fmritools.com>