



Mauro Costagli

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Academic Experience

2023 - ongoing

Associate Professor of Applied Medical Technical Sciences
University of Genoa – Genoa (Italy)

2020 - 2023

Senior Researcher (Tenure Track Professor)
University of Genoa – Genoa (Italy)

2017 - 2023

Contract Professor (Advanced Neuroimaging)
IMT School of Advanced Studies Lucca – Lucca (Italy)

2011 - 2020

Researcher
Imago 7 Research Foundation and IRCCS Stella Maris – Pisa (Italy)

2004 - 2011

Researcher
RIKEN Brain Science Institute – Wakoshi (Japan)

2003 - 2004

Graduate fellow
Institute of Information Science and Technologies
Italian National Research Council (CNR) – Pisa (Italy)

Education and Training

Ph.D. in Molecular, Metabolic and Functional Exploration of the Nervous System and Sensory Organs

Thesis title: "High-field functional magnetic resonance imaging reveals different patterns of responses elicited by transient changes in visual motion coherency" (2010)
University of Pisa – Pisa (Italy)

M.Sc. in Telecommunication Engineering

Thesis title: "Bayesian Source Separation of Astrophysical Images Using Particle Filters" (2003)
University of Pisa – Pisa (Italy)

Research activity

My research activity is focused on the field of magnetic resonance, both in technological development and its application in neuroscience and clinical settings.

I am interested in acquisition techniques, image reconstruction, and data analysis for high-field (3T) and ultra-high-field (7T) MRI systems. Currently, my main research areas include susceptibility-weighted imaging (SWI), quantitative susceptibility mapping (QSM), functional imaging (fMRI, functional QSM), multiparametric quantitative imaging techniques (Magnetic Resonance Fingerprinting, MRF; Quantitative Transient-state Imaging, QTI), and synthetic imaging.

I am an elected member of the Biomedical Image & Signal Analytics Technical Area Committee of the European Association for Signal Processing (EURASIP) for the years 2022-2024; Secretary of the Electro-Magnetic Tissue Property (EMTP) Study Group of the International Society of Magnetic Resonance in Medicine (ISMRM); Member of the EMTP 2024 Steering Committee (Santiago, Chile).

I served as Chairman of QMR 2024 (Lucca, Italy), Member of the Steering Committee of the QSM Workshop 2019 (Seoul, Korea), and Organizer of the Summer School of Ultra-High Field Magnetic Resonance Imaging (HiMR 2015, Elba Island, Italy).

Publications

Selection of publications on peer-reviewed journals as *first / last / corresponding author*:

1. Donatelli G., Migaletto G., Cencini M., Cecchi P., D'Amelio C., Peretti L., Buonincontri G., Tosetti M., Costagli M.*, Cosottini M.: "Detection of pathological contrast enhancement with synthetic brain imaging from quantitative multiparametric MRI". *Journal of Neuroimaging* DOI: 10.1111/jon.13201 (2024). **co-last and corresponding author*
2. Donatelli G., Cecchi P., Migaletto G., Cencini M., Frumento P., D'Amelio C., Peretti L., Buonincontri G., Pasquali L., Tosetti M., Cosottini M., Costagli M.: "Quantitative T1 mapping detects blood-brain barrier breakdown in apparently non-enhancing multiple sclerosis lesions", *NeuroImage: Clinical* 40, 103509 (2023).
3. Peretti L., Donatelli G., Cencini M., Cecchi P., Buonincontri G., Cosottini M., Tosetti M., Costagli M.: "Generating Synthetic Radiological Images with PySynthMRI: An Open-Source Cross-Platform Tool", *Tomography* 9(5), 1723-1733, DOI: 10.3390/tomography9050137 (2023).
4. Schiavi S., Palombo M., Zacà D., Tazza F., Lapucci C., Castellan L., Costagli M.*, Inglese M.: "Mapping tissue microstructure across the human brain on a clinical scanner with soma and neurite density image metrics", *Human Brain Mapping* 44(13):4792-4811 (2023). **corresponding author*.
5. Ferraro P.M., Gualco L., Costagli M.*, Schiavi S., Ponzano M., Signori A., Massa F., Pardini M., Castellan L., Levrero F., Zacà D., Piredda G.F., Hilbert T., Kober T., Roccatagliata L.: "Compressed sensing (CS) MP2RAGE versus standard MPRAGE: a comparison of derived brain volume measurements", *Physica Medica – European Journal of Medical Physics* 103, 166-174 (2022). **corresponding author*.
6. Costagli M., Donatelli G., Cecchi P., Bosco P., Migaletto G., Siciliano G., Cosottini M.: "Distribution Indices of Magnetic Susceptibility Values in the Primary Motor Cortex Enable to Classify Patients with Amyotrophic Lateral Sclerosis", *Brain Sciences* 12(7), 942 (2022).
7. Donatelli G., Costagli M.*, Cecchi P., Migaletto G., Bianchi F., Frumento P., Siciliano G., Cosottini M.: "Motor cortical patterns of upper motor neuron pathology in amyotrophic lateral sclerosis: A 3 T MRI study with iron-sensitive sequences", *NeuroImage: Clinical* 35, 103138 (2022). **corresponding author*.
8. Costagli M., Lapucci C., Zacà D., Bruschi N., Schiavi S., Castellan L., Stemmer A., Roccatagliata L., Inglese M.: "Improved detection of multiple sclerosis lesions with T2-prepared double inversion recovery at 3T", *Journal of Neuroimaging*, DOI:10.1111/jon.13021 (2022).
9. Lancione M., Cencini M., Costagli M.*, Donatelli G., Tosetti M., Giannini G., Zangaglia R., Calandra-Buonaura G., Pacchetti C., Cortelli P., Cosottini M.: "Diagnostic accuracy of quantitative susceptibility mapping in multiple system atrophy: The impact of echo time and the potential of histogram analysis", *NeuroImage: Clinical* 34, 102989 (2022). **corresponding author*.
10. Lancione M., Donatelli G., Cecchi P., Cosottini M., Tosetti M., Costagli M.: "Echo-time dependency of quantitative susceptibility mapping reproducibility at different magnetic field strengths", *NeuroImage* 197, 557-564 (2019).
11. Costagli M.*, Lancione M., Cecchetti L., Pietrini P., Cosottini M., Ricciardi E., Tosetti M.: "Quantitative Susceptibility Mapping of Brain Function during Auditory Stimulation", *IEEE Transactions on Radiation and Plasma Medical Sciences* 3 (4) 516-522 (2019). **first and corresponding author*.
12. Donatelli G., Caldarazzo Ienco E., Costagli M.*, Migaletto G., Cecchi P., Siciliano G., Cosottini M.: "MRI cortical feature of bulbar impairment in patients with amyotrophic lateral sclerosis", *NeuroImage: Clinical* 24 101934 (2019). **corresponding author*.
13. Rua C., Wastling S.J., Costagli M.*, Symms M.R., Biagi L., Cosottini M., Del Guerra A., Tosetti M., Barker G.J.: "Improving fMRI in signal drop-out regions at 7 T by using tailored radiofrequency pulses: application to the ventral occipito-temporal cortex", *Magnetic Resonance Materials in Physics, Biology and Medicine (MAGMA)*, 31(2):257-267 (2018). **corresponding author*.
14. Lancione M., Tosetti M., Donatelli G., Cosottini M., Costagli M.: "The impact of white matter fiber orientation in single-acquisition quantitative susceptibility mapping", *NMR in Biomedicine*, e3798. (2017).
15. Rua C., Costagli M.*, Symms M.R., Biagi L., Donatelli G., Cosottini M., Del Guerra A., Tosetti M.: "Characterization of high-resolution Gradient Echo and Spin Echo EPI for fMRI in the human visual cortex at 7 T", *Magnetic Resonance Imaging* 40: 98-108 (2017). **corresponding author*.

16. Costagli M., Donatelli G., Biagi L., Caldarazzo Ienco E., Siciliano G., Tosetti M. Cosottini M.: "Magnetic susceptibility in the deep layers of the primary motor cortex in Amyotrophic Lateral Sclerosis", *NeuroImage: Clinical* 12: 965-969 (2016).
17. Costagli M.*, Symms M.R., Angeli, L., Kelley D.A.C., Biagi L., Farnetani A., Rua C., Donatelli G., Tiberi G., Tosetti M., Cosottini M.: "Assessment of Silent T1-weighted head imaging at 7T", *European Radiology* 26: 1879-1888 (2016). **first and corresponding author.*
18. Gaglianese A.*, Costagli M.*, Ueno K., Ricciardi E., Bernardi G., Pietrini P., Cheng K.: "The direct, not V1-mediated, functional influence between the thalamus and middle temporal complex in the human brain is modulated by the speed of visual motion", *Neuroscience* 284: 833-844 (2015). **co-first authors (equal contribution).*
19. Costagli M.*, Ueno K., Sun P., Gardner J., Wan X., Ricciardi E., Pietrini P., Tanaka K. and Cheng K.: "Functional Signalers of Changes in Visual Stimuli: Cortical Responses to Increments and Decrements in Motion Coherence", *Cerebral Cortex* 24 (1): 110-118 (2014). **first and corresponding author.*
20. Costagli M.*, Kelley D.A.C., Symms M.R., Biagi L., Stara R., Maggioni E., Tiberi G., Barba C., Guerrini R., Cosottini M., Tosetti M.: "Tissue Border Enhancement by inversion recovery MRI at 7.0 Tesla", *NeuroRadiology* 56: 517-523 (2014). **first and corresponding author.*
21. Costagli M.*, Waggoner R.A., Ueno K., Tanaka K., Cheng K.: "Correction of 3D rigid body motion in fMRI time series by independent estimation of rotational and translational effects in kspace", *Neuroimage* 45(3) 749-757 (2009). **first and corresponding author.*
22. Costagli M.*, Kuruoğlu E.E.: "Image separation using particle filters", *Digital Signal Processing*, 17(5):935-946 (2007). **first and corresponding author.*

Selection of other representative publications on peer-reviewed journals (from 2012 onwards):

1. QSM Consensus Organization Committee, Bilgic B., Costagli M., Chan K.S., Duyn J., Langkammer C., Lee J., Li X., Liu C., Marques J.P., Milovic C., Robinson S.D., Schweser F., Shmueli K., Spincemille P., Straub S., van Zijl P., Wang Y., ISMRM Electro-Magnetic Tissue Properties Study Group: "Recommended implementation of quantitative susceptibility mapping for clinical research in the brain: a consensus of the ISMRM electro-magnetic tissue properties study group". *Magnetic Resonance in Medicine* 91:1834–1862 (2024).
2. Celardo G., Scaife E., Buchignani B., Donatelli G., Costagli M., Cristofani P., Canapicchi R., Pasquariello R., Tosetti M., Battini R., Biagi L.: "Case report: Exploring chemoradiotherapy-induced leukoencephalopathy with 7T imaging and quantitative susceptibility mapping". *Frontiers In Neurology* 15:1362704 (2024).
3. Donatelli G., Emmi A., Costagli M., Cecchi P., Macchi V., Biagi L., Lancione M., Tosetti M., Porzionato A., De Caro R., Cosottini M.: "Brainstem anatomy with 7-T MRI: in vivo assessment and ex vivo comparison". *European Radiology Experimental* 7:71 (2023).
4. Lancione M., Bosco P., Costagli M., Nigri A., Aquino D., Carne I., Ferraro S., Giulietti G., Napolitano A., Palesi F., Pavone L., Pirastru A., Savini G., Tagliavini F., Bruzzone M.G., Gandini Wheeler-Kingshott C.A.M., Tosetti M., Biagi L.: "Multi-centre and multi-vendor reproducibility of a standardized protocol for quantitative susceptibility mapping of the human brain at 3T". *Physica Medica* 103:37-45 (2022).
5. Lancione M., Donatelli G., Del Prete E., Campese N., Frosini D., Cencini M., Costagli M., Biagi L., Lucchi G., Tosetti M., Godani M., Arnaldi D., Terzaghi M., Provini F., Pacchetti C., Cortelli P., Bonanni E., Ceravolo R., Cosottini M.: "Evaluation of iron overload in Nigrosome 1 via Quantitative Susceptibility Mapping as a progression biomarker in prodromal stages of synucleinopathies", *NeuroImage*, 119454 (2022).
6. Mazzucchi S., Del Prete E., Costagli M., Frosini D., Paoli D., Migaleddu G., Cecchi P., Donatelli G., Morganti R., Siciliano G., Cosottini M., Ceravolo R.: "Morphometric Imaging and Quantitative Susceptibility Mapping as complementary tools in the diagnosis of parkinsonisms", *European Journal of Neurology*, 29(10): 2944-2955 (2022).
7. Pirkl C.M., Cencini M., Kurzawski J.W., Waldmannstetter D., Li H., Sekuboyina A., Endt S., Peretti L., Donatelli G., Pasquariello R., Costagli M., Buonincontri G., Tosetti M., Menzel M.I., Menze B.H.: "Learning residual motion correction for fast and robust 3D multiparametric MRI", *Medical Image Analysis* 77:102387 (2022).
8. Lancione M., Costagli M., Handjaras G., Tosetti M., Ricciardi E., Pietrini P., Cecchetti L.: "Complementing canonical fMRI with functional Quantitative Susceptibility Mapping (fQSM) in modern neuroimaging research", *NeuroImage* 244, 118574 (2021).
9. E. Düzel, M. Costagli, G. Donatelli, O. Speck, M. Cosottini: "Studying Alzheimer disease, Parkinson disease, and amyotrophic lateral sclerosis with 7-T magnetic resonance", *European Radiology Experimental* 5(1), 36 (2021).

10. Benedetto A., Binda P., Costagli M., Tosetti M., Morrone M.C.: "Predictive visuo-motor communication through neural oscillations", *Current Biology* 31(15), pp. 3401–3408.e4 (2021).
11. Kurzawski J.W., Cencini M., Peretti L., Gómez P.A., Schulte R.F., Donatelli G., Cosottini M., Cecchi P., Costagli M., Retico A., Tosetti M., Buonincontri G.: "Retrospective rigid motion correction of three-dimensional magnetic resonance fingerprinting of the human brain", *Magnetic Resonance in Medicine* 84(5):2606-2615 (2020).
12. Ambrosi P., Costagli M., Kuruoglu E.E., Biagi L., Buonincontri G., Tosetti M.: "Modeling brain connectivity dynamics in functional magnetic resonance imaging via particle filtering", *Brain Informatics* 8, 19 1-12 (2021).
13. E. Bartolini, M. Cosottini, M. Costagli, C. Barba, L. Tassi, R. Spreafico, R. Garbelli, L. Biagi, A. Buccoliero, F. Giordano, R. Guerrini: "Ultra-High-Field Targeted Imaging of Focal Cortical Dysplasia: The Intracortical Black Line Sign in Type IIb", *American Journal of NeuroRadiology* 40 (12) 2137-2142 (2019).
14. E. Düzel, J. Acosta-Cabrero, D. Berron, G.J. Biessels, I. Björkman-Burtscher, M. Botlaender, R. Bowtell, M. v Buchem, A. Cardenas-Blanco, F. Boumezbeur, D. Chan, S. Clare, M. Costagli, L. de Rochefort, A. Fillmer, P. Gowland, O. Hansson, J. Hendrikse, O. Kraff, M.E. Ladd, I. Ronen, E. Petersen, J.B. Rowe, H. Siebner, T. Stoecker, S. Straub, M. Tosetti, K. Uludag, A. Vignaud, J. Zwaneburg, O. Speck: "European Ultrahigh-Field Imaging Network for Neurodegenerative Diseases (EUFIND)", *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring* 11 (C) 538-549 (2019).
15. S. Mazzucchi, D. Frosini, M. Costagli, E. Del Prete, G. Donatelli, P. Cecchi, G. Migaleddu, U. Bonuccelli, R. Ceravolo, M. Cosottini: "Quantitative susceptibility mapping in atypical Parkinsonisms", *NeuroImage: Clinical* 24, 101999 (2019).
16. G. Donatelli, A. Retico, E. Caldarazzo lenco, P. Cecchi, M. Costagli, D. Frosini, L. Biagi, M. Tosetti, G. Siciliano and M. Cosottini: "Semiautomated Evaluation of the Primary Motor Cortex in Patients with Amyotrophic Lateral Sclerosis at 3T", *American Journal of NeuroRadiology* 39 (1) 63-69 (2018).
17. Schulte R.F., Guonincontri G., Costagli M., Menini A., Wiesinger F., Solana A.B.: "Silent T2* and T2 encoding using ZTE combined with BURST", *Magnetic Resonance in Medicine* 81(4): 2277-2287 (2018).
18. Frosini D., Cosottini M., Donatelli G., Costagli M., Biagi L., Pacchetti C., Terzaghi M., Cortelli P., Arnaldi D., Bonanni E., Tosetti M., Bonuccelli U., Ceravolo R.: "Seven tesla MRI of the substantia nigra in patients with rapid eye movement sleep behavior disorder ", *Parkinsonism and Related Disorder* 43:105-109 (2017).
19. Cosottini M., Donatelli G., Costagli M., Caldarazzo lenco E., Frosini D., Pesaresi I., Biagi L., Siciliano G., Tosetti M.: "High resolution 7T-MR imaging of motor cortex in amyotrophic lateral sclerosis", *American Journal of NeuroRadiology* 37: 455-461 (2016).
20. De Ciantis A., Barba C., Tassi L., Cosottini M., Tosetti M., Costagli M., Bramerio M., Bartolini E., Biagi L., Cossu M., Pelliccia V., Symms M.R., Guerrini R.: "7T MRI in focal epilepsy with unrevealing conventional field strength imaging", *Epilepsia* 57 (3): 445-454 (2016).
21. Tiberi G., Costagli M., Biagi L., De Ciantis A., Fontana N., Stara R., Symms M.R., Cosottini M., Guerrini R., Tosetti M.: "SAR prediction in adults and children by combining measured B1+ maps and simulations at 7.0 Tesla", *Journal of Magnetic Resonance Imaging* 44: 1048-1055 (2016).
22. Stara R., Tiberi G., Gabrieli M., Buonincontri G., Fontana N., Monorchio A., Costagli M., Symms M.R., Retico A., Tosetti M.: "Quadrature birdcage coil with distributed capacitors for 7.0T magnetic resonance data acquisition of small animals", *Concepts in Magnetic Resonance Part B: Magnetic Resonance Engineering* 44: 83-88 (2015).
23. Tiberi G., Fontana N., Costagli M., Stara R., Biagi L., Symms M.R., Monorchio A., Retico A., Cosottini M., Tosetti M.: "Investigation of Maximum Local Specific Absorption Rate in 7 T Magnetic Resonance with Respect to Load Size by Use of Electromagnetic Simulations", *Bioelectromagnetics* 36: 358-366 (2015).
24. Cosottini M., Frosini D., Pesaresi I., Donatelli G., Cecchi P., Costagli M., Biagi L., Ceravolo R., Bonuccelli U., Tosetti M.: "Comparison of 3T and 7T Susceptibility-Weighted Angiography of the Substantia Nigra in Diagnosing Parkinson Disease", *American Journal of NeuroRadiology* 36: 461-466 (2015).
25. De Ciantis A., Barkovich A.J., Cosottini M., Barba C., Montanaro D., Costagli M., Tosetti M., Biagi L., Dobyns W.B., Guerrini R.: "Ultra-High-Field MR Imaging in Polymicrogyria and Epilepsy", *American Journal of NeuroRadiology* 36 (2) 309-316 (2015).
26. Toncelli A., Noeske R., Cosottini M., Costagli M., Domenici V., Tiberi G., Tosetti M.: "STEAM-MiTis: An MR Spectroscopy Method for the Detection of Scalar-Coupled Metabolites and Its Application to Glutamate at 7T", *Magnetic Resonance in Medicine* 74: 1515-1522 (2015).
27. Cosottini M., Frosini D., Pesaresi I., Costagli M., Biagi L., Ceravolo R., Bonuccelli U., Tosetti M.: "MR Imaging of the Substantia Nigra at 7 T Enables Diagnosis of Parkinson Disease", *Radiology* 271 (3), 831-838 (2014).

28. Cosottini M., Frosini D., Biagi L., Pesaresi I., Costagli M., Tiberi G., Symms M.R., Tosetti M.: "Short-Term Side-Effects of Brain MR Examination at 7T: a Single-Centre Experience", *European Radiology* 24(8):1923-8 (2014).
29. Sun P., Gardner J., Costagli M., Ueno K., Waggoner R.A., Tanaka K. and Cheng K.: "Orientation in the Human Visual Cortex: A High-Resolution fMRI Study with a Novel Continuous and Periodic Stimulation Paradigm", *Cerebral Cortex* 23 (7): 1618-1629 (2013).
30. Tiberi G., Costagli M., Stara R., Cosottini M., Tropp J., Tosetti M.: "Electromagnetic characterization of an MR volume coil with multilayered cylindrical load using a 2-D analytical approach", *Journal of Magnetic Resonance* 230: 186-197 (2013).
31. Gaglianese A., Costagli M., Bernardi G., Sani L., Ricciardi E., Pietrini P.: "Evidence of a direct influence between the thalamus and hMT+ independent of V1 in the human brain as measured by fMRI", *NeuroImage* 60, 1440-1447 (2012).