



Call for data and joint analysis

starts on December 2016

The ARIANNA project

<http://arianna.pi.infn.it>



Regione Toscana



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First call for data and joint analysis of the ARIANNA project

Collaborative
research
environment

An interdisciplinary research platform devoted to the study of Autism Spectrum Disorders (ASD) through neuroimaging has been developed within the ARIANNA project (*"Ambiente di Ricerca Interdisciplinare per l'Analisi di Neuroimmagini Nell'Autismo"*), funded by the Tuscan Government, and it is now available to researchers: <http://arianna.pi.infn.it>

Contacts

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Research
objective of
this "First Call"

The complexity and heterogeneity of ASD requires a dedicated effort to develop new analysis techniques to get the most from the interrelationship among the many variables that describe affected individuals, spanning from clinical phenotypic characterization to brain images.

This *first call for data and joint analysis* aims to put together structural MRI data of subjects with ASD and controls from multiple sites with the following characteristics:

- structural T1w MRI data should be acquired with high-resolution 3D protocols (no anomalies should be detected at MRI; both 1.5 T and 3 T data would be accepted);
- both male and female children up to 8 years of age;
- IQ level;
- for subjects with ASD also ADOS-G or ADOS-2 scores.

Data will be analyzed as follows:

- a) Voxel-based morphometry and Freesurfer-based statistical comparison of structural features of the cortex and inner structures will be carried out within each data sample, and on the entire sample accounting for the variability across different data acquisition sites.
- b) Support Vector Machine (SVM) multivariate analyses will be set up to identify involved brain regions in ASD.

In addition, both standard (a) and innovative (b) analysis techniques will be applied to more homogeneous subgroups of subjects, grouped according to narrower age ranges and IQ values, to detect a more robust neuroimaging-based biomarker.

The analysis methods we recently implemented on data samples of young children with ASD [1-8], will be fully exploited on the wider sample collected in the ARIANNA project.

This joint analysis will add to the present literature on ASD precious information about the morphometric brain characteristic of a very young population, including the under-represented female subjects. The final goal of the project is to contribute to the definition of objective and reproducible criteria allowing for a stratification of the subjects with ASD in the view of personalized treatments.

Results of the
joint analysis

The results of the analysis carried out within this *first call* of the ARIANNA project will be jointly published by all authors in peer-reviewed International scientific journals.

Ethical
Committee

The ARIANNA project received the approval of the Regional Ethical Committee on February 28th, 2017 (n. 17/2017).

The ARIANNA
developer
team

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Publication policy
for the "Call for
data and joint
analysis"

Researchers can agree to participate to the proposed ARIANNA *first call* by signing a research agreement defining also the publication policy, which can be briefly summarized as follows: 1) results of the joint analysis proposed for this *first call* will be authored by all participants to the study and submitted for publication in peer reviewed international journals (the expected number of involved researchers for each participating team is two); 2) data collected and results achieved within this *first call* will not be redistributed nor repurposed for different analyses or publications without the explicit consent of the data owners; 3) additional/improved analysis on the same data and/or on extended data samples will be subjected to additional agreements and authorship regulations signed between the data owners and the ARIANNA developer team.

How to
participate

If you are interested in joining the ARIANNA research you can find more information on ARIANNA's website, or you can write to arianna-info@lists.pi.infn.it

In brief: 1) you will have to register to the ARIANNA portal and be allowed to the reserved area; 2) you will upload in the reserved area the phenotypic characteristics and MRI data of the subjects you will contribute to the project (please, plan to contribute at least 20 subjects with ASD and a similar amount of matched controls); 3) you will have your data analyzed by the ARIANNA team, you can contribute to the analysis with your advises and take part to the interpretation of the results; 4) relevant results will be jointly submitted for publication in peer reviewed journals. You will remain the only owner of the data you contributed to the ARIANNA project. Data will neither be redistributed nor be used for purposes other than what agreed between you (your Institution) and the ARIANNA team.

A selection of recent
publications on ASD
neuroimaging by
ARIANNA researchers

- [1] A. Retico, I. Gori, A. Giuliano, F. Muratori, S. Calderoni. One-class Support Vector Machines identify the language and default mode regions as common patterns of structural alterations in young children with Autism Spectrum Disorders. *Frontiers in Neuroscience* 10:306 (2016).
- [2] S. Calderoni, L. Billeci, A. Narzisi, P. Brambilla, A. Retico, F. Muratori, Rehabilitative Interventions and Brain Plasticity in Autism Spectrum Disorders: Focus on MRI-Based Studies, *Frontiers in Neuroscience* 10:139 (2016).
- [3] G. Valvo, S. Baldini, A. Retico, G. Rossi, R. Tancredi, A.R. Ferrari, S. Calderoni, F. Apicella, F. Muratori, F.M. Santorelli, F. Sicca, Temporal lobe connects regression and macrocephaly to autism spectrum disorders, *European Child and Adolescent Psychiatry* 2(4):421-429 (2016).
- [4] A. Retico, A. Giuliano, R. Tancredi, A. Cosenza, F. Apicella, A. Narzisi, L. Biagi, M. Tosetti, F. Muratori, S. Calderoni. The effect of gender on the neuroanatomy of children with autism spectrum disorders: a support vector machine case-control study. *Molecular Autism* 7:5 (2016).
- [5] I. Gori, A. Giuliano, F. Muratori, I. Saviozzi, P. Oliva, R. Tancredi, A. Cosenza, M. Tosetti, S. Calderoni, A. Retico. Gray Matter Alterations in Young Children with Autism Spectrum Disorders: Comparing Morphometry at the Voxel and Structural Level, *Journal of Neuroimaging* 25(6):866-74 (2015).
- [6] A. Retico, M. Tosetti, F. Muratori, S. Calderoni, Neuroimaging-based methods for autism identification: a possible translational application? *Functional Neurology* 29(4):231-239 (2014).
- [7] M. Bellani, S. Calderoni, F. Muratori, P. Brambilla, Brain anatomy of autism spectrum disorders I. Focus on corpus callosum, *Epidemiology and Psychiatric Sciences* 22(3):217-21 (2013).
- [8] S. Calderoni, A. Retico, L. Biagi, R. Tancredi, F. Muratori, M. Tosetti, Female children with autism spectrum disorder: An insight from mass-univariate and pattern classification analyses. *Neuroimage* 59:1013-1022 (2012).

We look forward to you joining us,
the ARIANNA team