Open science initiatives

brain image analysis

data-driven challenges

smartphone data collection

Arno Klein at the Montreal Neurological Institute (1/21/2015)
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mindboggle.info

Mindboggle

Software Data Papers People

Welcome to Mindboggle!

We are developing Mindboggle to improve the accuracy, precision, and reliability of automated labeling and shape analysis of human brain image data, and to promote open science by making all data, software, and documentation freely and openly available.

We are gearing up for our first official release!

Software

Please see the README for Mindboggle's open source, freely available python software for automated labeling, feature extraction, and shape analysis of human brain image data.

Data

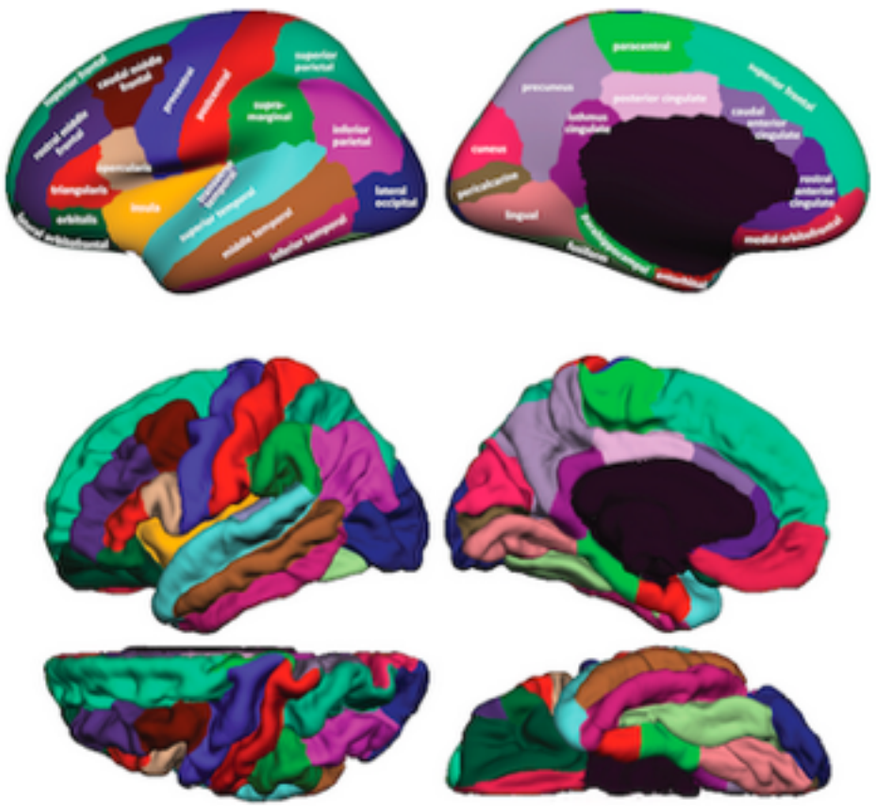
Feel free to download Mindboggle-101 atlases, templates, and individual labeled brain image data, the largest collection of publicly available, manually labeled human brains in the world!

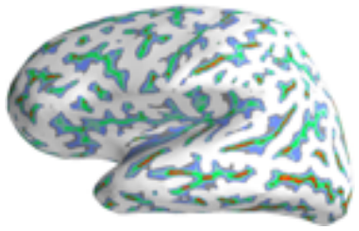
Mindboggle

Data

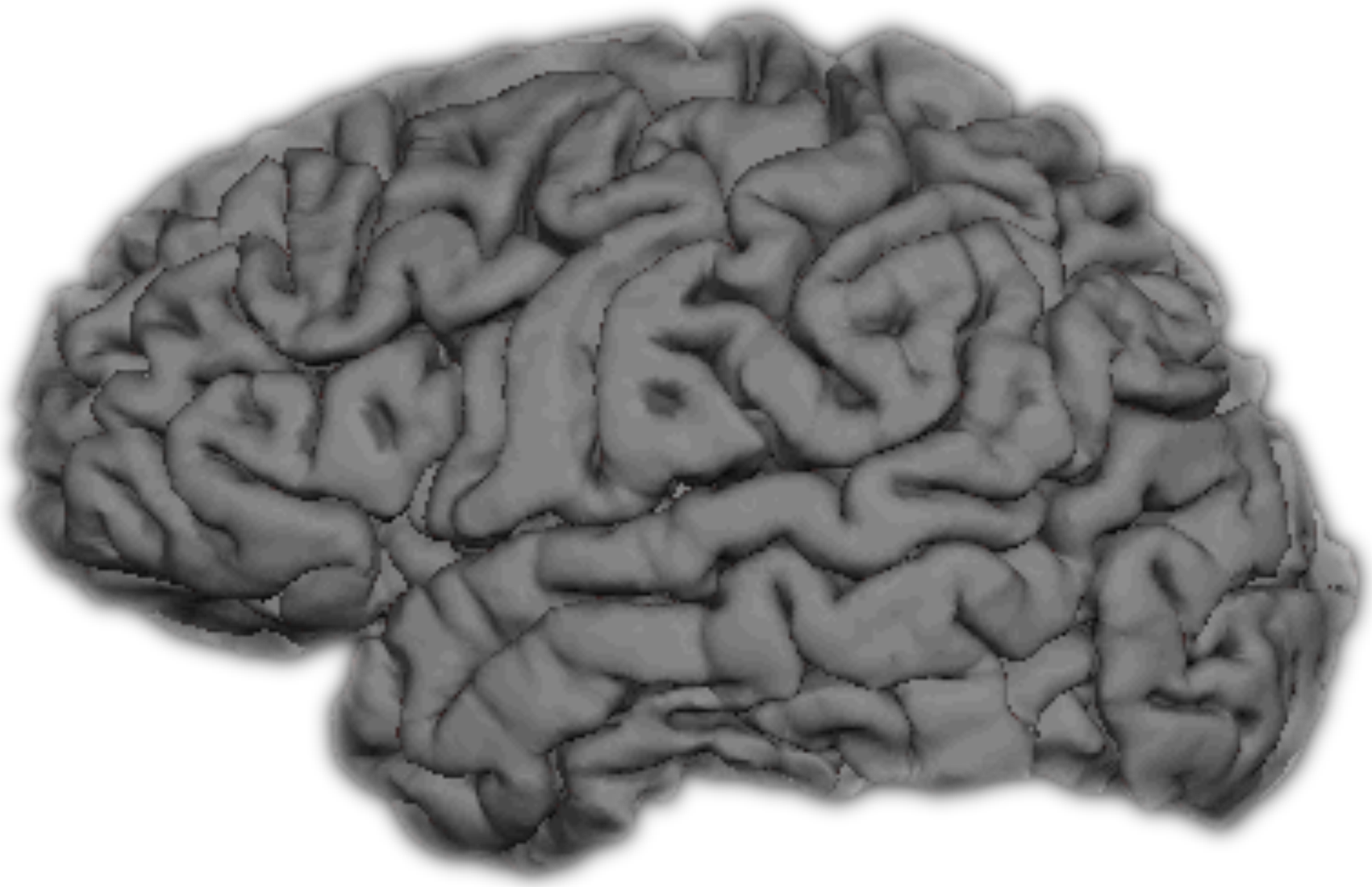
Welcome to the world's largest collection of free, manually labeled human brain image data!
Please cite the following article and this website when making use of Mindboggle-101 data:
101 labeled brain images and a consistent human cortical labeling protocol
Arno Klein, Jason Tourville. Frontiers in Brain Imaging Methods. 6:171. DOI: 10.3389/fnins.2012.00171

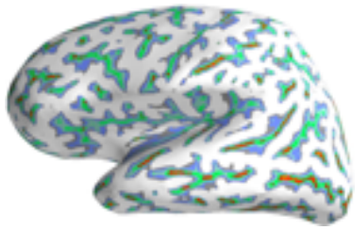
See the README, subjects table, scan info, labels, the CHANGELOG, and MD5SUMS,
which describe the labeled nifti volumes (nii), vtk surfaces (vtk), and FreeSurfer files (mgh, etc.).
Except where noted, all data are licensed under a Creative Commons License: (cc) BY-NC-SA



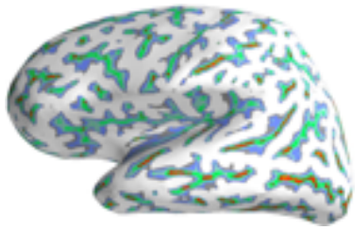


Cortical surface

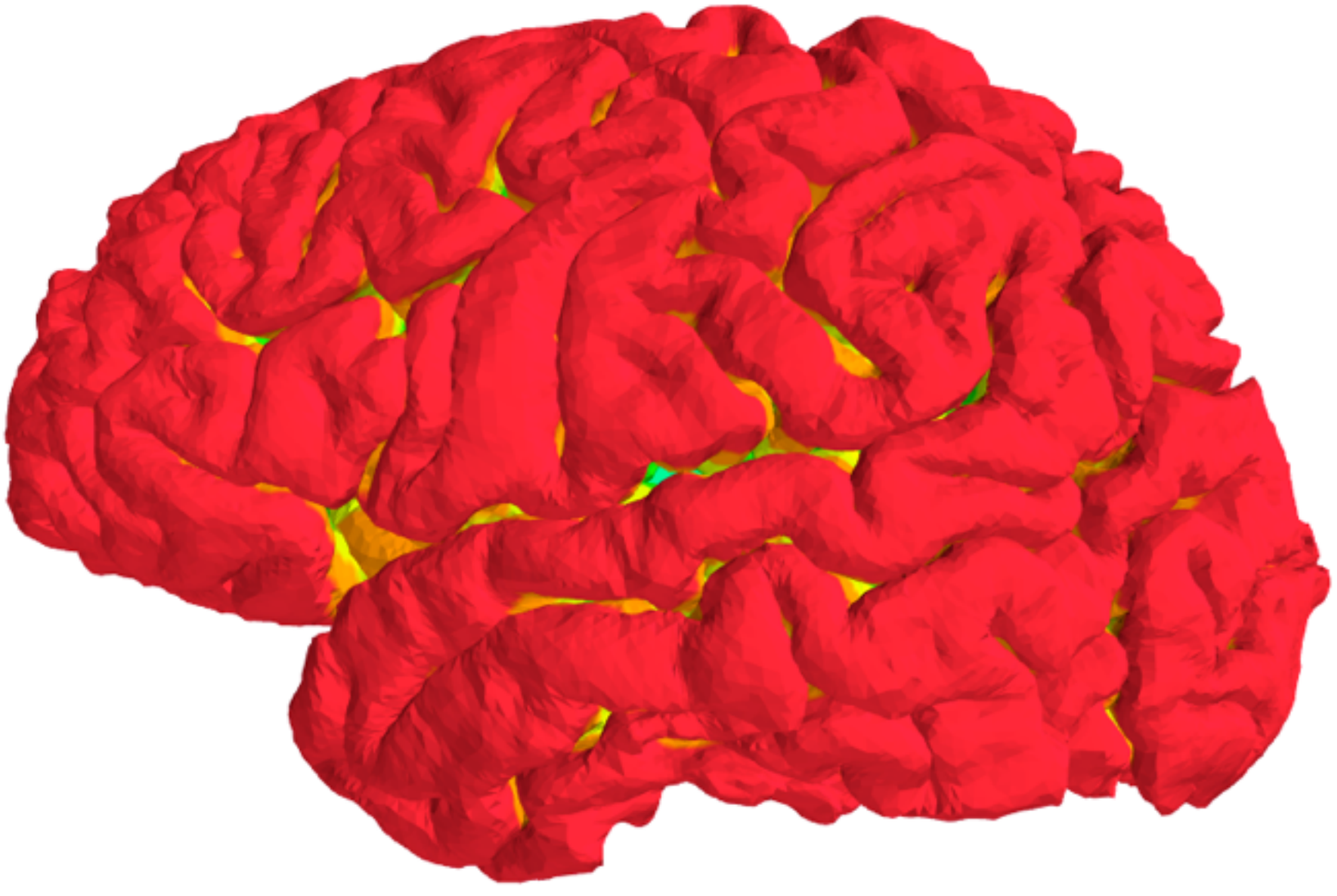


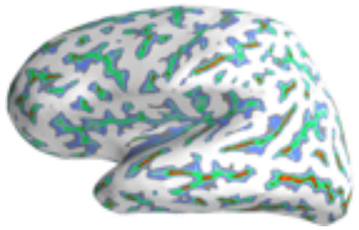


Mean curvature

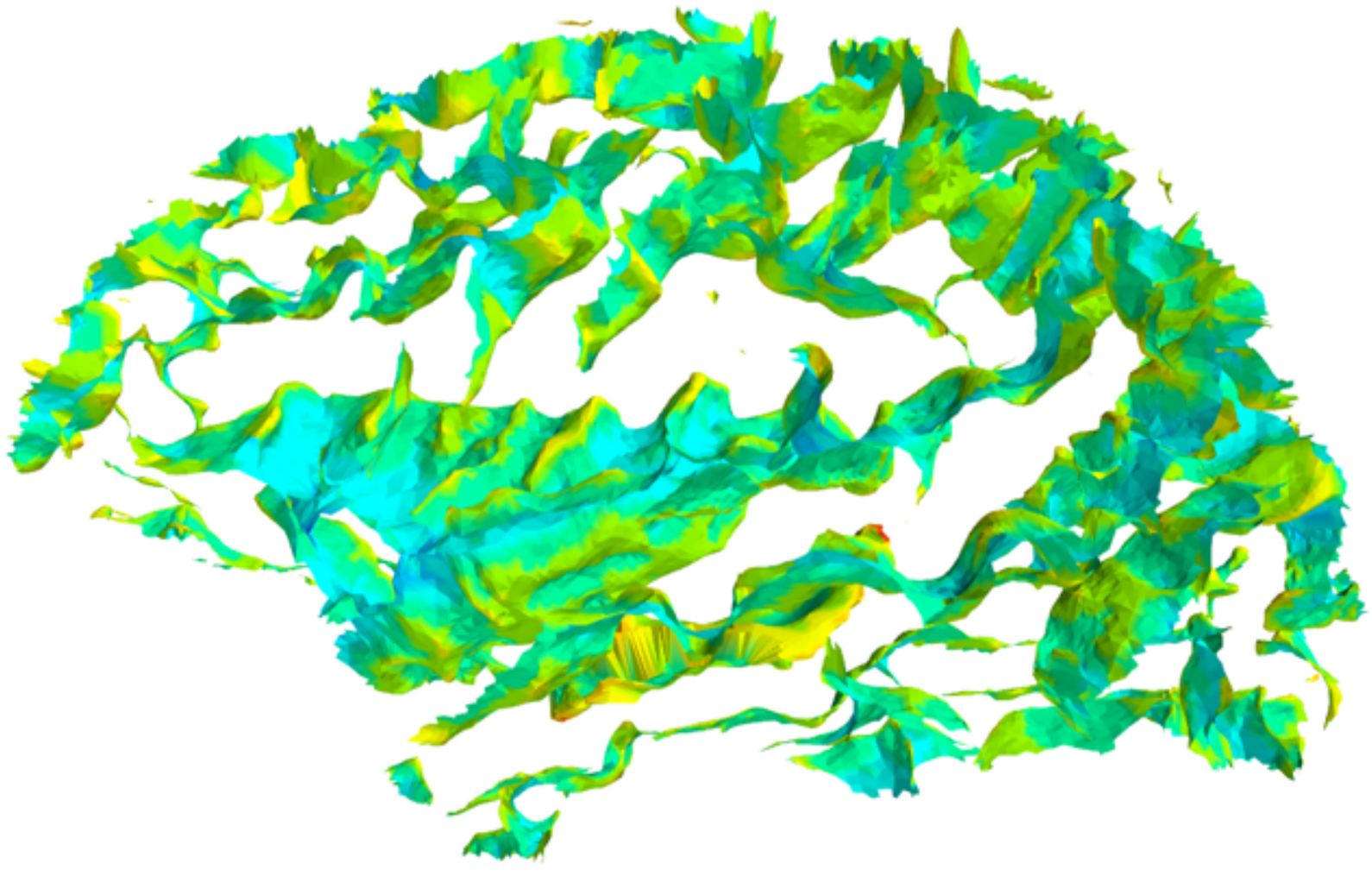


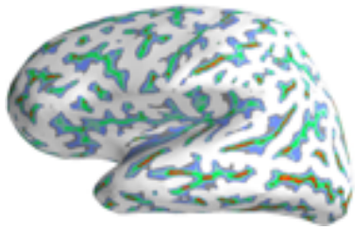
Travel depth



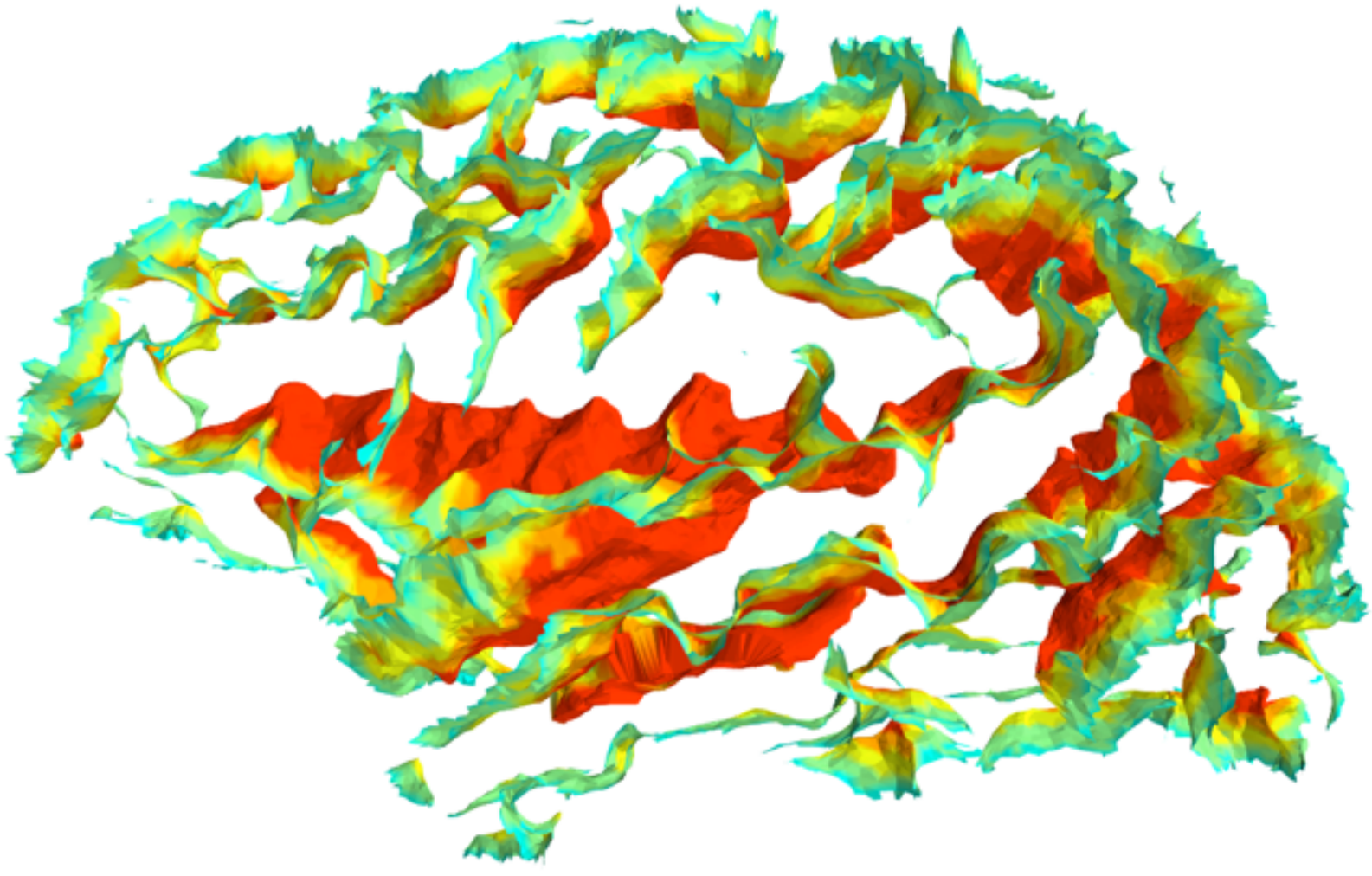


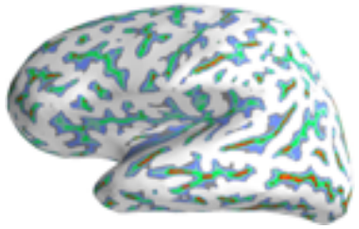
Mean curvature (folds)



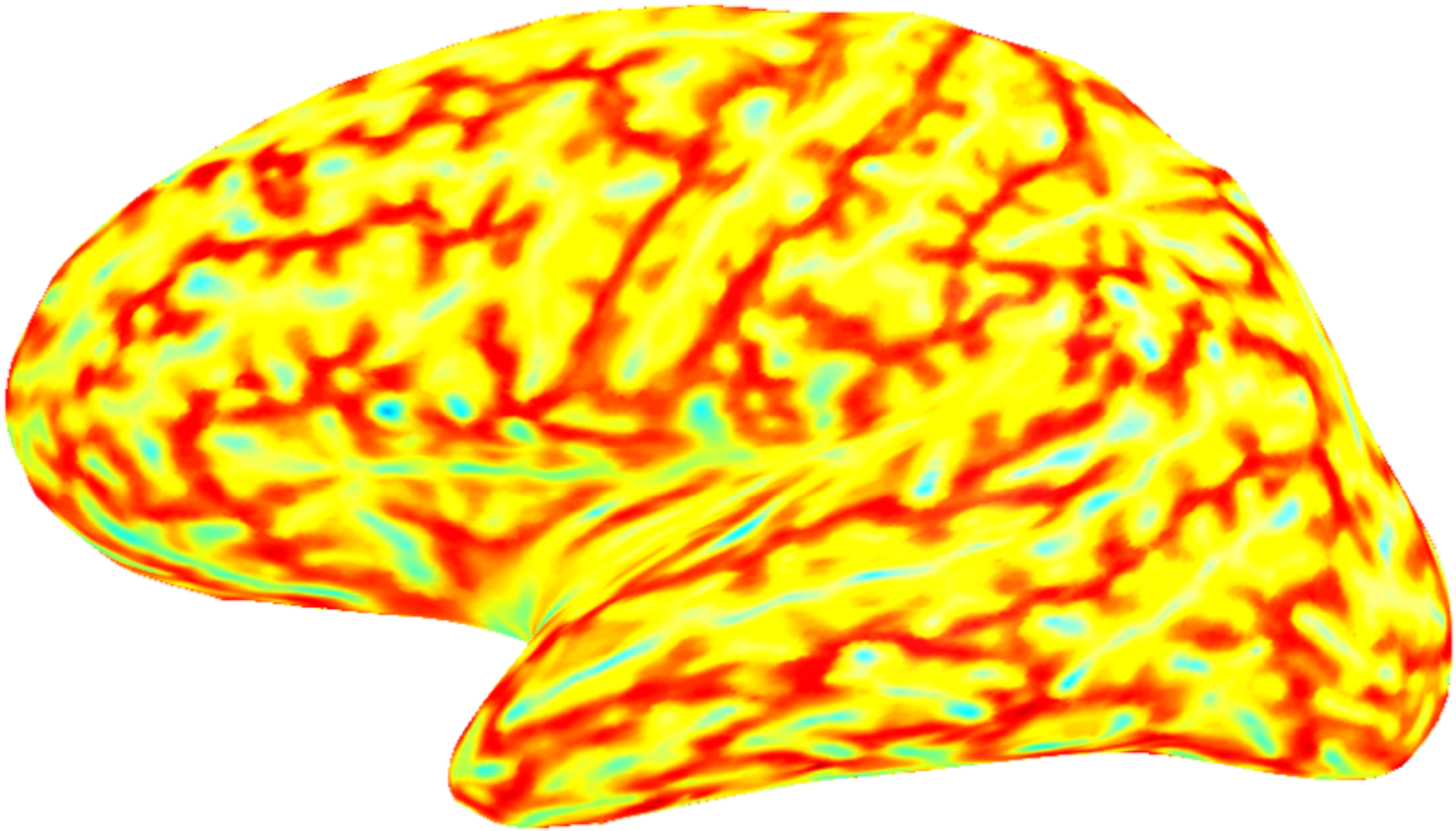


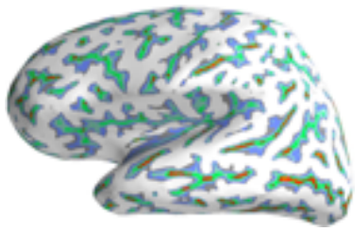
Travel depth (folds)



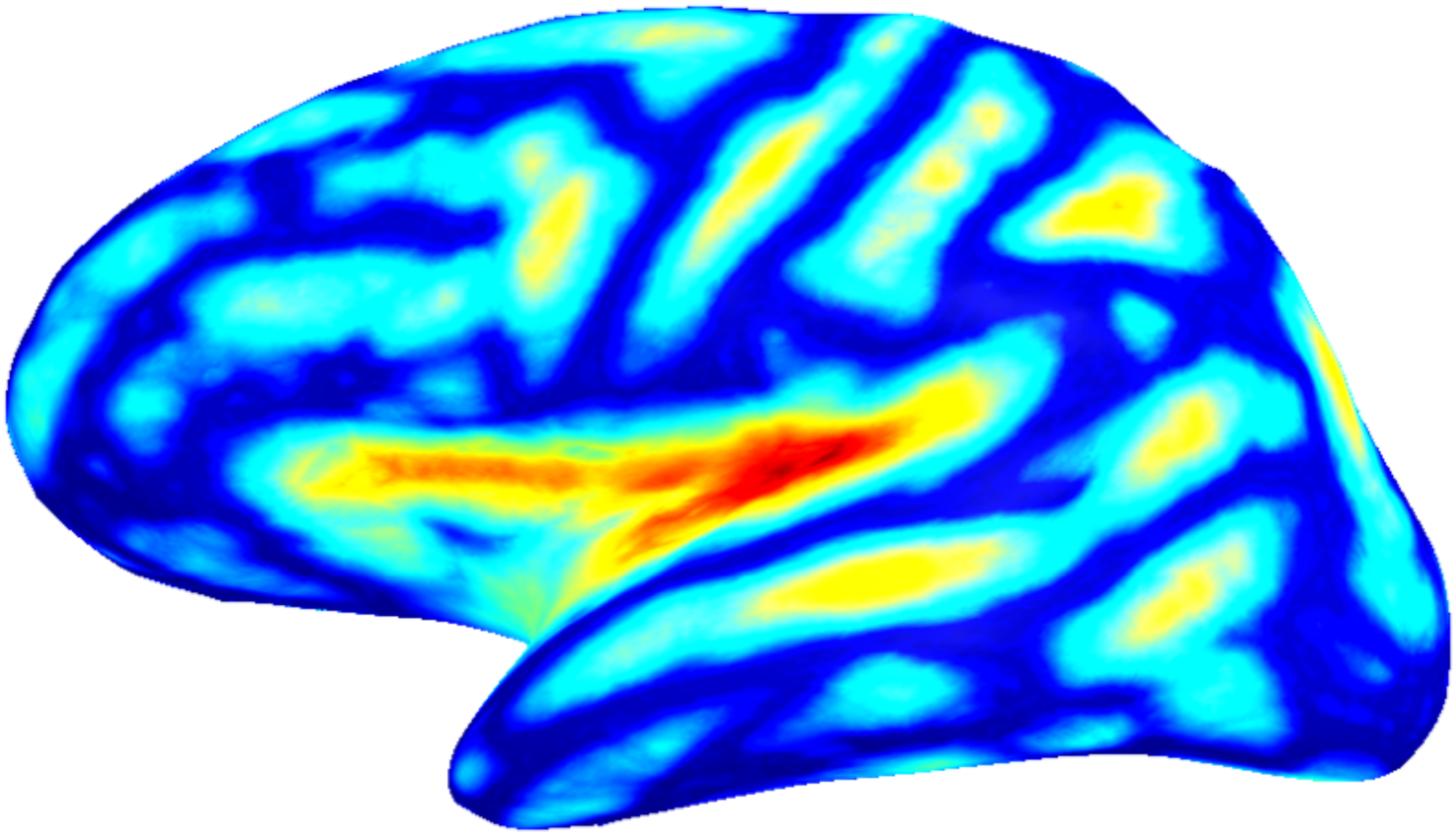


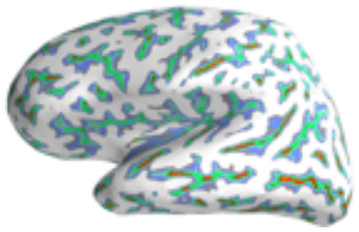
Mean curvature (inflated surface)



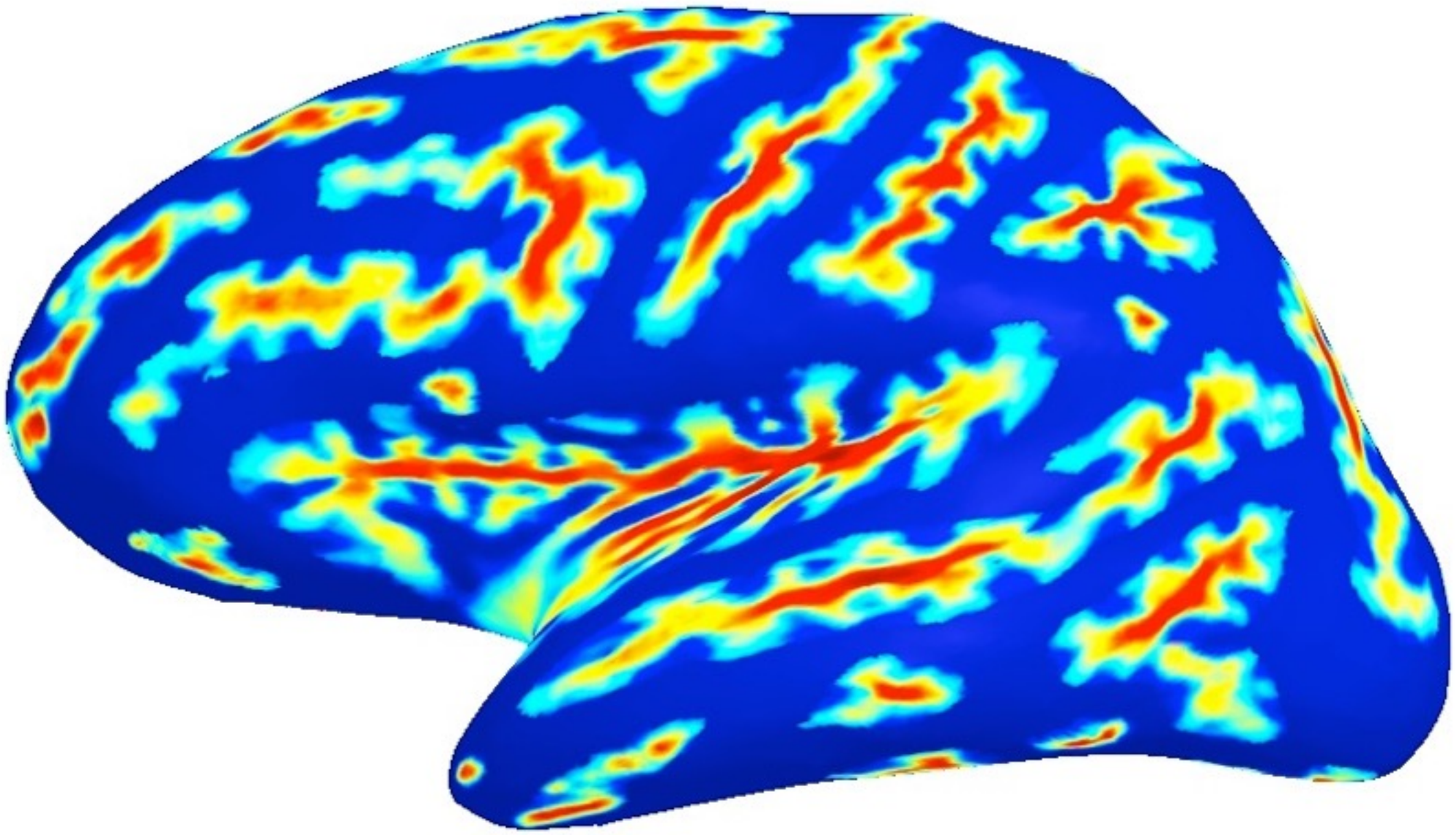


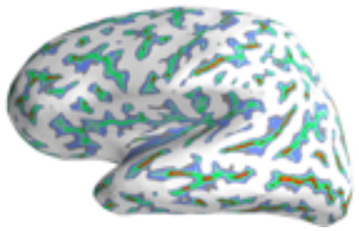
Travel depth (inflated surface)



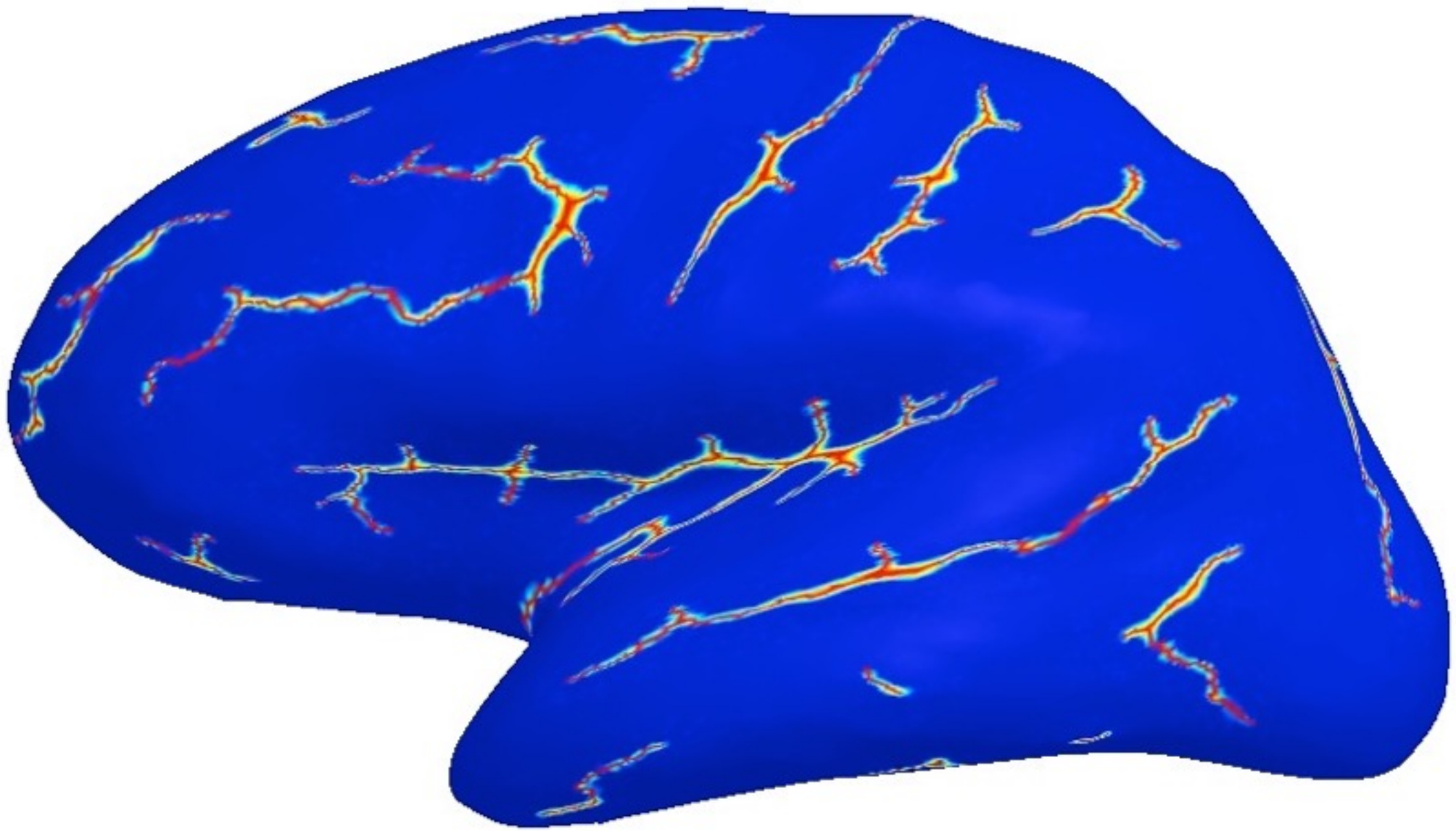


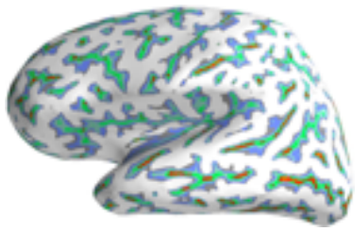
Fundus curves



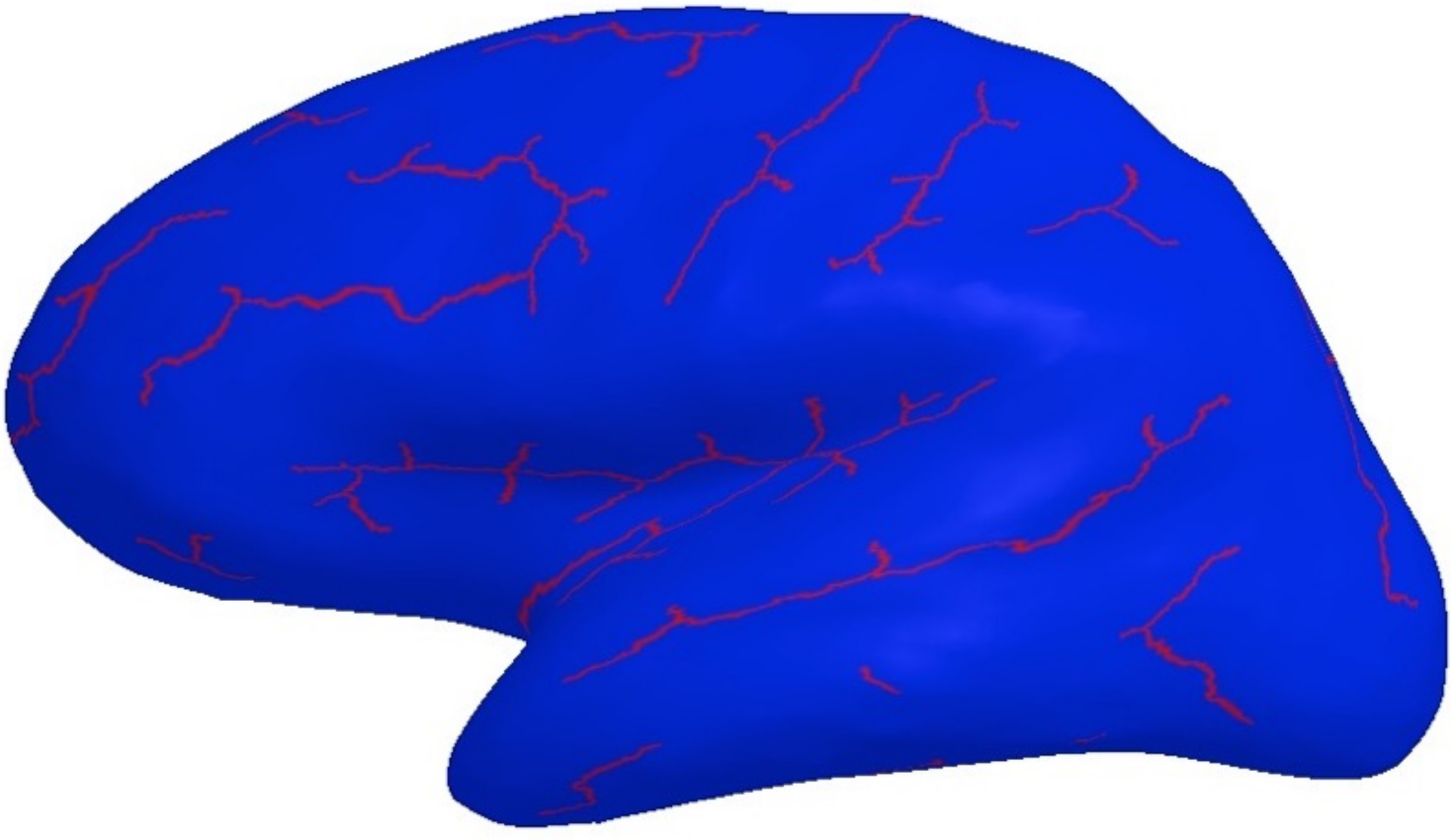


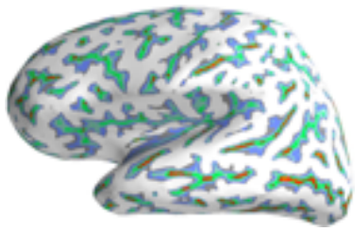
Fundus curves



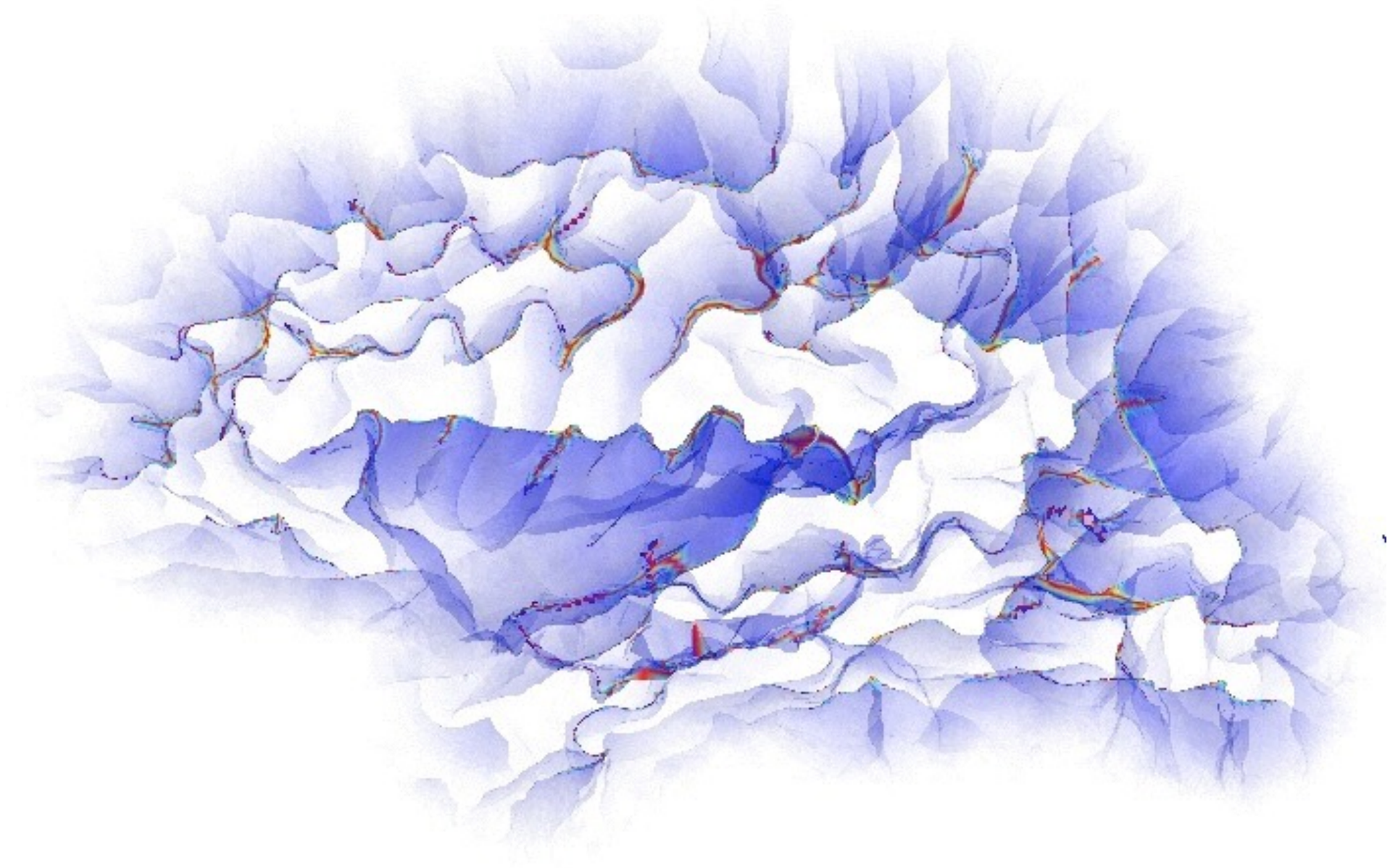


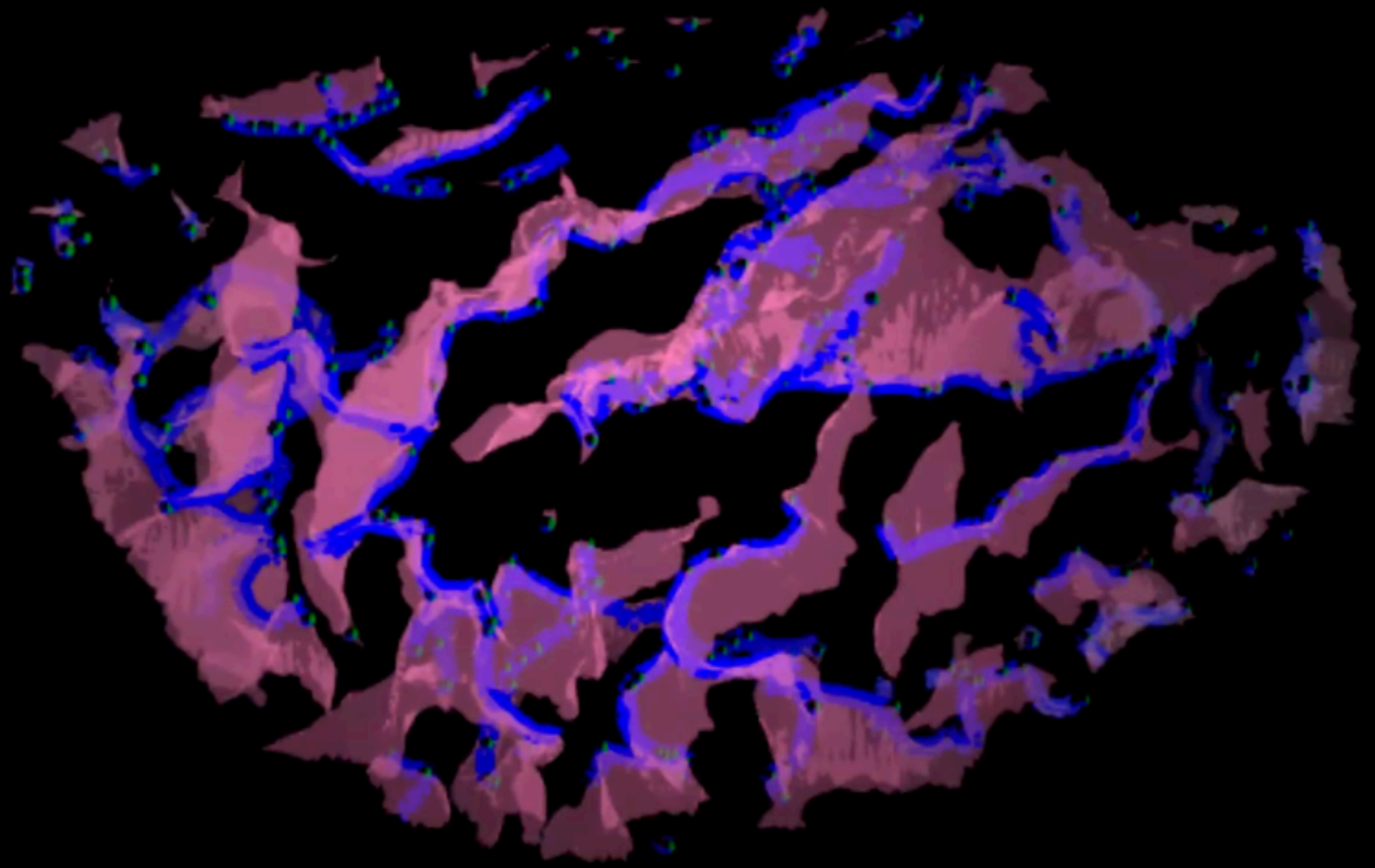
Fundus curves





Folds + fundus curves





Hackathon challenge #3: MNI152 mashup

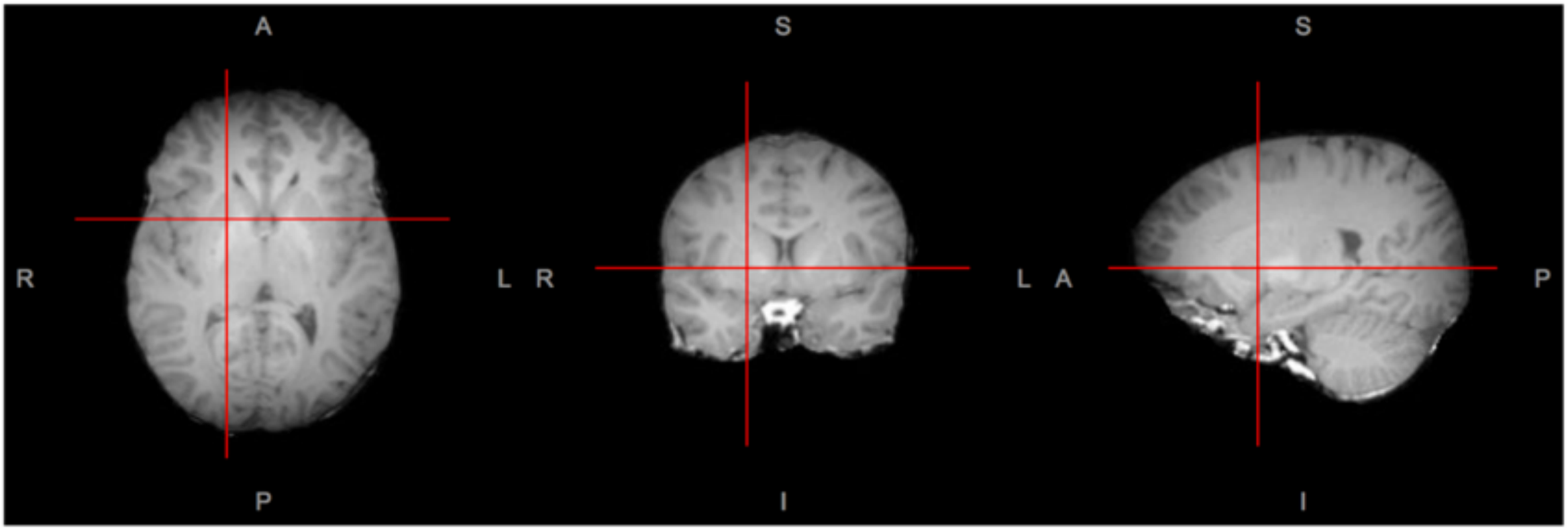
Anatomical labels, shape measures, and gene expression in MNI152 space

Mindboggle-102 team

arno klein / jason tourville / jay bohland / rich stoner

Allen human brain image and gene expression data

H0351.2001



1cm MNI Coordinate: **21, 8, 1**

Structure: **Striatum**

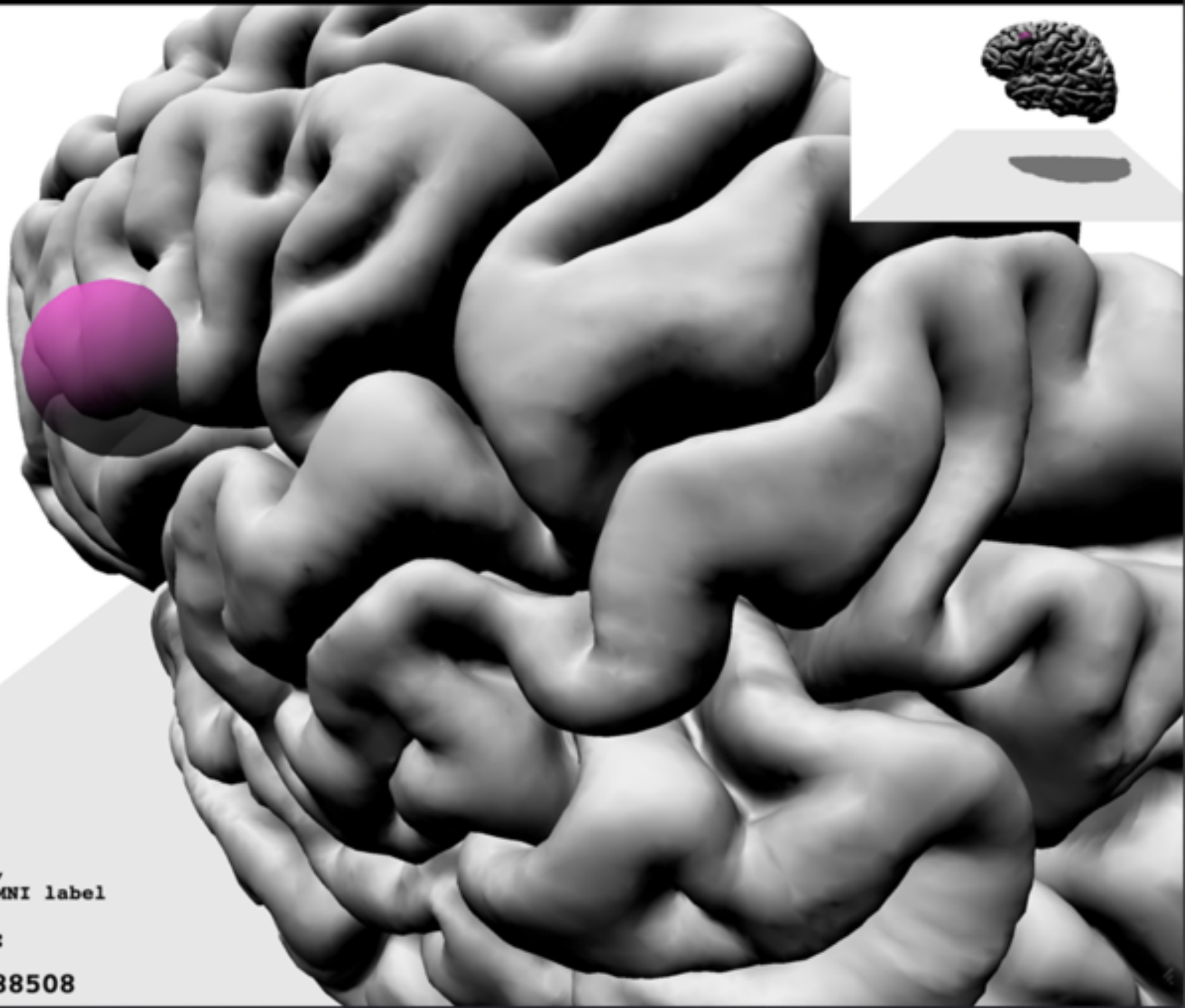
Putamen, Right (Pu)

MNI152 Visualization Demo

Show select label

Controls

Label 3



Highest expression,
aggregated within MNI label

A_24_P109661 :

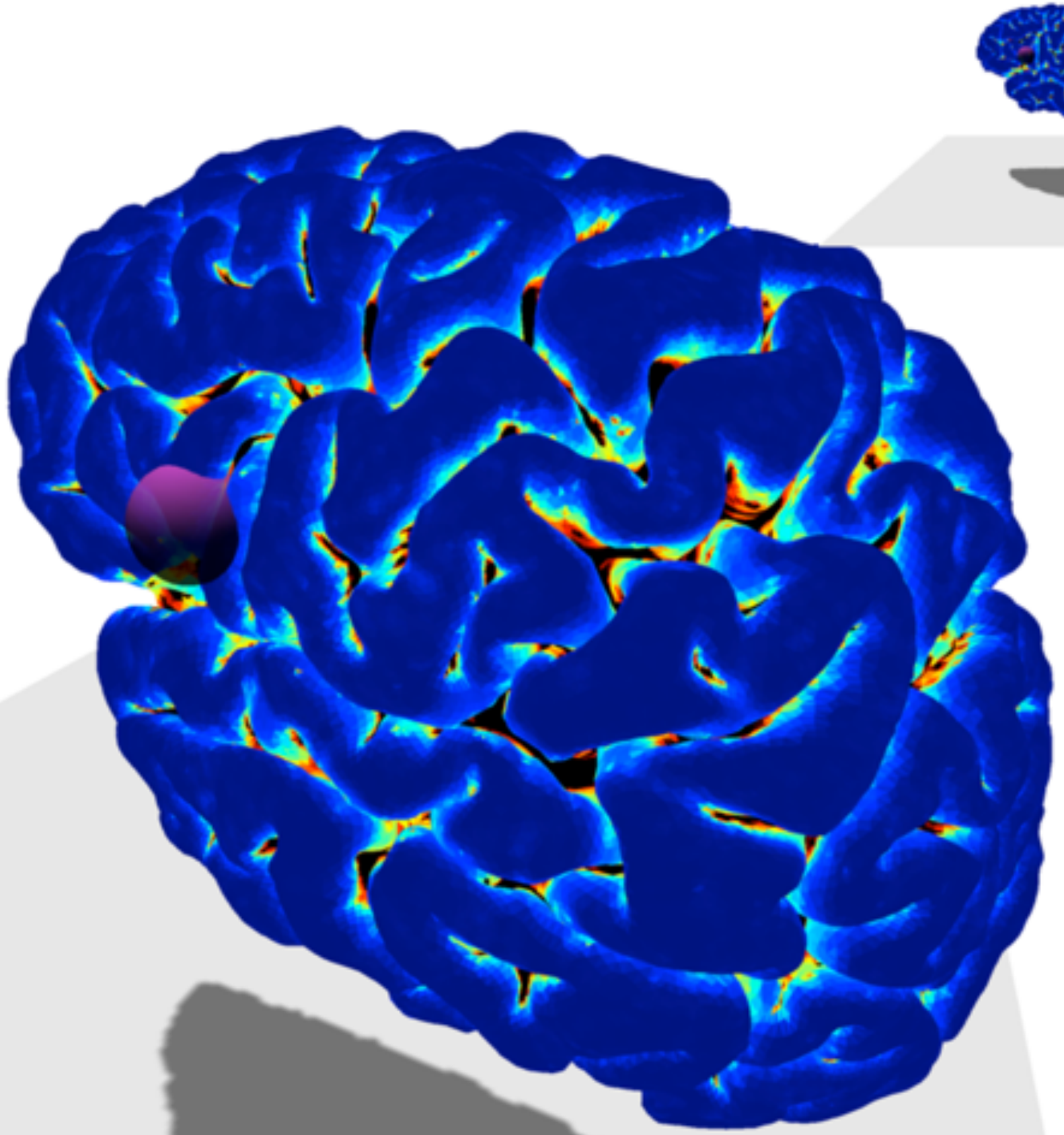
5.3213262053588508

MNI152 Visualization Demo

Show select label

Controls

Label 18



Highest expression,
aggregated within MNI label

A_23_P169812 :

6.4810893969243741

brainhack.org

SPINALCORDHACK2014-M...

Notes from Spinal Cord Hack – Milan 2014 The 44 researchers and clinicians attending

BRAINHACK EDT

Brainhack is a unique conference that convenes researchers from across the globe

15 MINUTE DSI PROJEC...

Summary: The 15 Minute DSI Project first began at the 2013 Hackathon in Paris,

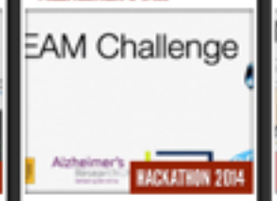
HACKATHON TECH RESOURCES

wifi password: hacktheplanet projects page: www.brainhack.org chat: https://gitter.im/INCF/brainhack2014 live video: http://bit.ly/1pT0ELh

FLASKING NEUROSYNTH

Summary: The Neurosynth website is currently supported by a Rails back-end.

ALZHEIMER'S DI...

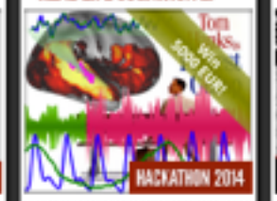


Summary: The goal of the Alzheimer's Disease Big Data DREAM8.5 Challenge #1 (AD#1) is

NI-DM APPS

Summary: The NIDASH Data Model (NI-DM) is a set of specifications (http://nidm.nidash.org/sp

REAL-LIFE COGNITION ...



Summary: The human brain is designed to process vast amounts of input that are

AURAL NEUROANATOMY

Summary: What if there was a neuroanatomy not meant to be seen, but to be listened? Eyes

PIXEL SHADER LIVECOD...

Summary: Livecoding on the GPU-no geometry, just texture convolution–represents

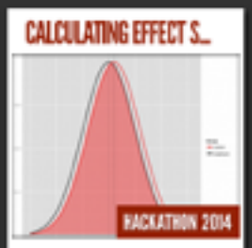
1000 FUNCTIONAL CONN...

Summary: The 1000 Functional Connectomes Project and its International

BRAINBROWSER

Summary: BrainBrowser is a set of open source, web-based, 3D visualization

CALCULATING EFFECT S...



Summary: It is becoming obvious that the the black and white world of reporting

MRI QUALITY CONTROL

Summary: MRI QC https://github.com/chrisfilo is a set of plotting routines useful for

NEUROVAULT.ORG + NI-...

Summary: NI-DM is a format of describing neuroimaging experiments results.

AUTOSEG STN

Summary: Deep-Brain-Stimulation (DBS) is a widely used and highly-effective treatment in

THE MODELGUI PROJECT

Summary: The ModelGUI Project is a Java-based, free, open source, platform-

NITRC RESOURCES REGI...

Summary: The Neuroimaging Informatics Tools and Resources

NIPYPE FOR XNAT

Summary: Nipype has the potential to be a great feature in XNAT. For this project, we will

DATA SHARING: MAKING...

Summary: Brain imaging lags behind other disciplines in data sharing. But to make

SPINALCORDHACK 2014

Summary: To follow close on the ISMRM meeting in Milan, we are inviting participants

NEUROSTARS.ORG

Summary: As part of INCF's Google Summer of Code, neurostars.org, a question and answer

BRAINSPELL TAGGING S...

Summary: More than 1 neuroimaging paper is published every hour. But we can keep up with

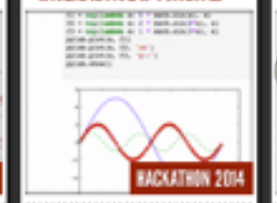
LORIS

Summary: Longitudinal Online Research and Imaging System (LORIS ; Das et al., 2011) is a

NEUROSYNTH BIBLIOMET...

Summary: Bibliometrics, which explores citation practices in the scientific

INTERACTIVE IPYTHON ...



Summary: This project will build on a starting set of IPython notebooks to replace

RE-ARCHITECTING NIPY...

Summary: A brainstorming + proof of concept implementations for the

INTEGRATING NIDM AND...

Summary: NIDM is a data sharing model that's being built to capture details of brain

EXTENDING MURFI2 ...

Summary: MURFI2 describes an open communication protocol for realtime fMRI. This

JAVASCRIPT VISUALIZA...

Summary: Create a collection of reusable javascript visualizatio

AUTOMATIC FREESURFER...

Summary: FreeSurfer often requires substantial manual

CIRRUSSCIENCE -...

Summary: CirrusScience (Cloud Infrastructure for

BRAINHACK 2013

The Neuro Bureau is proud to announce the 2013 Brainhack to be

BIG QUALITY CONTROL

Summary: MRI data quality control over a wide range of

REPRODUCE EXISTING R...

Summary: NiLearn is a Python module, still under development, for

CONSORTIUM FOR REPRO...

Summary: The overarching goal of CoRR is to create an

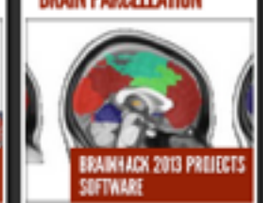
FEAR CIRCUITS

Summary: Who's afraid of the big, bad wolf? Fear processing circuit

HCP PRE-PROCESSED

Summary: At Brainhack 2012, we started a project on the idea to

BRAIN PARCELLATION



Summary: Most connectivity-based clustering studies focus

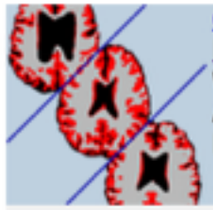
All Challenges

Here is an overview of all challenges that have been organized within the area of medical image analysis that we are aware of. If you know any study that would fit in this overview, please let us know by filling out this form.

Showing 76 projects of 76

Filter by: ☐ Open for submissions (41) ☐ Data download (47) ☐ Hosted on Grand-challenge (6)

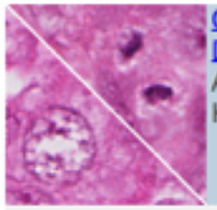
2014



Open for submissions
Data download
Workshop: Sep 18, 2014
Associated with: MICCAI 2014
Hosted on: grand-challenge.org

CADDementia

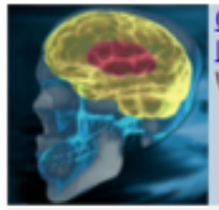
We seek algorithms that perform multi-class classification of patients with Alzheimer's disease (AD), patients with mild cognitive impairment (MCI) and healthy controls (CN) using multi-center structural MRI data.



Open for submissions
Data download
Associated with: ICPR 2014
Hosted on: grand-challenge.org

MITOS-ATYPIA-14

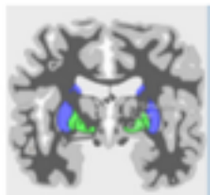
MITOS & ATYPIA 14 Contest, hosted by conference ICPR 2014 Detection of mitosis and evaluation of nuclear atypia on breast cancer H&E stained images



Open for submissions
Data download
Workshop: Sep 14, 2014

Brain Tumor Image Segmentation (BraTS 2014)

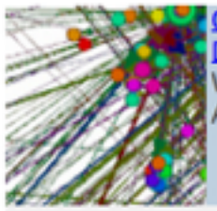
Contains three sub-challenges. 1: Segmentation of brain tumor (GBM) and its components, 2: Longitudinal Evaluation of time series image data and 3: Classification into Low- and and High Grade (GBM) gliomas.



Open for submissions
Data download
Associated with: STN 2014

Subthalamic Nucleus Segmentation Challenge 2014

This challenge seeks to bring together leading academic researchers to tackle the difficult problem of Subthalamic Nucleus (STN) segmentation in MRI volumes. Sponsored by Renishaw plc and organised by Aberytswyth University



Open for submissions
Data download
Workshop: Sep 14, 2014
Associated with: MICCAI 2014

Brain Tumor Digital Pathology Challenge

Evaluation of classification of LGG and GBM, and segmentation of necrotic and normal brain regions from high-res digital pathology slide clinical cases.

Data download
Workshop: Sep 12, 2014
Associated with: ECCV 2014

Leaf Segmentation Challenge

To advance the state of the art in leaf segmentation and to demonstrate the difficulty of segmenting all leaves in an image of plants, we organize the Leaf Segmentation Challenge (LSC).

Open for submissions
Data download
Workshop: Sep 18, 2014
Associated with: MICCAI 2014

Open for submissions
Data download
Workshop: Sep 14, 2014
Associated with: MICCAI 2014

Open for submissions
Data download
Workshop: Sep 14, 2014
Associated with: MICCAI 2014

Alzheimers Disease Big Data DREAM Challenge 1

Sharing

Synapse ID: syn2290704
DOI: (doi:10.7303/syn2290704)

Wiki Files

Pages

Alzheimers Disease Big Data DREAM Challenge 1

1. Overview
   1.1 Steps to Participate
   1.2 DREAM9 Challenges Rules
2. Incentives
3. Data Access
4. Data Description and Format
   4.1 Training
   4.2 Ancillary
   4.3 Test - ROS/MAP
   4.4 Test - AddNeuroMed
5. Questions and Scoring
   5.1 Timelines
6. Leaderboards
   6.1 Submitting Results
      6.1.1 Making submission via the web

Please see News and Updates for messages about data and other AD Challenge information. Questions can be posed in the Community Forum. See Step 3 for how to sign up

Alzheimer's Disease Big Data DREAM Challenge #1
Launch: June 2, 2014
Close: October 3, midnight Pacific Time

Join

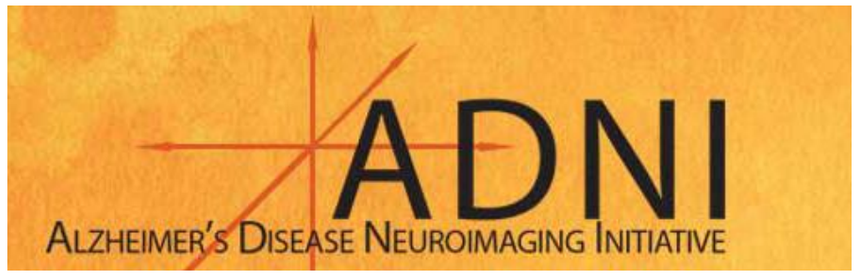
Classify individuals into diagnostic groups and predict MMSE cognitive score using MR imaging data

Scientific Rationale:

If a single MR image could be used to differentiate AD patients from people with mild cognitive impairment or from healthy individuals, research can focus on specific anatomical structures that are different between the groups.

Data

Training set



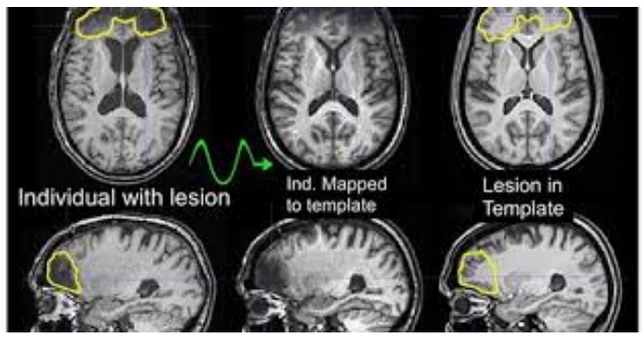
- MRI data
- Age
- Gender
- Years of education
- APOE4 genotype
- Whole genome imputed genotypes

Test sets 1 & 2

The
AddNeuroMed
Study

Image processing

FreeSurfer (recon-all)



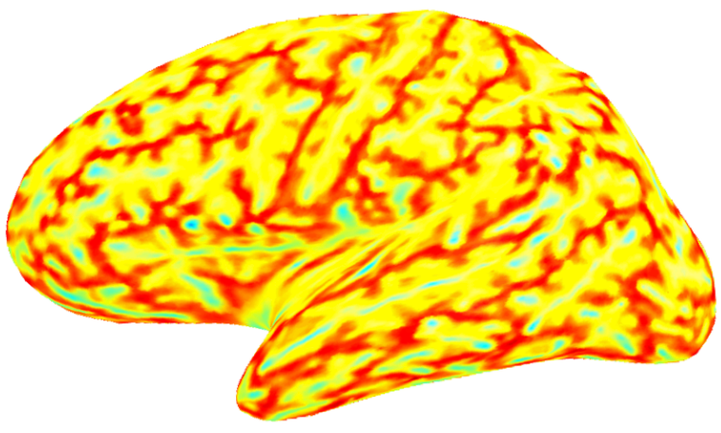
ANTs (antsCorticalThickness.sh)

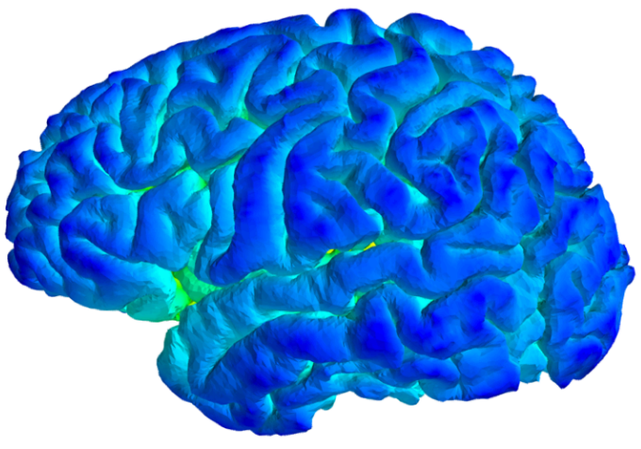
Mindboggle (http://mindboggle.info)

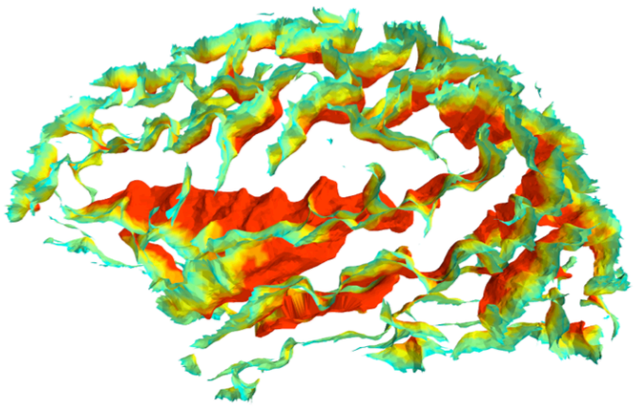
https://www.synapse.org/#!Synapse:syn2290704/wiki/64710

Shape measures

- Surface area
- Travel depth
- Geodesic depth
- Mean curvature
- Convexity (FreeSurfer)
- Thickness (FreeSurfer)
- Volume (per labeled region)
- Laplace-Beltrami spectra (10 floats /label)



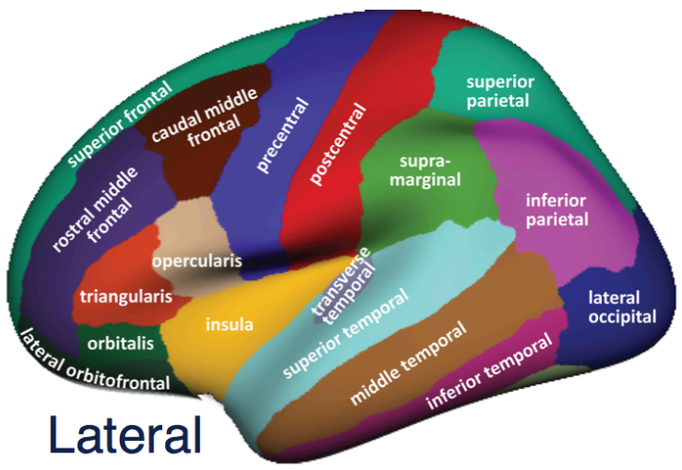


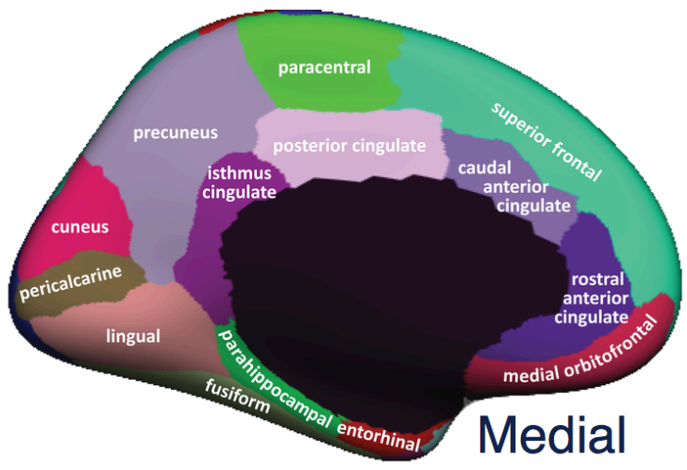


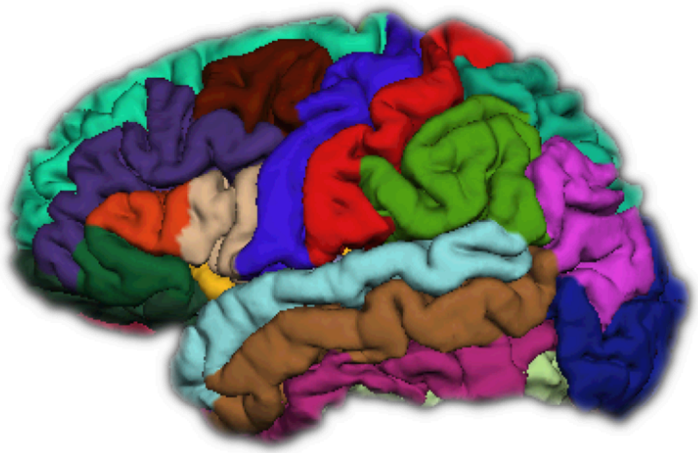
https://www.synapse.org/#!Synapse:syn2290704/wiki/64635

Brain labels

- Cortical surface brain regions (left and right hemispheres)
- Non-cortical brain regions
- Sulcus folds







https://www.synapse.org/#!Synapse:syn2290704/wiki/64635

Processed shape tables

Shape measures for every cortical surface vertex

vertices.csv

Volume for every labeled brain region

FreeSurferfilledlabels_volumes.csv

Cortical surface shape statistics

per label: *label_shapes.csv*
per sulcus: *sulcus_shapes.csv*

https://www.synapse.org/#!Synapse:syn2290704/wiki/64635

Submission format

ID	MMSE Score	Diagnosis
Sample21	26	1
Sample34	29	0
Sample45	20	2
...	...	...
Sample162	18	2

Submissions take the form of comma-separated (.csv) tables with **ID**, predicted **MMSE score**, and **diagnosis**, as above.

https://www.synapse.org/#!Synapse:syn2290704/wiki/64635

Alzheimers Disease Big Data DREAM Challenge 1

Sharing

Synapse ID: syn2290704
DOI: (doi:10.7303/syn2290704)

Wiki Files

Pages

Alzheimers Disease Big Data DREAM Challenge 1

1. Overview
   1.1 Steps to Participate
   1.2 DREAM9 Challenges Rules
2. Incentives
3. Data Access
4. Data Description and Format
   4.1 Training
   4.2 Ancillary
   4.3 Test - ROS/MAP
   4.4 Test - AddNeuroMed
5. Questions and Scoring
   5.1 Timelines
6. Leaderboards
   6.1 Submitting Results
      6.1.1 Making submission via the web

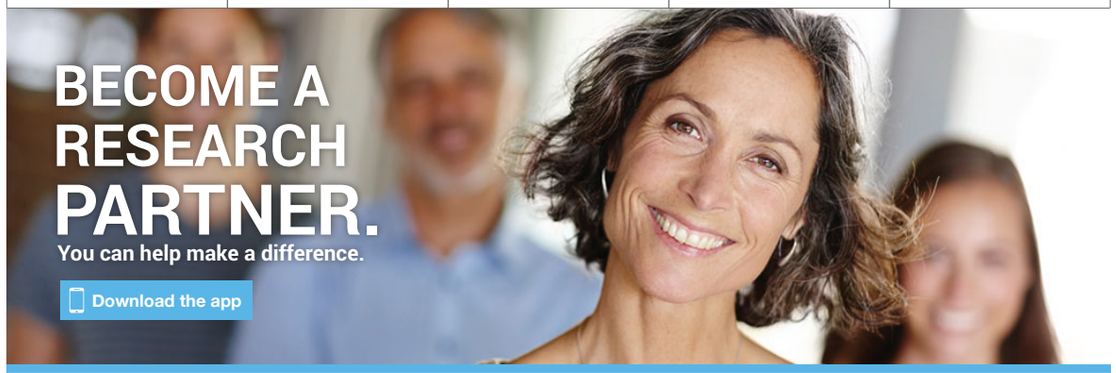
6.4 Q3 Leaderboard

ID	Date	Name	entity	team	Percent Correct	Pearson MMSE	CCC MMSE	Mean Rank	Final Rank
2636580	08/21/2014 08:31:37AM	Guanlab05	syn2636579	Guanlab_UMich	38.30	0.6735	0.5792	1.50	1.50
2665590	09/03/2014 11:48:08AM	Guanlab6	syn2665589	Guanlab_UMich	48.94	0.6716	0.5803	1.50	1.50
2666633	09/03/2014 05:58:07PM	pred_11.csv	syn2666632	jn13	52.13	0.5767	0.5360	4.00	3.50
2677163	09/10/2014 08:37:39PM	SS100250	syn2677162	Bias	59.57	0.6018	0.5338	4.00	3.50
2633527	08/20/2014 02:00:40PM	Guanlab04	syn2633526	Guanlab_UMich	46.81	0.6275	0.5232	4.50	5.00
2677157	09/10/2014 08:29:07PM	SS250	syn2677156	Bias	59.57	0.5688	0.5245	6.00	6.00
2668034	09/05/2014 08:10:34AM	pred_12.csv	syn2666889	jn13	52.13	0.5708	0.5114	6.50	7.00
2662296	09/01/2014 02:47:55PM	pred_9.csv	syn2662278	jn13	52.13	0.5679	0.4676	9.50	8.00
2648187	08/23/2014 06:52:21PM	pred_8.csv	syn2648186	jn13	52.13	0.5605	0.4699	10.00	9.00
2662777	09/01/2014	pred_10.csv	syn2662761	jn13	52.13	0.5677	0.4653	10.50	10.50

Parkinson's Disease Study

Download the app

About this study | How this Study Works | Who is Running this Study | Who is Eligible to Participate | Length of the Study



About this Study

Become a research partner! We believe in empowering individuals like you with the voice and the tools you need to manage your health, understand your disease, and contribute to research.

The Parkinson's Disease Mobile Study provides online tools that allow you to provide data and insights as research partners on the health problems that matter most to you and your family. By sharing data and experiences, you can contribute to new discoveries and better treatments. Learn more.

How this Study Works

Download the mobile app

The mobile app will help gather sensor data, freeing you up from having to entering lots of info.

Perform simple tasks

We'll ask you to do a few tasks and answer some questions about your health.

Track your health

You can use the health dashboard to track your health data.

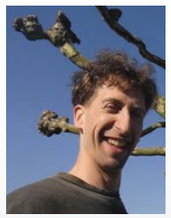
Scientists make discoveries

Scientists will use your data to make breakthroughs in medical research and treatments.

You learn the results

You'll have the opportunity to learn from the scientists about their research results.

Who is Running this Study



Arno Klein

Arno is excited about image processing and analysis, information visualization, 3-D display such as holography, and collaborative, open science. An example project he is actively leading is the Mindboggle software for brain image labeling, feature extraction, and shape analysis.

Who is Eligible to Participate

About this study
rest state

About this study
hover state

About this study
selected state

How this Study Works
rest state

How this Study Works
hover state

How this Study Works
selected state

Who is Running this Study
rest state

Who is Running this Study
hover state

Who is Running this Study
selected state

Who is Eligible to Participate
rest state

Who is Eligible to Participate
hover state

Who is Eligible to Participate
selected state

Length of the Study
rest state

Length of the Study
hover state

Length of the Study
selected state

	SCORE
2.12 WALKING AND BALANCE Over the past week, have you usually had problems with balance and walking? 0: Normal: Not at all (no problems). 1: Slight: I am slightly slow or may drag a leg. I never use a walking aid. 2: Mild: I occasionally use a walking aid, but I do not need any help from another person. 3: Moderate: I usually use a walking aid (cane, walker) to walk safely without falling. However, I do not usually need the support of another person. 4: Severe: I usually use the support of another persons to walk safely without falling.	

SCORE

2.4 EATING TASKS

Over the past week, have you usually had troubles handling your food and using eating utensils? For example, do you have trouble handling finger foods or using forks, knifes, spoons, chopsticks?

0: Normal: Not at all (No problems).

1: Slight: I am slow, but I do not need any help handling my food and have not had food spills while eating.

2: Mild: I am slow with my eating and have occasional food spills. I may need help with a few tasks such as cutting meat.

3: Moderate: I need help with many eating tasks but can manage some alone.

4: Severe: I need help for most or all eating tasks.