<html> <html xmlns="http://www.w3.org/1999/xhtml"><head><meta http-equiv="Content-Type" content="text/html; charset=UTF-8"><title>Zotero Report</title><link rel="stylesheet" type="text/css" href="Zotero%20Report_retinotopy_anatomy_files/detail.css"><link rel="stylesheet" type="text/css" media="screen,projection" href="Zotero%20Report_retinotopy_anatomy_files/detail_screen.css"><link rel="stylesheet" type="text/css" media="print" href="Zotero%20Report_retinotopy_anatomy_files/detail_print.css"></head><body><ul class="report combineChildItems"><li id="item-15352" class="item journalArticle"><h2>Brodmann's areas 17 and 18 brought into stereotaxic space-where and how variable?</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>K Amunts</td></tr><tr class="creator author"><th class="author">Author</th><td>A Malikovic</td></tr><tr class="creator author"><th class="author">Author</th><td>H Mohlberg</td></tr><tr class="creator author"><th class="author">Author</th><td>T Schormann</td></tr><tr class="creator author"><th class="author">Author</th><td>K Zilles</td></tr><tr class="volume"><th class="volume">Volume</th><td>11</td></tr><tr class="issue"><th class="issue">Issue</th><td>1</td></tr><tr class="pages"><th class="pages">Pages</th><td>66-84</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>NeuroImage</td></tr><tr class="date"><th class="date">Date</th><td>Jan 2000</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1006/nimg.1999.0516</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Studies on structural-functional associations in the visual system require precise information on the location and variability of Brodmann's areas 17 and 18. Usually, these studies are based on the Talairach atlas, which does not rely on cytoarchitectonic observations, but on comparisons of macroscopic features in the Talairach brain and Brodmann's drawing. In addition, in this atlas are found only the approximate positions of cytoarchitectonic areas and not the exact borders. We have cytoarchitectonically mapped both areas in 10 human brains and marked their borders in corresponding computerized images. Borders were defined on the basis of quantitative cytoarchitecture and multivariate statistics. In addition to borders of areas 17 and 18, subparcellations within both areas were found. The cytoarchitectonically defined areas were 3-D reconstructed and transferred into the stereotaxic space of the standard reference brain. Surface rendering of the brains revealed high individual variability in size and shape of the areas and in the relationship to the free surface and sulci. Ranges and centers of gravity of both areas were calculated in Talairach coordinates. The positions of areas 17 and 18 in the stereotaxic space differed between the hemispheres. Both areas reached significantly more caudal and medial positions on the left than on the right. Probability maps were created in which the degree of overlap in each stereotaxic position was quantified. These maps of areas 17 and 18 are the first of their kind and contain precise stereotaxic information on both interhemispheric and interindividual differences.</td></tr></tbody></table>
<li id="item-15347" class="item journalArticle"><h2>Correlated size variations in human visual cortex, lateral geniculate nucleus, and optic tract</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>T J Andrews</td></tr><tr class="creator author"><th class="author">Author</th><td>S D Halpern</td></tr><tr class="creator author"><th class="author">Author</th><td>D Purves</td></tr><tr class="volume"><th class="volume">Volume</th><td>17</td></tr><tr class="issue"><th class="issue">Issue</th><td>8</td></tr><tr class="pages"><th class="pages">Pages</th><td>2859-2868</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>The Journal of neuroscience: the official journal of the

Society for Neuroscience</td></tr><tr class="date"><th class="date">Date</th><td>Apr 15, 1997</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>We have examined several components of the human visual system to determine how the dimensions of the optic tract, lateral geniculate nucleus (LGN), and primary visual cortex (V1) vary within the same brain. Measurements were made of the cross-sectional area of the optic tract, the volumes of the magnocellular and parvocellular layers of the LGN, and the surface area and volume of V1 in one or both cerebral hemispheres of 15 neurologically normal human brains obtained at autopsy. Consistent with previous observations, there was a two- to threefold variation in the size of each of these visual components among the individuals studied. Importantly, this variation was coordinated within the visual system of any one individual. That is, a relatively large V1 was associated with a commensurately large LGN and optic tract, whereas a relatively small V1 was associated with a commensurately smaller LGN and optic tract. This relationship among the components of the human visual system indicates that the development of its different parts is interdependent. Such coordinated variation should generate substantial differences in visual ability among humans.</td></tr></tbody></table>
<li id="item-10881" class="item journalArticle"><h2>*The retinotopic organization of striate cortex is well predicted by surface topology*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Noah C Benson</td></tr><tr class="creator author"><th class="author">Author</th><td>Omar H Butt</td></tr><tr class="creator author"><th class="author">Author</th><td>Ritobrato Datta</td></tr><tr class="creator author"><th class="author">Author</th><td>Petya D Radoeva</td></tr><tr class="creator author"><th class="author">Author</th><td>David H Brainard</td></tr><tr class="creator author"><th class="author">Author</th><td>Geoffrey K Aguirre</td></tr><tr class="volume"><th class="volume">Volume</th><td>22</td></tr><tr class="issue"><th class="issue">Issue</th><td>21</td></tr><tr class="pages"><th class="pages">Pages</th><td>2081-2085</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Current biology: CB</td></tr><tr class="date"><th class="date">Date</th><td>Nov 6, 2012</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.cub.2012.09.014</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*In 1918, Gordon Holmes combined observations of visual-field scotomas across brain-lesioned soldiers to produce a schematic map of the projection of the visual field upon the striate cortex. One limit to the precision of his result, and the mapping of anatomy to retinotopy generally, is the substantial individual variation in the size, volumetric position, and cortical magnification of area V1. When viewed within the context of the curvature of the cortical surface, however, the boundaries of striate cortex fall at a consistent location across individuals. We asked whether the surface topology of the human brain can be used to accurately predict the internal, retinotopic function of striate cortex as well. We used fMRI to measure polar angle and eccentricity in 25 participants and combined their maps within a left-right, transform-symmetric representation of the cortical surface. These data were then fit using a deterministic, algebraic model of visual-field representation. We found that an anatomical image alone can be used to predict the retinotopic organization of striate cortex for an individual with accuracy equivalent to 10-25 min of functional mapping. This indicates tight developmental linkage of structure and function within a primary, sensory cortical area.*</td></tr></tbody></table>
<li id="item-15355" class="item journalArticle"><h2>Visual field representations and locations of visual areas V1/2/3 in human visual cortex</h2><table><tbody><tr class="creator

author”><th class=“author”>Author</th><td>Robert F. Dougherty</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Volker M. Koch</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Alyssa A. Brewer</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Bernd Fischer</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Jan Modersitzki</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Brian A. Wandell</td></tr><tr class=“url”><th class=“url”>URL</th><td>http://www.journalofvision.org/content/3/10/1</td></tr><tr class=“volume”><th class=“volume”>Volume</th><td>3</td></tr><tr class=“issue”><th class=“issue”>Issue</th><td>10</td></tr><tr class=“publicationTitle”><th class=“publicationTitle”>Publication</th><td>Journal of Vision</td></tr><tr class=“date”><th class=“date”>Date</th><td>10/24/2003</td></tr><tr class=“DOI”><th class=“DOI”>DOI</th><td>10.1167/3.10.1</td></tr><tr class=“abstractNote”><th class=“abstractNote”>Abstract</th><td>The position, surface area and visual field representation of human visual areas V1, V2 and V3 were measured using fMRI in 7 subjects (14 hemispheres). Cortical visual field maps of the central 12 deg were measured using rotating wedge and expanding ring stimuli. The boundaries between areas were identified using an automated procedure to fit an atlas of the expected visual field map to the data. All position and surface area measurements were made along the boundary between white matter and gray matter. The representation of the central 2 deg of visual field in areas V1, V2, V3 and hV4 spans about 2100 mm2 and is centered on the lateral-ventral aspect of the occipital lobes at Talairach coordinates −29, −78, −11 and 25, −80, −9. The mean area between the 2-deg and 12-deg eccentricities for the primary visual areas was: V1: 1470 mm2; V2: 1115 mm2; and V3: 819 mm2. The sizes of areas V1, V2 and V3 varied by about a factor of 2.5 across individuals; the sizes of V1 and V2 are significantly correlated within individuals, but there is a very low correlation between V1 and V3. These in vivo measurements of normal human retinotopic visual areas can be used as a reference for comparison to unusual cases involving developmental plasticity, recovery from injury, identifying homology with animal models, or analyzing the computational resources available within the visual pathways.</td></tr></tbody></table>
<li id=“item-3033” class=“item journalArticle”><h2>Parcellations and Hemispheric Asymmetries of Human Cerebral Cortex Analyzed on Surface-Based Atlases</h2><table><tbody><tr class=“creator author”><th class=“author”>Author</th><td>David C. Van Essen</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Matthew F. Glasser</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Donna L. Dierker</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>John Harwell</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Timothy Coalson</td></tr><tr class=“url”><th class=“url”>URL</th><td>http://cercor.oxfordjournals.org/content/22/10/2241</td></tr><tr class=“volume”><th class=“volume”>Volume</th><td>22</td></tr><tr class=“issue”><th class=“issue”>Issue</th><td>10</td></tr><tr class=“pages”><th class=“pages”>Pages</th><td>2241-2262</td></tr><tr class=“publicationTitle”><th class=“publicationTitle”>Publication</th><td>Cerebral Cortex</td></tr><tr class=“date”><th class=“date”>Date</th><td>10/01/2012</td></tr><tr class=“DOI”><th class=“DOI”>DOI</th><td>10.1093/cercor/bhr291</td></tr><tr class=“abstractNote”><th class=“abstractNote”>Abstract</th><td>We report on surface-based analyses that enhance our understanding of human cortical organization, including its convolutions and

*its parcellation into many distinct areas. The surface area of human neocortex averages 973 cm2 per hemisphere, based on cortical midthickness surfaces of 2 cohorts of subjects. We implemented a method to register individual subjects to a hybrid version of the FreeSurfer “fsaverage” atlas whose left and right hemispheres are in precise geographic correspondence. Cortical folding patterns in the resultant population-average “fs_LR” midthickness surfaces are remarkably similar in the left and right hemispheres, even in regions showing significant asymmetry in 3D position. Both hemispheres are equal in average surface area, but hotspots of surface area asymmetry are present in the Sylvian Fissure and elsewhere, together with a broad pattern of asymmetries that are significant though small in magnitude. Multiple cortical parcellation schemes registered to the human atlas provide valuable reference data sets for comparisons with other studies. Identified cortical areas vary in size by more than 2 orders of magnitude. The total number of human neocortical areas is estimated to be ~150 to 200 areas per hemisphere, which is modestly larger than a recent estimate for the macaque.</td></tr></tbody></table>
<li id=“item-3988” class=“item journalArticle”><h2>Cortical Folding Patterns and Predicting Cytoarchitecture</h2><table><tbody><tr class=“creator author”><th class=“author”>Author</th><td>Bruce Fischl</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Niranjini Rajendran</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Evelina Busa</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Jean Augustinack</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Oliver Hinds</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>B.T. Thomas Yeo</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Hartmut Mohlberg</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Katrin Amunts</td></tr><tr class=“creator author”><th class=“author”>Author</th><td>Karl Zilles</td></tr><tr class=“url”><th class=“url”>URL</th><td>http://cercor.oxfordjournals.org/content/18/8/1973.abstract</td></tr><tr class=“volume”><th class=“volume”>Volume</th><td>18</td></tr><tr class=“issue”><th class=“issue”>Issue</th><td>8</td></tr><tr class=“pages”><th class=“pages”>Pages</th><td>1973 -1980</td></tr><tr class=“publicationTitle”><th class=“publicationTitle”>Publication</th><td>Cerebral Cortex</td></tr><tr class=“date”><th class=“date”>Date</th><td>2008</td></tr><tr class=“DOI”><th class=“DOI”>DOI</th><td>10.1093/cercor/bhm225</td></tr><tr class=“abstractNote”><th class=“abstractNote”>Abstract</th><td>The human cerebral cortex is made up of a mosaic of structural areas, frequently referred to as Brodmann areas (BAs). Despite the widespread use of cortical folding patterns to perform ad hoc estimations of the locations of the BAs, little is understood regarding 1) how variable the position of a given BA is with respect to the folds, 2) whether the location of some BAs is more variable than others, and 3) whether the variability is related to the level of a BA in a putative cortical hierarchy. We use whole-brain histology of 10 postmortem human brains and surface-based analysis to test how well the folds predict the locations of the BAs. We show that higher order cortical areas exhibit more variability than primary and secondary areas and that the folds are much better predictors of the BAs than had been previously thought. These results further highlight the significance of cortical folding patterns and suggest a common mechanism for the development of the folds and the cytoarchitectonic fields.</td></tr></tbody></table>
<li id=“item-17210” class=“item journalArticle”><h2>The subparietal and parietooccipital sulci: An anatomical study</h2><table><tbody><tr*

*class="creator author"><th class="author">Author</th><td>Bora Gürer</td></tr><tr class="creator author"><th class="author">Author</th><td>Melih Bozkurt</td></tr><tr class="creator author"><th class="author">Author</th><td>Gabriel Neves</td></tr><tr class="creator author"><th class="author">Author</th><td>Ulaş Cikla</td></tr><tr class="creator author"><th class="author">Author</th><td>Tomer Hananya</td></tr><tr class="creator author"><th class="author">Author</th><td>Veysel Antar</td></tr><tr class="creator author"><th class="author">Author</th><td>Shahriar Salamat</td></tr><tr class="creator author"><th class="author">Author</th><td>Mustafa K. Başkaya</td></tr><tr class="url"><th class="url">URL</th><td>http://onlinelibrary.wiley.com/doi/10.1002/ca.22277/abstract</td></tr><tr class="volume"><th class="volume">Volume</th><td>26</td></tr><tr class="issue"><th class="issue">Issue</th><td>6</td></tr><tr class="pages"><th class="pages">Pages</th><td>667–674</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Clinical Anatomy</td></tr><tr class="date"><th class="date">Date</th><td>2013</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1002/ca.22277</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The subparietal and parietooccipital sulci are both located on the medial surface of the brain. Both of these sulci reveal significant variability in pattern and complexity. Both subparietal and parietooccipital sulci play an important role as surgical landmarks using posterior interhemispheric parietooccipital approach to lesions located adjacent to the ventricular trigon deep to the cingulate gyrus. The aim of this study is to analyze variations in the patterns of the subparietal and parietooccipital sulci and to emphasize their surgical importance. Fifty-six formalin-fixed cadaveric cerebral hemispheres from 28 adult humans are examined. Subparietal and parietal sulci patterns, variations and their relationship with the cingulate sulcus are studied according to the terminology introduced by Ono et al. The H-pattern was observed in 50% (n = 28) of all hemispheres, being the most common pattern of the subparietal sulcus. The Straight pattern was observed in the 30.4% (n = 17) of all hemispheres, being the most common pattern of the parietooccipital sulcus. Furthermore, more detailed results among the patterns, connections, side branches and the relationship with the adjacent sulci are given. Our study further confirms the complexities in the patterns of the subparietal and parietooccipital sulci and demonstrates that these sulci fall within an expected range of variations. Better knowledge of these variations will further help neurosurgeons to navigate easily during approaches involving the medial surface of the parietal lobe. Clin. Anat. 26:667–674, 2013. © 2013 Wiley Periodicals, Inc.</td></tr></tbody></table>
<li id="item-5924" class="item journalArticle"><h2>Structure–function spatial covariance in the human visual cortex</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>M K Hasnain</td></tr><tr class="creator author"><th class="author">Author</th><td>P T Fox</td></tr><tr class="creator author"><th class="author">Author</th><td>M G Woldorff</td></tr><tr class="url"><th class="url">URL</th><td>http://www.ncbi.nlm.nih.gov/pubmed/11459760</td></tr><tr class="volume"><th class="volume">Volume</th><td>11</td></tr><tr class="issue"><th class="issue">Issue</th><td>8</td></tr><tr class="pages"><th class="pages">Pages</th><td>702-716</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Cerebral Cortex (New York, N.Y.: 1991)</td></tr><tr class="date"><th class="date">Date</th><td>Aug 2001</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The value of sulcal landmarks for predicting functional areas was quantitatively examined. Medial occipital sulci were identified using anatomical magnetic resonance

images to create individual cortical-surface models. Functional visual areas were identified using retinotopically organized visual stimuli, and positron emission tomography subtraction imaging with intra-subject averaging. Functional areas were assigned labels by placement along the cortical surface from V1. Structure-function spatial covariances between sulci and functional areas, and spatial covariances among functional areas, were determined by projecting sulcal landmarks and functional areas into a standardized stereotaxic space and computing the 'r' statistics. A functional area was considered to spatially covary with a sulcus or another functional area if their geometric centers correlated significantly (P < 0.05) in two or more axes. Statistically significant spatial covariances were found for some, but not all comparisons. The finding of significant spatial covariances within a standardized stereotaxic space indicates that nine-parameter spatial normalization does not account for all the predictive value of structural or functional locations, and may be improved upon by using selected sulcal and functional landmarks. The present findings quantify for the first time the strength of structure–function spatial covariance and comment directly on developmental theories addressing the etiology of structure–function correspondence.</td></tr></tbody></table>
<li id="item-15460" class="item journalArticle"><h2>*Retinotopic maps, spatial tuning, and locations of human visual areas in surface coordinates characterized with multifocal and blocked FMRI designs*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Linda Henriksson</td></tr><tr class="creator author"><th class="author">Author</th><td>Juha Karvonen</td></tr><tr class="creator author"><th class="author">Author</th><td>Niina Salminen-Vaparanta</td></tr><tr class="creator author"><th class="author">Author</th><td>Henry Railo</td></tr><tr class="creator author"><th class="author">Author</th><td>Simo Vanni</td></tr><tr class="volume"><th class="volume">Volume</th><td>7</td></tr><tr class="issue"><th class="issue">Issue</th><td>5</td></tr><tr class="pages"><th class="pages">Pages</th><td>e36859</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>PloS one</td></tr><tr class="date"><th class="date">Date</th><td>2012</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1371/journal.pone.0036859</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*The localization of visual areas in the human cortex is typically based on mapping the retinotopic organization with functional magnetic resonance imaging (fMRI). The most common approach is to encode the response phase for a slowly moving visual stimulus and to present the result on an individual's reconstructed cortical surface. The main aims of this study were to develop complementary general linear model (GLM)-based retinotopic mapping methods and to characterize the inter-individual variability of the visual area positions on the cortical surface. We studied 15 subjects with two methods: a 24-region multifocal checkerboard stimulus and a blocked presentation of object stimuli at different visual field locations. The retinotopic maps were based on weighted averaging of the GLM parameter estimates for the stimulus regions. In addition to localizing visual areas, both methods could be used to localize multiple retinotopic regions-of-interest. The two methods yielded consistent retinotopic maps in the visual areas V1, V2, V3, hV4, and V3AB. In the higher-level areas IPS0, VO1, LO1, LO2, TO1, and TO2, retinotopy could only be mapped with the blocked stimulus presentation. The gradual widening of spatial tuning and an increase in the responses to stimuli in the ipsilateral visual field along the hierarchy of visual areas likely reflected the increase in the average receptive field size. Finally, after registration to Freesurfer's surface-based atlas of the human cerebral cortex, we calculated the mean and variability of the visual area positions in the spherical surface-based coordinate system and generated probability maps of the visual areas on the average cortical surface. The inter-individual variability in the area locations decreased when the*

*midpoints were calculated along the spherical cortical surface compared with volumetric coordinates. These results can facilitate both analysis of individual functional anatomy and comparisons of visual cortex topology across studies.</td></tr></tbody></table>
<li id="item-2966" class="item journalArticle"><h2>Accurate prediction of V1 location from cortical folds in a surface coordinate system</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Oliver P Hinds</td></tr><tr class="creator author"><th class="author">Author</th><td>Niranjini Rajendran</td></tr><tr class="creator author"><th class="author">Author</th><td>Jonathan R Polimeni</td></tr><tr class="creator author"><th class="author">Author</th><td>Jean C Augustinack</td></tr><tr class="creator author"><th class="author">Author</th><td>Graham Wiggins</td></tr><tr class="creator author"><th class="author">Author</th><td>Lawrence L Wald</td></tr><tr class="creator author"><th class="author">Author</th><td>H Diana Rosas</td></tr><tr class="creator author"><th class="author">Author</th><td>Andreas Potthast</td></tr><tr class="creator author"><th class="author">Author</th><td>Eric L Schwartz</td></tr><tr class="creator author"><th class="author">Author</th><td>Bruce Fischl</td></tr><tr class="volume"><th class="volume">Volume</th><td>39</td></tr><tr class="issue"><th class="issue">Issue</th><td>4</td></tr><tr class="pages"><th class="pages">Pages</th><td>1585-1599</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>NeuroImage</td></tr><tr class="date"><th class="date">Date</th><td>Feb 15, 2008</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.neuroimage.2007.10.033</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Previous studies demonstrated substantial variability of the location of primary visual cortex (V1) in stereotaxic coordinates when linear volume-based registration is used to match volumetric image intensities [Amunts, K., Malikovic, A., Mohlberg, H., Schormann, T., and Zilles, K. (2000). Brodmann's areas 17 and 18 brought into stereotaxic space-where and how variable? Neuroimage, 11(1):66-84]. However, other qualitative reports of V1 location [Smith, G. (1904). The morphology of the occipital region of the cerebral hemisphere in man and the apes. Anatomischer Anzeiger, 24:436-451; Stensaas, S.S., Eddington, D.K., and Dobelle, W.H. (1974). The topography and variability of the primary visual cortex in man. J Neurosurg, 40(6):747-755; Rademacher, J., Caviness, V.S., Steinmetz, H., and Galaburda, A.M. (1993). Topographical variation of the human primary cortices: implications for neuroimaging, brain mapping, and neurobiology. Cereb Cortex, 3(4):313-329] suggested a consistent relationship between V1 and the surrounding cortical folds. Here, the relationship between folds and the location of V1 is quantified using surface-based analysis to generate a probabilistic atlas of human V1. High-resolution (about 200 microm) magnetic resonance imaging (MRI) at 7 T of ex vivo human cerebral hemispheres allowed identification of the full area via the stria of Gennari: a myeloarchitectonic feature specific to V1. Separate, whole-brain scans were acquired using MRI at 1.5 T to allow segmentation and mesh reconstruction of the cortical gray matter. For each individual, V1 was manually identified in the high-resolution volume and projected onto the cortical surface. Surface-based intersubject registration [Fischl, B., Sereno, M.I., Tootell, R.B., and Dale, A.M. (1999b). High-resolution intersubject averaging and a coordinate system for the cortical surface. Hum Brain Mapp, 8(4):272-84] was performed to align the primary cortical folds of individual hemispheres to those of a reference template representing the average folding pattern. An atlas of V1 location was constructed by computing the probability of V1 inclusion for each cortical location in the template space. This probabilistic atlas of V1 exhibits low prediction error compared to previous V1 probabilistic atlases built in volumetric coordinates. The increased predictability observed under surface-based registration suggests that the location of V1 is more accurately predicted by the cortical folds than by the shape of the brain embedded in the volume of the skull. In addition, the high quality of this atlas

provides direct evidence that surface-based intersubject registration methods are superior to volume-based methods at superimposing functional areas of cortex and therefore are better suited to support multisubject averaging for functional imaging experiments targeting the cerebral cortex.</td></tr></tbody></table>
<li id="item-3068" class="item journalArticle"><h2>Locating the functional and anatomical boundaries of human primary visual cortex</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Oliver Hinds</td></tr><tr class="creator author"><th class="author">Author</th><td>Jonathan R. Polimeni</td></tr><tr class="creator author"><th class="author">Author</th><td>Niranjini Rajendran</td></tr><tr class="creator author"><th class="author">Author</th><td>Mukund Balasubramanian</td></tr><tr class="creator author"><th class="author">Author</th><td>Katrin Amunts</td></tr><tr class="creator author"><th class="author">Author</th><td>Karl Zilles</td></tr><tr class="creator author"><th class="author">Author</th><td>Eric L. Schwartz</td></tr><tr class="creator author"><th class="author">Author</th><td>Bruce Fischl</td></tr><tr class="creator author"><th class="author">Author</th><td>Christina Triantafyllou</td></tr><tr class="url"><th class="url">URL</th><td>http://www.sciencedirect.com/science/article/pii/S1053811909002754</td></tr><tr class="volume"><th class="volume">Volume</th><td>46</td></tr><tr class="issue"><th class="issue">Issue</th><td>4</td></tr><tr class="pages"><th class="pages">Pages</th><td>915-922</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>NeuroImage</td></tr><tr class="date"><th class="date">Date</th><td>July 15, 2009</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.neuroimage.2009.03.036</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The primary visual cortex (V1) can be delineated both functionally by its topographic map of the visual field and anatomically by its distinct pattern of laminar myelination. Although it is commonly assumed that the specialized anatomy V1 exhibits corresponds in location with functionally defined V1, demonstrating this in human has not been possible thus far due to the difficulty of determining the location of V1 both functionally and anatomically in the same individual. In this study we use MRI to measure the anatomical and functional V1 boundaries in the same individual and demonstrate close agreement between them. Functional V1 location was measured by parcellating occipital cortex of 10 living humans into visual cortical areas based on the topographic map of the visual field measured using functional MRI. Anatomical V1 location was estimated for these same subjects using a surface-based probabilistic atlas derived from high-resolution structural MRI of the stria of Gennari in 10 intact ex vivo human hemispheres. To ensure that the atlas prediction was correct, it was validated against V1 location measured using an observer-independent cortical parcellation based on the laminar pattern of cell density in serial brain sections from 10 separate individuals. The close agreement between the independent anatomically and functionally derived V1 boundaries indicates that the whole extent of V1 can be accurately predicted based on cortical surface reconstructions computed from structural MRI scans, eliminating the need for functional localizers of V1. In addition, that the primary cortical folds predict the location of functional V1 suggests that the mechanism giving rise to V1 location is tied to the development of the cortical folds.</td></tr></tbody></table>
<li id="item-17203" class="item journalArticle"><h2>Occipital sulci of the human brain: variability and probability maps</h2><table><tbody><tr class="creator author"><th

class="author">Author</th><td>Giuseppe Iaria</td></tr><tr class="creator author"><th class="author">Author</th><td>Michael Petrides</td></tr><tr class="volume"><th class="volume">Volume</th><td>501</td></tr><tr class="issue"><th class="issue">Issue</th><td>2</td></tr><tr class="pages"><th class="pages">Pages</th><td>243-259</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>The Journal of comparative neurology</td></tr><tr class="date"><th class="date">Date</th><td>Mar 10, 2007</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1002/cne.21254</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The morphological variation of the sulci of the occipital region of the human brain was examined in both the left and the right hemispheres in 40 normal adult human brains on magnetic resonance images. We identified the occipital sulci and marked their corresponding gray matter voxels on the magnetic resonance images, which had been transformed into the Montreal Neurological Institute standard proportional stereotaxic space in order to construct probability maps. In the medial occipital region, the calcarine sulcus was the longest and most constant sulcus. We identified, in the inferior part of the medial occipital lobe, the lingual sulcus and the posterior collateral sulcus, and, in the superior part, the inferior and superior sagittal sulci of the cuneus. On the lateral surface of the occipital lobe, the lateral occipital, the lunate, and the transverse and inferior occipital sulci were identified. The parieto-occipital fissure and the temporo-occipital incisure were also identified on the lateral and medial surfaces. Finally, the patterns of the occipital sulci and gyri were examined in 20 post-mortem human hemispheres fixed in formalin. Probability maps of the occipital sulci were constructed, which provide a quantitative description of the variability of the sulci in standard stereotaxic space and may be used to identify the location of voxels in other magnetic resonance images transformed into the same streotaxic space. These maps are a useful tool in the study of functional activations related to visual processing.</td></tr></tbody></table>
<li id="item-17201" class="item journalArticle"><h2>*Three-dimensional probabilistic maps of the occipital sulci of the human brain in standardized stereotaxic space*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>*G Iaria*</td></tr><tr class="creator author"><th class="author">Author</th><td>*S Robbins*</td></tr><tr class="creator author"><th class="author">Author</th><td>*M Petrides*</td></tr><tr class="volume"><th class="volume">Volume</th><td>*151*</td></tr><tr class="issue"><th class="issue">Issue</th><td>*1*</td></tr><tr class="pages"><th class="pages">Pages</th><td>*174-185*</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>*Neuroscience*</td></tr><tr class="date"><th class="date">Date</th><td>*Jan 2, 2008*</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>*10.1016/j.neuroscience.2007.09.050*</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*Developments in functional neuroimaging in normal human subjects, such as functional magnetic resonance imaging (fMRI), have permitted the mapping of several visual areas of the human brain and have already provided provisional identification of some of the visual areas that were first described in nonhuman primates. However, the lack of a detailed description of the sulcal patterns of the human occipital lobe makes it difficult to establish clear relationships between sulcal landmarks and identified visual areas with functional neuroimaging. In the present study we used magnetic resonance images to investigate the morphological variation of the human occipital sulci in both the left and right hemispheres of 40 normal adult human brains. We identified 11 occipital sulci, the parieto-occipital fissure and the temporo-occipital incisure, and their corresponding gray matter voxels were marked in the magnetic resonance volumes which had been transformed into the Montreal Neurological Institute standard proportional*

*stereotaxic space. Probability maps were then constructed for each occipital sulcus. These probability maps provide a quantitative measure of the variability of the occipital sulci in standard stereotaxic space and are a useful tool to identify the location of voxels of other magnetic resonance imaging images transformed in the same stereotaxic space.</td></tr></tbody></table>
<li id="item-17205" class="item journalArticle"><h2>Occipital sulci of the human brain: variability and morphometry</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Aleksandar Malikovic</td></tr><tr class="creator author"><th class="author">Author</th><td>Biljana Vucetic</td></tr><tr class="creator author"><th class="author">Author</th><td>Milan Milisavljevic</td></tr><tr class="creator author"><th class="author">Author</th><td>Jovo Tosevski</td></tr><tr class="creator author"><th class="author">Author</th><td>Predrag Sazdanovic</td></tr><tr class="creator author"><th class="author">Author</th><td>Bojan Milojevic</td></tr><tr class="creator author"><th class="author">Author</th><td>Slobodan Malobabic</td></tr><tr class="volume"><th class="volume">Volume</th><td>87</td></tr><tr class="issue"><th class="issue">Issue</th><td>2</td></tr><tr class="pages"><th class="pages">Pages</th><td>61-70</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Anatomical science international</td></tr><tr class="date"><th class="date">Date</th><td>Jun 2012</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1007/s12565-011-0118-6</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The external morphology of the occipital lobe was investigated in 15 human post-mortem brains (30 hemispheres) fixed in formalin. We identified, described and measured the lengths of nine major human occipital sulci and five variable ones, comparing both types between individuals and hemispheres. Morphological variability of human occipital sulci is related to interindividual and interhemispheric differences in their presence, origin, type, segmentation, intersection and length. The major occipital sulci, particularly the parieto-occipital, the calcarine, the inferior lateral occipital and the anterior occipital sulci, as well as two points of their intersections (cuneal point and intersection of the transverse occipital and superior occipital sulcus) may be used as reliable anatomical landmarks for the location of architectonically and functionally defined human visual areas (V1, V2, V3, V3A, V5/MT+, LO1 and LO2) and during less invasive neurosurgical procedures in the cases of focal lesions within the occipital lobe. Two lateral occipital sulci (inferior and superior) were defined on the lateral surface of the occipital lobe. The variable lunate sulcus was studied and combining our results with those from histological and functional imaging studies, we suggest that the lunate sulci of human and nonhuman primates are not homologous.</td></tr></tbody></table>
<li id="item-15471" class="item journalArticle"><h2>Topographical variation of the human primary cortices: implications for neuroimaging, brain mapping, and neurobiology</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>J Rademacher</td></tr><tr class="creator author"><th class="author">Author</th><td>V S, Jr Caviness</td></tr><tr class="creator author"><th class="author">Author</th><td>H Steinmetz</td></tr><tr class="creator author"><th class="author">Author</th><td>A M Galaburda</td></tr><tr class="volume"><th class="volume">Volume</th><td>3</td></tr><tr class="issue"><th class="issue">Issue</th><td>4</td></tr><tr class="pages"><th class="pages">Pages</th><td>313-329</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Cerebral cortex (New York, N.Y.: 1991)</td></tr><tr*

*class="date"><th class="date">Date</th><td>1993 Jul-Aug</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>The relationships of the "primary" cytoarchitectonic neocortical fields, 17, 41, 3b, and 4 (Brodmann areas), to salient topographic landmarks have been reconstructed from serial histological sections in 20 human cerebral hemispheres (10 brains). Each of these architectonic fields is found to bear a characteristic relationship to a set of enframing anatomic landmarks, in particular, gyri, fissures, and sulci, that can be readily defined by MRI. Two classes of variability were found characteristic, at least to some extent, of each of the fields. Class 1 variability–variability that is not predictable from visible landmarks–was typical of the polar and for the cuneal and lingual extracalcarine distributions of field 17 and the distribution of field 4 upon the paracentral lobule. Class 2 variability–variability that is closely predictable from visible landmarks–is seen in the marked interindividual or interhemispheric variation in size or shape of a field and was found to be prominent for all four fields. Because of the prominence of class 2 variability, direct reference to the landmarks that frame these fields may be expected to be a more reliable basis for functional mapping than reference to a template or stereotactic coordinate-based system of reference to a standard or idealized brain.</td></tr></tbody></table>
<li id="item-18408" class="item journalArticle"><h2>Does Retinotopy Influence Cortical Folding in Primate Visual Cortex?</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Reza Rajimehr</td></tr><tr class="creator author"><th class="author">Author</th><td>Roger B. H. Tootell</td></tr><tr class="url"><th class="url">URL</th><td>http://www.jneurosci.org/content/29/36/11149</td></tr><tr class="volume"><th class="volume">Volume</th><td>29</td></tr><tr class="issue"><th class="issue">Issue</th><td>36</td></tr><tr class="pages"><th class="pages">Pages</th><td>11149-11152</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>The Journal of Neuroscience</td></tr><tr class="date"><th class="date">Date</th><td>09/09/2009</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1523/JNEUROSCI.1835-09.2009</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>In humans and other Old World primates, much of visual cortex comprises a set of retinotopic maps, embedded in a cortical sheet with well known, identifiable folding patterns. However, the relationship between these two prominent cortical variables has not been comprehensively studied. Here, we quantitatively tested this relationship using functional and structural magnetic resonance imaging in monkeys and humans. We found that the vertical meridian of the visual field tends to be represented on gyri (convex folds), whereas the horizontal meridian is preferentially represented in sulci (concave folds), throughout visual cortex in both primate species. This relationship suggests that the retinotopic maps may constrain the pattern of cortical folding during development.</td></tr></tbody></table>
<li id="item-3000" class="item journalArticle"><h2>Correspondence of human visual areas identified using functional and anatomical MRI in vivo at 7 T</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Rosa M. Sánchez-Panchuelo</td></tr><tr class="creator author"><th class="author">Author</th><td>Susan T. Francis</td></tr><tr class="creator author"><th class="author">Author</th><td>Denis Schluppeck</td></tr><tr class="creator author"><th class="author">Author</th><td>Richard W. Bowtell</td></tr><tr class="url"><th class="url">URL</th><td>http://onlinelibrary.wiley.com/doi/10.1002/jmri.22822/abstract</td></tr><tr class="volume"><th class="volume">Volume</th><td>35</td></tr><tr class="issue"><th class="issue">Issue</th><td>2</td></tr><tr class="pages"><th*

class="pages">Pages</th><td>287–299</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Journal of Magnetic Resonance Imaging</td></tr><tr class="date"><th class="date">Date</th><td>2012</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1002/jmri.22822</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Purpose:To study the correspondence of anatomically and functionally defined visual areas (primary visual cortex, V1, and motion selective area V5/human MT+) by using structural magnetic resonance imaging (MRI) and functional MRI (fMRI) in vivo at 7 T.Materials and Methods:Four subjects participated in this study. High-resolution (≈0.4 mm isotropic) anatomical MRI was used to identify cortical regions based on their distinct cortical lamination. The optimal contrast for identifying heavily myelinated layers within gray matter was quantitatively assessed by comparing T1-weighted magnetization-prepared rapid gradient echo (MPRAGE) and T2-weighted, 3D fast-low angle shot (FLASH) imaging. Retinotopic mapping was performed using GE-based fMRI at 1.5 mm isotropic resolution to identify functional areas.Results:T2*-weighted FLASH imaging was found to provide a significantly higher contrast-to-noise ratio, allowing visualization of the stria of Gennari in every slice of a volume covering the occipital cortex in each of the four subjects in this study. The independently derived boundary of V1, identified in the same subjects using retinotopic mapping by fMRI, closely matched the border of anatomically defined striate cortex in the human brain. Evidence of banding was also found within the functionally defined V5 area; however, we did not find a good correlation of this area, or the functionally identified subregion (MT), with the banded area.Conclusion:High-resolution T2*-weighted images acquired at 7 T can be used to identify myelinated bands within cortical gray matter in reasonable measurement times. Regions where a myelinated band was identified show a high degree of overlap with the functionally defined V1 area. J. Magn. Reson. Imaging 2012;287-299. © 2011 Wiley Periodicals, Inc.</td></tr></tbody></table>
<li id="item-15467" class="item journalArticle"><h2>Three-Dimensional Statistical Analysis of Sulcal Variability in the Human Brain</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Paul M. Thompson</td></tr><tr class="creator author"><th class="author">Author</th><td>Craig Schwartz</td></tr><tr class="creator author"><th class="author">Author</th><td>Robert T. Lin</td></tr><tr class="creator author"><th class="author">Author</th><td>Aelia A. Khan</td></tr><tr class="creator author"><th class="author">Author</th><td>Arthur W. Toga</td></tr><tr class="url"><th class="url">URL</th><td>http://www.jneurosci.org/content/16/13/4261</td></tr><tr class="volume"><th class="volume">Volume</th><td>16</td></tr><tr class="issue"><th class="issue">Issue</th><td>13</td></tr><tr class="pages"><th class="pages">Pages</th><td>4261-4274</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>The Journal of Neuroscience</td></tr><tr class="date"><th class="date">Date</th><td>07/01/1996</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Morphometric variance of the human brain is qualitatively observable in surface features of the cortex. Statistical analysis of sulcal geometry will facilitate multisubject atlasing, neurosurgical studies, and multimodality brain mapping applications. This investigation describes the variability in location and geometry of five sulci surveyed in each hemisphere of six postmortem human brains placed within the Talairach stereotaxic grid. The sulci were modeled as complex internal surfaces in the brain. Heterogeneous profiles of three-dimensional (3D) variation were quantified locally within individual sulci. Whole human heads, sectioned at 50 μm, were digitally*

photographed and high-resolution 3D data volumes were reconstructed. The parieto-occipital sulcus, the anterior and posterior rami of the calcarine sulcus, the cingulate and marginal sulci, and the supracallosal sulcus were delineated manually on sagittally resampled sections. Sulcal outlines were reparameterized for surface comparisons. Statistics of 3D variation for arbitrary points on each surface were calculated locally from the standardized individual data. Additional measures of surface area, extent in three dimensions, surface curvature, and fractal dimension were used to characterize variations in sulcal geometry. Paralimbic sulci exhibited a greater degree of anterior– posterior variability than vertical variability. Occipital sulci displayed the reverse trend. Both trends were consistent with developmental growth patterns. Points on the occipital sulci displayed a profile of variability highly correlated with their 3D distance from the posterior commissure. Surface curvature was greater for the arched paralimbic sulci than for those bounding occipital gyri in each hemisphere. On the other hand, fractal dimension measures were remarkably similar for all sulci examined, and no significant hemispheric asymmetries were found for any of the selected spatial and geometric parameters. Implications of cortical morphometric variability for multisubject comparisons and brain mapping applications are discussed.</td></tr></tbody></table>
<li id="item-7276" class="item journalArticle"><h2>*Where is 'dorsal V4' in human visual cortex? Retinotopic, topographic and functional evidence*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>R B Tootell</td></tr><tr class="creator author"><th class="author">Author</th><td>N Hadjikhani</td></tr><tr class="volume"><th class="volume">Volume</th><td>11</td></tr><tr class="issue"><th class="issue">Issue</th><td>4</td></tr><tr class="pages"><th class="pages">Pages</th><td>298-311</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Cerebral Cortex (New York, N.Y.: 1991)</td></tr><tr class="date"><th class="date">Date</th><td>Apr 2001</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>11278193</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*In flattened human visual cortex, we defined the topographic homologue of macaque dorsal V4 (the 'V4d topologue'), based on neighborhood relations among visual areas (i.e. anterior to V3A, posterior to MT+, and superior to ventral V4). Retinotopic functional magnetic resonance imaging (fMRI) data suggest that two visual areas ('LOC' and 'LOP') are included within this V4d topologue. Except for an overall bias for either central or peripheral stimuli (respectively), the retinotopy within LOC and LOP was crude or nonexistent. Thus the retinotopy in the human V4d topologue differed from previous reports in macaque V4d. Unlike some previous reports in macaque V4d, the human V4d topologue was not significantly color-selective. However, the V4d topologue did respond selectively to kinetic motion boundaries, consistent with previous human fMRI reports. Because striking differences were found between the retinotopy and functional properties of the human topologues of 'V4v' and 'V4d', it is unlikely that these two cortical regions are subdivisions of a singular human area 'V4'.*</td></tr></tbody></table>
<li *id="item-18396" class="item journalArticle"><h2>Functional anatomy of macaque striate cortex. II. Retinotopic organization</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>R B Tootell</td></tr><tr class="creator author"><th class="author">Author</th><td>E Switkes</td></tr><tr class="creator author"><th class="author">Author</th><td>M S Silverman</td></tr><tr class="creator author"><th class="author">Author</th><td>S L Hamilton</td></tr><tr class="volume"><th class="volume">Volume</th><td>8</td></tr><tr class="issue"><th class="issue">Issue</th><td>5</td></tr><tr class="pages"><th class="pages">Pages</th><td>1531-1568</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>The Journal of neuroscience: the official journal of the

Society for Neuroscience</td></tr><tr class="date"><th class="date">Date</th><td>May 1988</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Macaque monkeys were shown retinotopically-specific visual stimuli during 14C-2-deoxy-d-glucose (DG) infusion in a study of the retinotopic organization of primary visual cortex (V1). In the central half of V1, the cortical magnification was found to be greater along the vertical than along the horizontal meridian, and overall magnification factors appeared to be scaled proportionate to brain size across different species. The cortical magnification factor (CMF) was found to reach a maximum of about 15 mm/deg at the representation of the fovea, at a point of acute curvature in the V1-V2 border. We find neither a duplication nor an overrepresentation of the vertical meridian. The magnification factor did not appear to be doubled in a direction perpendicular to the ocular dominance strips; it may not be increased at all. The DG borders in parvorecipient layer 4Cb were found to be as sharp as 140 micron (half-amplitude, half width), corresponding to a visual angle of less than 2' of arc at the eccentricity measured. In other layers (including magnorecipient layer 4Ca), the retinotopic borders are broader. The retinotopic spread of activity is greater when produced by a low-spatial-frequency grating than when produced by a high-spatial-frequency grating. Orientation-specific stimuli produced a pattern of activation that spread further than 1 mm across cortex in some layers. Some DG evidence suggests that the spread of functional activity is greater near the foveal representation than near 5 degrees eccentricity.</td></tr></tbody></table>
<li id="item-15473" class="item journalArticle"><h2>*Consequences of large interindividual variability for human brain atlases: converging macroscopical imaging and microscopical neuroanatomy*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>H B M Uylings</td></tr><tr class="creator author"><th class="author">Author</th><td>G Rajkowska</td></tr><tr class="creator author"><th class="author">Author</th><td>E Sanz-Arigita</td></tr><tr class="creator author"><th class="author">Author</th><td>K Amunts</td></tr><tr class="creator author"><th class="author">Author</th><td>K Zilles</td></tr><tr class="volume"><th class="volume">Volume</th><td>210</td></tr><tr class="issue"><th class="issue">Issue</th><td>5-6</td></tr><tr class="pages"><th class="pages">Pages</th><td>423-431</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Anatomy and embryology</td></tr><tr class="date"><th class="date">Date</th><td>Dec 2005</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1007/s00429-005-0042-4</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*In human brain imaging studies, it is common practice to use the Talairach stereotaxic reference system for signifying the convergence of brain function and structure. In nearly all neuroimaging reports, the studied cortical areas are specified further with a Brodmann Area (BA) number. This specification is based upon macroscopic extrapolation from Brodmann's projection maps into the Talairach atlas rather than upon a real microscopic cytoarchitectonic study. In this review we argue that such a specification of Brodmann area(s) via the Talairach atlas is not appropriate. Cytoarchitectonic studies reviewed in this paper show large interindividual differences in 3-D location of primary sensory cortical areas (visual cortex) as well as heteromodal associational areas (prefrontal cortical areas), even after correction for differences in brain size and shape. Thus, the simple use of Brodmann cortical areas derived from the Talairach atlas can lead to erroneous results in the specification of pertinent BA. This in turn can further lead to wrong hypotheses on brain system(s) involved in normal functions or in specific brain disorders. In addition, we will briefly discuss the different 'Brodmann' nomenclatures which are in use for the cerebral*

*cortex.</td></tr></tbody></table>
<li id="item-9483" class="item journalArticle"><h2>Comparison of functional and cytoarchitectonic maps of human visual areas V1, V2, V3d, V3v, and V4(v)</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Marcus Wilms</td></tr><tr class="creator author"><th class="author">Author</th><td>Simon B Eickhoff</td></tr><tr class="creator author"><th class="author">Author</th><td>Lars Hömke</td></tr><tr class="creator author"><th class="author">Author</th><td>Claudia Rottschy</td></tr><tr class="creator author"><th class="author">Author</th><td>Milenko Kujovic</td></tr><tr class="creator author"><th class="author">Author</th><td>Katrin Amunts</td></tr><tr class="creator author"><th class="author">Author</th><td>Gereon R Fink</td></tr><tr class="url"><th class="url">URL</th><td>http://www.ncbi.nlm.nih.gov/pubmed/19800409</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>NeuroImage</td></tr><tr class="date"><th class="date">Date</th><td>Oct 1, 2009</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.neuroimage.2009.09.063</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Cytoarchitectonic maps of human striate and extrastriate visual cortex based upon post-mortem brains can be correlated with functionally defined cortical areas using, for example, fMRI. We here assess the correspondence of anatomical maps of the visual cortex with functionally defined in vivo visual areas using retinotopic mapping. To this end, anatomical maximum probability maps (aMPM) derived from individual cytoarchitectonic maps of striate and extrastriate visual areas were compared with functional localisers for the early visual areas. Using fMRI, we delineated dorsal and ventral human retinotopic areas V1, V2, and V3, as well as a quarter-field visual field representation lateral to V3v, V4(v), in 24 healthy subjects. Based on these individual definitions, a functional maximum probability map (fMPM) was then computed in analogy to the aMPM. Functional and anatomical MPMs were highly correlated at group level: 78.5% of activated voxels in the fMPM were correctly assigned by the aMPM. The group aMPM was less effective in predicting functional retinotopic areas in the individual brain due to the large inter-individual variability in the location and extent of visual areas (mean overlap 32-69%). We conclude that cytoarchitectonic maps of striate and extrastriate visual areas may provide a valuable method for assigning functional group activations and thus add valuable a priori knowledge to the analysis of functional imaging data of the visual cortex.</td></tr></tbody></table>
<li id="item-17199" class="item journalArticle"><h2>Where Is Human V4? Predicting the Location of hV4 and VO1 from Cortical Folding</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Nathan Witthoft</td></tr><tr class="creator author"><th class="author">Author</th><td>Mai Lin Nguyen</td></tr><tr class="creator author"><th class="author">Author</th><td>Golijeh Golarai</td></tr><tr class="creator author"><th class="author">Author</th><td>Karen F Larocque</td></tr><tr class="creator author"><th class="author">Author</th><td>Alina Liberman</td></tr><tr class="creator author"><th class="author">Author</th><td>Mary E Smith</td></tr><tr class="creator author"><th class="author">Author</th><td>Kalanit Grill-Spector</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Cerebral cortex (New York, N.Y.: 1991)</td></tr><tr class="date"><th class="date">Date</th><td>Apr 16, 2013</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1093/cercor/bht092</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>A strong relationship between cortical folding and the location of primary sensory areas in the human brain is well established.*

*However, it is unknown if coupling between functional responses and gross anatomy is found at higher stages of sensory processing. We examined the relationship between cortical folding and the location of the retinotopic maps hV4 and VO1, which are intermediate stages in the human ventral visual processing stream. Our data show a consistent arrangement of the eccentricity maps within hV4 and VO1 with respect to anatomy, with the consequence that the hV4/VO1 boundary is found consistently in the posterior transverse collateral sulcus (ptCoS) despite individual variability in map size and cortical folding. Understanding this relationship allowed us to predict the location of visual areas hV4 and VO1 in a separate set of individuals, using only their anatomies, with >85% accuracy. These findings have important implications for understanding the relation between cortical folding and functional maps as well as for defining visual areas from anatomical landmarks alone.</td></tr></tbody></table>
<li id="item-3013" class="item journalArticle"><h2>Linking retinotopic fMRI mapping and anatomical probability maps of human occipital areas V1 and V2</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>A.M. Wohlschläger</td></tr><tr class="creator author"><th class="author">Author</th><td>K. Specht</td></tr><tr class="creator author"><th class="author">Author</th><td>C. Lie</td></tr><tr class="creator author"><th class="author">Author</th><td>H. Mohlberg</td></tr><tr class="creator author"><th class="author">Author</th><td>A. Wohlschläger</td></tr><tr class="creator author"><th class="author">Author</th><td>K. Bente</td></tr><tr class="creator author"><th class="author">Author</th><td>U. Pietrzyk</td></tr><tr class="creator author"><th class="author">Author</th><td>T. Stöcker</td></tr><tr class="creator author"><th class="author">Author</th><td>K. Zilles</td></tr><tr class="creator author"><th class="author">Author</th><td>K. Amunts</td></tr><tr class="creator author"><th class="author">Author</th><td>G.R. Fink</td></tr><tr class="url"><th class="url">URL</th><td>http://www.sciencedirect.com/science/article/pii/S1053811905000522</td></tr><tr class="volume"><th class="volume">Volume</th><td>26</td></tr><tr class="issue"><th class="issue">Issue</th><td>1</td></tr><tr class="pages"><th class="pages">Pages</th><td>73-82</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>NeuroImage</td></tr><tr class="date"><th class="date">Date</th><td>May 15, 2005</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.neuroimage.2005.01.021</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>Using functional MRI, we characterized field sign maps of the occipital cortex and created three-dimensional maps of these areas. By averaging the individual maps into group maps, probability maps of functionally defined V1 or V2 were determined and compared to anatomical probability maps of Brodmann areas BA17 and BA18 derived from cytoarchitectonic analysis (Amunts, K., Malikovic, A., Mohlberg, H., Schormann, T., Zilles, K., 2000. Brodmann's areas 17 and 18 brought into stereotaxic space—where and how variable? NeuroImage 11, 66–84). Comparison of areas BA17/V1 and BA18/V2 revealed good agreement of the anatomical and functional probability maps. Taking into account that our functional stimulation (due to constraints of the visual angle of stimulation achievable in the MR scanner) only identified parts of V1 and V2, for statistical evaluation of the spatial correlation of V1 and BA17, or V2 and BA18, respectively, the a priori measure κ was calculated testing the hypothesis that a region can only be part of functionally defined V1 or V2 if it is also in anatomically defined BA17 or BA18, respectively. κ = 1 means the hypothesis is fully true, κ = 0 means functionally and anatomically defined visual areas are independent.

When applying this measure to the probability maps, κ was equal to 0.84 for both V1/BA17 and V2/BA18. The data thus show a good correspondence of functionally and anatomically derived segregations of early visual processing areas and serve as a basis for employing anatomical probability maps of V1 and V2 in group analyses to characterize functional activations of early visual processing areas.</td></tr></tbody></table>
<li id="item-25485" class="item journalArticle"><h2>*Functional and anatomical properties of human visual cortical fields*</h2><table><tbody><tr class="creator author"><th class="author">Author</th><td>Shouyu Zhang</td></tr><tr class="creator author"><th class="author">Author</th><td>Anthony D. Cate</td></tr><tr class="creator author"><th class="author">Author</th><td>Timothy J. Herron</td></tr><tr class="creator author"><th class="author">Author</th><td>Xiaojian Kang</td></tr><tr class="creator author"><th class="author">Author</th><td>E. William Yund</td></tr><tr class="creator author"><th class="author">Author</th><td>Shanglian Bao</td></tr><tr class="creator author"><th class="author">Author</th><td>David L. Woods</td></tr><tr class="volume"><th class="volume">Volume</th><td>109</td></tr><tr class="issue"><th class="issue">Issue</th><td>Pt A</td></tr><tr class="pages"><th class="pages">Pages</th><td>107-121</td></tr><tr class="publicationTitle"><th class="publicationTitle">Publication</th><td>Vision Research</td></tr><tr class="date"><th class="date">Date</th><td>Apr 2015</td></tr><tr class="DOI"><th class="DOI">DOI</th><td>10.1016/j.visres.2015.01.015</td></tr><tr class="abstractNote"><th class="abstractNote">Abstract</th><td>*Human visual cortical fields (VCFs) vary in size and anatomical location across individual subjects. Here, we used functional magnetic resonance imaging (fMRI) with retinotopic stimulation to identify VCFs on the cortical surface. We found that aligning and averaging VCF activations across the two hemispheres provided clear delineation of multiple retinotopic fields in visual cortex. The results show that VCFs have consistent locations and extents in different subjects that provide stable and accurate landmarks for functional and anatomical mapping. Interhemispheric comparisons revealed minor differences in polar angle and eccentricity tuning in comparable VCFs in the left and right hemisphere, and somewhat greater intersubject variability in the right than left hemisphere. We then used the functional boundaries to characterize the anatomical properties of VCFs, including fractional anisotropy (FA), magnetization transfer ratio (MTR) and the ratio of T1W and T2W images and found significant anatomical differences between VCFs and between hemispheres.*</td></tr></tbody></table>
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