# Fabrizio Pizzagalli, Ph.D.
Neuroscientist, Data analyst

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## Current positions

***Associate Professor***, Applied Physics for Neuroscience.
Department of Neuroscience, University of Turin, Italy.

## Areas of specialization

Analysis of Big Data; Imaging Genetics; Neuroimaging; Multimodal MRI data analysis; Multi-site data harmonization.

## Skills

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|---|---|
| Tools and Languages | Python, Git, Containers (Docker, Singularity), R, Bash, Matlab, LaTeX. |
| Quantitative Research | Descriptive and Inferential statistics, Machine Learning, Network analysis (Graph Theory). |
| Communication | Italian, English, French (fluent speaker). |

## Research Interests

- Imaging Genetics: the study of the genetic factors driving human brain cortical and subcortical architecture.
- Human brain structural and functional changes in pathological and healthy conditions.
- Neurodevelopment.
- Leveraging Harmonization methods for multi-site Big Data analysis.
- Classification and prediction of neurodegenerative diseases using AI.

## Appointments held

2015-2020 **Imaging Genetic Center (IGC)** - University of Southern California, Los Angeles (U.S.A.)
(PI: Prof. Paul Thompson and Dr. Neda Jahanshad)

2013-2015 **Laboratoire de Recherche En Neuroimagerie (LREN/CHUV)** - Lausanne (Switzerland)
(PI: Prof. Bogdan Draganski)

2013 **International School for Advanced Studies (ISAS/SISSA)**, Trieste (Italy)

## Education

2012 **Ph.D.** at Ecole Doctorale for Health, Cognition and Environment Engineering (EDISCE), Biotechnology, signal processing and biomedical imaging, University of Grenoble Alpes (France)

2008 **M.Sc.** in **Applied Physics**, University of Bologna, Bologna (Italy)

2006 **B.Sc.** in **Physics**, University of Bologna, Bologna (Italy)

## Talks and Seminars

2024 Invited speaker at IEEE International Symposium on Biomedical Imaging 21th Edition

2024 Invited speaker at Leenards Memory Center seminars

2023 Invited speaker at GIN Grenoble seminars

2022 Invited speaker at Meeting on Tomography and Applications Discrete Tomography, Neuroscience and Image Reconstruction 16th Edition

2019 Invited speaker at 2019 IEEE Winter School on Imaging Genetics

2019 Invited speaker at ISBI 2019, Special sessions: "Is Imaging genetics the frontier for precision medicine?"

2015 Invited speaker at the "Meet the Professor" serie of meeting held at IRST-IRCCS, Meldola (Italy)

2014 Tutoring for the "Statistical Parametric Mapping" SPM Course, Lausanne (CH)

## Student Supervision

2022/24 **Advisor,** Internship, *Exploring the human brain trajectories in Alzheimer's and Parkinson's diseases.* University of Turin. Students: Martina Noé, Carlo Tomba and Sveva Bagnasco.

2021 **Advisor,** Master project, *Effect of children's screen time activity on their mental health and brain structure in ABCD.* Politecnico di Torino. Student: Marco Bottino.

2019 **Advisor,** undergraduate project, *Convolutional Neuronal Network methods for predicting human brain ageing patterns : how the brain would look after a few years of follo-up?.* University of Southern California (USC), Los Angeles, Student: S. Gadewar

2019 **Co-advisor,** undergraduate project, *Machine learning for central sulci shape classification*. University of Bologna. Student: S. Magri

2019 **Advisor**, undergraduate project, *Classification of left and right central sulci shape in large cohorts*, University of Southern California (USC), Los Angeles. Student: J. Boyd

2018 **Co-advisor**, undergraduate project, *Visual inspection of sulci segmentation performance*, University of Southern California (USC), Los Angeles. Student: A. Amini

2017 **Advisor**, undergraduate project, "Gyrification analysis based on Laplace Beltrami eigenfunction level-sets". Department of Biomedical Engineering, University of Melbourne, Melbourne, Australia and University of Southern California (USC), Los Angeles. Student: R. Shishegar

## Computer skills

- Operating Systems: Linux, Mac OS X, Windows.
- Programming: Python, Bash, C/C++, Perl, Java.
- NeuroImaging-related softwares: Freesurfer, SPM, FSL, ANTs, BrainVISA, TrackVis.
- Scientific software: Matlab, R, Gnuplot.
- Other software packages: Git, Docker, Singularity.

## Vocational Experience

2022 - Summer School (funded) Neuro-Imaging, Neuro-Oncology, Neuro-Science 2022 https://www.neurosummerschool.org/

2018 - Summer School (funded) Brain Imaging Genetics: Genetics for Imagers 2018 (Nimejen, NL) https://www.ru.nl/radboudsummerschool/courses/2018/brain-imaging-genetics-genetics-imagers

2016 - Summer School (funded) Brain Connectomics Summer School 2016 (Verona, ITA) http://brainconnectomics.org/

2013 - Training course (funded) Lausanne SPM Course, Lausanne (CH)

2013 - Summer School (funded) Graphical models for the characterization of information flow in complex networks: Application in neuroimaging, Grenoble (France)

2010 - Workshop (funded) JIRFNI BrainVISA fMRI Toolbox, Marseille (France) http://irmfmrs.free.fr/spip.php?article158

2010 - Summer School (funded) 9th IEEE EMBS International Summer School on Biomedical Imaging, Berder (France) ieeess.enst-bretagne.fr

2009 - Workshop (funded) JIRFNI : IRM fonctionnelle, une introduction, Lyon (France)

2008 - Erasmus (funded) Exchange student, Department of Physics and Electrical Engineering, Joseph Fourier University (UJF) (Institut des Neurosciences,Grenoble)

## Professional Memberships

- Society for Neuroscience (SfN) https://www.sfn.org/
- Organization of Human Brain Mapping (OHBM) www.humanbrainmapping.org

## Publications

ENIGMA-SULCI protocol (Pizzagalli F): http://enigma.ini.usc.edu/protocols/imaging-protocols/

Google Scholar

2024 G Sighinolfi, M Mitolo, **F Pizzagalli**, et al. *Sulcal Morphometry Predicts Mild Cognitive Impairment Conversion to Alzheimer's Disease. Journal of Alzheimer's Disease.* 10.3233/JAD-231192

2022 **Co-second author** in Sun BB, Loomis SJ, **Pizzagalli F** et al., *Genetic map of regional sulcal morphology in the human brain from UK biobank data. NATURE COMMUNICATIONS.* https://doi.org/10.1038/s41467-022-33829-1

2022 Kasdan AV, Burgess AN, **Pizzagalli F** et al., *Identifying a brain network for musical rhythm: A functional neuroimaging meta-analysis and systematic review. NEUROSCIENCE AND BIOBEHAVIORAL REVIEWS.* https://doi.org/10.1016/j.neubiorev.2022.104588

2022 Haddad E, **Pizzagalli F** et al., *Multisite test-retest reliability and compatibility of brain metrics derived from FreeSurfer versions 7.1, 6.0, and 5.3. HUMAN BRAIN MAPPING.* https://doi.org/10.1002/hbm.26147

2022 Medland et al., *Ten years of enhancing neuro-imaging genetics through meta-analysis : An overview from the ENIGMA Genetics Working Group. HUMAN BRAIN MAPPING.* https://doi.org/10.1002/hbm.25311

2021 Shishegar R, **Pizzagalli F** et al., *A Gyrification Analysis Approach Based on Laplace Beltrami Eigenfunction Level sets. NEUROIMAGE* https://doi.org/10.1016/j.neuroimage.2021.117751

2021 Reza T, **Pizzagalli F** et al., *White matter tracts characteristics in habitual decision-making circuit underlie ritual behaviors in anorexia nervosa. SCIENTIFIC REPORTS* https://doi.org/10.1038/s41598-021-95300-3

2020 **Co-second author** in Grasby, K. L. et al. *The genetic architecture of the human cerebral cortex. SCIENCE* https://doi.org/10.1126/science.aay6690

2020 **Pizzagalli F** et al., *The reliability and heritability of cortical folds. COMMUNICATION BIOLOGY* https://doi.org/10.1038/s42003-020-01163-1

2020 Thompson, P. M. et al. *ENIGMA and Global Neuroscience: A Decade of Large-Scale Studies of the Brain in Health and Disease Across More Than 40 Countries. TRANSLATIONAL PSYCHIATRY*
https://doi.org/10.1038/s41398-020-0705-1

2018 **Pizzagalli F** et al., *Sulcal-based morphometry in Parkinson's disease: a study of reliability and disease effects*. IEEE-SIPAIM
https://doi.org/10.1117/12.2511590.

2018 Dojat M, **Pizzagalli F** and Houpe JM; *Magnetic resonance imaging does not reveal structural alterations in the brain of grapheme-color synesthetes.*PLoS One. 13: e0194422.
doi:10.1371/journal.pone.0194422

2018 Hofer E et al., *Genetic Determinants of Cortical Structure (Thickness, Surface Area and Volumes) among Disease Free Adults in the CHARGE Consortium.* bioRxiv;
https://www.biorxiv.org/content/10.1101/409649v1.abstract

2018 Grasby KL et al, 2018, *The genetic architecture of the human cerebral cortex.* bioRxiv;
https://www.biorxiv.org/content/10.1101/399402v2.full-text

2017 KH Maier-Hein at al., *The challenge of mapping the human connectome based on diffusion tractography.* NATURE COMMUNICATION. 2017;8: 1349.;
https://www.nature.com/articles/s41467-017-01285-x

2017 Gutman BA, **Pizzagalli F**, Jahanshad N, Wright ML, Thompson PM, *Approximating Principle Genetic Components of Subcortical Shape.* IEEE-ISBI, 1226-1230.
doi:10.1109/ISBI.2017.7950738

2017 Adhikari BM et al., *A resting state fMRI analysis pipeline for pooling inference across diverse cohorts: an ENIGMA rs-fMRI protocol.* BRAIN IMAGING BEHAV. Oct;13(5):1453-146
doi:10.1007/s11682-018-9941-x

2017 Dojat M et al., *Magnetic resonance imaging does not reveal structural alterations in the brain of synesthetes.* bioRxiv 196865
10.1371/journal.pone.0194422

2016 Allegra M., Seyed-Allaei S., **Pizzagalli F.**, Baftizadeh F., Maieron M., Reverberi C., Laio A., Amati D., *fMRI single trial discovery of spatio-temporal brain activity patterns.* HUMAN BRAIN MAPPING 38:1421-1437
https://onlinelibrary.wiley.com/doi/abs/10.1002/hbm.23463

2016 **Pizzagalli F**, et al., *The core genetic network underlying sulcal morphometry.* IEEE-SIPAIM 10160 https://doi.org/10.1117/12.2256959

2016 Maier-Hein K. at al., *Tractography-based connectomes are dominated by false-positive connections.* bioRxiv https://doi.org/10.1101/084137

2016 **Pizzagalli F.** et al., *Genetic analysis of cortical sulci in 1,009 adults.* IEEE-ISBI https://ieeexplore.ieee.org/abstract/document/7493395/

2014 Maillard AM, Ruef A, **Pizzagalli F.**, et al., *The 16p11.2 locus modulates brain structures common to autism, schizophrenia and obesity.* MOL. PSYCHIATRY 2015;20(1):140-147. doi:10.1038/mp.2014.145

2013 **Pizzagali F**, et al., *Local landmark alignment for high-resolution fMRI group studies: Toward a fine cortical investigation of hand movements in human.* J NEUROSCI METHODS, 218 (1) (2013), pp. 83-95. https://doi.org/10.1016/j.jneumeth.2013.05.005

2012 **Pizzagali F**, Auzias G, Delon-Martin C, Dojat M, 2012, *Which registration method for high resolution fMRI to explore hand movement cortical representation?.* IEEE-ISBI 10.1109/ISBI.2012.6235642

2011 **Pizzagali F**, Auzias G, Delon-Martin C, Dojat M, 2011, *Combination of nonlinear registration methods with high resolution fMRI for a fine exploration of human primary motor hand area.* IEEE-EMBC 2011:6989-92 10.1109/IEMBS.2011.6091767

2011 Coulon O, **Pizzagali F**, et al., *Two new stable anatomical landmarks on the central sulcus: automatic detection and their relationship with primary motor functions of the hand.* IEEE-EMBC 7795-7798 10.1109/IEMBS.2011.6091921

Contributions to conferences

2024 Cinque et al., *Whole brain genetic correlation of brain folding: An MRI Study in 8,740 Children.* **ISBI2024**.

2024 Tamba et al., *BRAIN VOLUME AND GENES EXPRESSION ENDOPHENOTYPES FOR PARKINSON'S DISEASE.* **ISBI2024**.

2023 Tamba et al., *Analysis of brainstem areas' volumes and gene expression to retrieve multimodal biological markers for Parkinson's Disease.* **SINS 2023**.

2022 Sighinolfi et al., *Prediction of MCI conversion using sulcal morphometry.* **ISMRM 2022**.

2022 Zafferoni et al., *Siamese Network for classification of MCI using sulcal-based morphometry.* **OHBM 2022**.

2022 Bottino et al., *Effects of children's screen time activity on their mental health and brain structure in ABCD.* **OHBM 2022**.

2020 Turner et al., *ENIGMA COINSTAC: Increasing neuroimaging data diversity with managed privacy.* **APS Virtual Poster Showcase 2020**.

2019 **Pizzagalli F.** et al., *Classification of Alzheimer?s Disease patients using MRI-based cortical phenotyping 1 and 2 years before dementia onset.* ***SFN2019***

2019 **Pizzagalli F.** et al., *Sulcal morphometry as a predictor of conversion from Mild Cognitive Impairment to Alzheimer's Disease in ADNI.* **OHBM2019**

2018 **Pizzagalli F.** et al., *Improvement of sulcus-based morphometry reliability through sulci aggregation.* **OHBM2018**

2017 **Pizzagalli F.** et al., *Genetic Analysis of the Hemodynamic Response Function in Motor Areas in 680 Subjects.* **OHBM2017**

2016 **Pizzagalli F.** et al., *Heritability of 492 cortical sulcal measures in 1459 adults.* **OHBM2016**

2016 **Pizzagalli F.** et al., *Cortical investigation of bipolar disorder reveals inferior frontal gyral and sulcal abnormalities.* **OHBM2016**

2015 **Pizzagalli F.** et al., *A novel unsupervised clustering method for fMRI time-series.* **OHBM2015**

2014 Maillard AM, Ruef A, **Pizzagalli F** et al., , *The 16p11.2 locus modulates brain structures common to autism, schizophrenia and obesity.* **ASHG2014**

2011 **Pizzagali F** et al., *Which registration method for high resolution fMRI?.* **ESMRMB2011**

2011 **Pizzagali F**et al., *Une exploration fine en IRMf précise de la représentation corticale de la main chez l'homme par IRMf.* **GRAMM2011**

2011 Delon-Martin C, **Pizzagalli F**, Dojat M., *A fine fMRI exploration of hand cortical representation in humans.* **OHBM2011**