

Resource Summary Report

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ANTS - Advanced Normalization Tools

RRID:SCR_004757

Type: Tool

Proper Citation

ANTS - Advanced Normalization Tools (RRID:SCR_004757)

Resource Information

URL: <http://www.picsl.upenn.edu/ANTS/>

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Description: Software package designed to enable researchers with advanced tools for brain and image mapping. Many of the ANTS registration tools are diffeomorphic*, but deformation (elastic and BSpline) transformations are available. Unique components of ANTS include multivariate similarity metrics, landmark guidance, the ability to use label images to guide the mapping and both greedy and space-time optimal implementations of diffeomorphisms. The symmetric normalization (SyN) strategy is a part of the ANTS toolkit as is directly manipulated free form deformation (DMFFD). *Diffeomorphism: a differentiable map with differentiable inverse. In general, these maps are generated by integrating a time-dependent velocity field. ANTS Applications: * Gray matter morphometry based on the jacobian and/or cortical thickness. * Group and single-subject optimal templates. * Multivariate DT + T1 brain templates and group studies. * Longitudinal brain mapping -- special similarity metric options. * Neonatal and pediatric brain segmentation. * Pediatric brain mapping. * T1 brain mapping guided by tractography and connectivity. * Diffusion tensor registration based on scalar or connectivity data. * Brain mapping in the presence of lesions. * Lung and pulmonary tree registration. * User-guided hippocampus labeling, also of sub-fields. * Group studies and statistical analysis of cortical thickness, white matter volume, diffusion tensor-derived metrics such as fractional anisotropy and mean diffusion.

Abbreviations: ANTS, ANTsX

Synonyms: Advanced Normalization Tools

Resource Type: data processing software, image analysis software, registration software, segmentation software, software application, software resource

Defining Citation: [PMID:20851191](#), [PMID:33907199](#)

Keywords: algorithm, atlas application, morphology, segmentation, image registration, temporal transformation, child, pediatric, normalization

Funding: NIBIB R01 EB006266

Resource Name: ANTS - Advanced Normalization Tools

Resource ID: SCR_004757

Alternate IDs: nlx_75959

Alternate URLs: <http://www.nitrc.org/projects/ants>, <https://sources.debian.org/src/ants/>, <https://gist.github.com/ntustison/12a656a5fc2f6f9c4494c88dc09c5621>

Record Creation Time: 20220129T080226+0000

Record Last Update: 20260912T195616+0000

Ratings and Alerts

No rating or validation information has been found for ANTS - Advanced Normalization Tools.

No alerts have been found for ANTS - Advanced Normalization Tools.

Data and Source Information

Source: [SciCrunch Registry](#)

Usage and Citation Metrics

We found 525 mentions in open access literature.

Listed below are recent publications. The full list is available at [PRECISE-TBI](#) .

Yi S, et al. (2026) Computational and neural mechanisms underlying the influence of action affordances on value learning. Nature communications, 17(1), 1096.

Dennison JB, et al. (2026) Neurometabolic Response to Apneic Stimuli Tracks Global Grey Matter Volume Deficits in Patients With Obstructive Sleep Apnea. Journal of sleep research, 35(3), e70250.

Hvass CR, et al. (2026) Estimation of metabolic water production in human and rat brain and spinal cord. Fluids and barriers of the CNS, 23(1), 26.

Miao Z, et al. (2026) Common and distinct neural correlates of social interaction processing and theory of mind in narratives. Nature communications, 17(1).

Harikumar A, et al. (2026) Examining comorbid and transdiagnostic depression clinical outcomes across anxiety, autism, attention deficit hyperactivity disorder (ADHD), bipolar disorder, depression, and schizotypal personality groups: a novel NeuroMark SPECT

approach. medRxiv : the preprint server for health sciences.

Sugawara M, et al. (2026) A densely sampled fMRI dataset for investigating food valuation. *Scientific data*, 13(1).

Rezaei A, et al. (2026) The retrieval of previously learned motor memories is facilitated by the reinstatement of default mode network manifold structures. *PLoS biology*, 24(3), e3003684.

Wang M, et al. (2026) Global White Matter Damage in Focal Brainstem Injury Patients With Disorders of Consciousness: A Diffusion Tensor Tractography Study. *European journal of neurology*, 33(1), e70476.

Roussel P, et al. (2026) In vivo autofluorescence lifetime imaging of spatial metabolic heterogeneities and learning-induced changes in the *Drosophila* mushroom body. *eLife*, 14.

Adriano A, et al. (2026) Echoes of time: Organization of episodic autobiographical memories in the brain according to their remoteness. *NeuroImage*, 331, 121857.

Stevenson N, et al. (2026) Building bridges between brain and behavior: An open-source toolbox for joint modeling with fMRI. *Imaging neuroscience (Cambridge, Mass.)*, 4.

Blazey T, et al. (2026) Task-evoked deactivations: dissociation between BOLD fMRI and FDG. *bioRxiv : the preprint server for biology*.

Crawford JL, et al. (2026) Dissociable Mechanisms Underlie Differences Between Memory and Metamemory in Older Adults: The Differentiating Role of Anxiety and Depression Symptoms. *Hippocampus*, 36(3), e70100.

Quattrocchi CC, et al. (2026) Quadrato Motor Training in Parkinson's Disease: Resting-State fMRI Changes and Exploratory Whole-Brain Radiomics. *Bioengineering (Basel, Switzerland)*, 13(5).

Jacob J, et al. (2026) Behavioral and neurophysiological changes associated with a single session of bimanual task practice after stroke. *Clinical neurophysiology practice*, 11, 393.

Qu S, et al. (2026) Advancing whole-brain BOLD functional MRI in humans at 10.5T with motion-robust 3D echo-planar imaging, parallel transmission, and high-density radiofrequency receive coils. *Magnetic resonance in medicine*, 95(2), 1068.

Schoenfeld MJ, et al. (2026) Cognitive effects of STN-DBS on mental rotation performance in Parkinson's disease. *Scientific reports*, 16(1).

Brissenden JA, et al. (2026) Cerebellar perturbation impairs human working memory and degrades spatial tuning throughout cortex. *bioRxiv : the preprint server for biology*.

Huang J, et al. (2026) Binding items to contexts through conjunctive neural representations with the method of loci. *Nature communications*, 17(1).

Camacho PB, et al. (2026) Study protocol for the Champaign-Urbana population study. *Frontiers in neuroimaging*, 5, 1728970.