




Alessandro Sciarra

PHYSICIST · AI SCIENTIST

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“Be the change that you want to see in the world.”

Who Am I

My journey is a testament to the power of continuous learning and evolution within the realm of technology. It began with a foundational interest in physics and electronics, rooted deeply in the complexity of semiconductor physics and the hands-on assembly of printed circuit boards. This early passion set the stage for my eventual shift towards the cutting-edge fields of Data Science, Machine Learning (ML), and cybersecurity.

As I delved deeper into my career, my focus transitioned from the tangible aspects of electronics to the abstract and rapidly evolving domains of data analysis and artificial intelligence. This shift wasn't just a change in direction; it was an expansion of my technical repertoire, allowing me to tackle complex problems from a new, data-driven perspective. My role in developing AI models for malware detection and classification, alongside implementing graph neural networks for security applications, has placed me at the forefront of technological innovation in cybersecurity.

In embracing Data Science and ML, I've not only contributed to solving relevant practical problems for the industry, but also embarked on a mission to educate others about their potential in enhancing cybersecurity measures. This journey, from the physical to the digital, from hardware to software, underscores my belief in the transformative power of AI and the critical role of continuous learning in navigating the future of technology.

Skills

Programming & Scripting	Python, MATLAB, C/C++, Java/Javascript, Shell scripting(Bash & Csh), Git
Database	MariaDB, MySQL
Operating Systems	Unix, Linux (Debian-based, Fedora & Arch-based), MacOS & Windows
Virtualization and container	VirtualBox (Oracle VM), Docker
Image Processing	ImageMagick,SPM,FSL,ImageJ,3D Slicer,FreeSurfer,ANTs,Scikit-image,OpenCV,Nipy/Nipype,Dipy
Machine & Deep Learning	Numpy, Scipy, Matplotlib, Seaborn, Pandas, Sci-kit learn, Nilearn, Keras, Tensorflow, Torch & Pytorch
Web Development	HTML/HTML5, Javascript, d3js, Plotly, CSS, PHP
Office	Latex, MS Office (Excel, Word, Power Point, Outlook), MacOS (Numbers, Pages, Keynote)
Electronics and Telecommunication	OrCAD, PSpice, LabVIEW, COMSOL Multiphysics, Ansys HFSS
Languages	Italian (native), English (proficient), German (rudimentary)

Experience

DEAS S.p.A.

SENIOR DATA SCIENTIST

Roma, Italy

3/2023 - Today

- Machine & Deep Learning for Cybersecurity Applications.
- Malware analysis:
 - AI assisted malware analysis with LLMs.
 - Development of AI models for automatic malware detection and classification.
- Development of AI models (graph-based) for real-time data exfiltration detection.
- Development of an AI-based Intrusion Detection and Prevention System.
- Development of pipeline for automated data analysis.
- Teaching activity: AI for cybersecurity.

MedDigit Group, Otto-von-Guericke University

Magdeburg, Germany

RESEARCH ASSOCIATE - AI SCIENTIST

9/2018 - 3/2023

- Automated image enhancement and extraction; Imputation/Synthesis missing image data Machine & Deep Learning for Medical Imaging Applications.
- Super-resolution, Motion Artifacts Removal and Contrast Translation.
- Anomaly Detection, Image Classification and Segmentation.
- Development of pipeline for automated magnetic resonance image analysis.
- Teaching activity: "Integrative Neuroscience", functional-MRI theory and data processing with SPM (Statistical Parametric Mapping Toolbox), Matlab.

Dept. of Biomedical Magnetic Resonance, Otto-von-Guericke University

Magdeburg, Germany

RESEARCH ASSISTANT

11/2016 - 8/2018

- Data analysis, ETL(Extract, Transform, Load) data process using machine learning.
- Prospective motion correction in MRI (Magnetic Resonance Imaging).
- Pipeline development for MR image reconstruction.
- Development of an automated image quality assessment framework.

Dept. of Biomedical Magnetic Resonance, Otto-von-Guericke University

Magdeburg, Germany

EARLY-STAGE RESEARCHER, MARIE-CURIE FELLOWSHIP

11/2013 - 10/2016

- Prospective motion correction in MRI using an optical tracking system.
- Experience in image and signal processing, Python, MATLAB, SPM, FSL, ImageJ.
- Experience in data analysis using Python and MATLAB.
- Optimization of protocols for research projects, high & ultra high-resolution in-vivo structural imaging, functional MRI (fMRI task & resting-state).
- Development of web-based application for subjective MR image quality assessment.
- High level of expertise 7T Siemens Magnetom & 3T Siemens Skyra scanner.

New Zealand

New Zealand

WORKING-HOLIDAY

4/2013 - 10/2013

IEO - European Institute of Oncology

Milan, Italy

RESEARCH ASSISTANT

4/2012 - 3/2013

- Signal & Image processing, MRI in clinical application (prostate cancer)
- Experience in image processing, MATLAB/C++ programming, GUI development
- Optimization of protocols for research projects (Diffusion, Perfusion, SWI, T1, T2, T2* mapping)
- Development of clinical protocols for prostate cancer (SWI, DTI, ASL, bi-exponential diffusion)
- High level of expertise 1.5 T Siemens Magnetom Avanto scanner
- Teaching activity: Course on MRI Physics for radiographers (University of Milano)

Dept. Health Sciences, University of L'Aquila

L'Aquila, Italy

RESEARCH ASSISTANT

9/2010 - 3/2012

- Development of new methods for MRI analysis, Functional-MRI and fluorescence microscopy.
- Study of lipid droplets in human brain tumor cells.
- Study of Parkinson's disease (PD) in Rat Model.
- Development of hardware for nuclear magnetic resonance from low to ultra-high field.
Technology used: PCB design and manufacturing, oscilloscope, signal generator, spectrum analyzer, network analyzer.
- Hardware development of High Temperature Superconducting (HTS) RF coils for 0.14 T scanner.
- Intermediate level of expertise 2.35T Bruker animal scanner.

Education

Otto von Guericke University Magdeburg, Natural Sciences

Magdeburg, Germany

PHD CANDIDATE IN PHYSICS

Expected May 2024

- Thesis: Prospective and Deep Learning based Retrospective Motion Correction for Brain Magnetic Resonance Imaging.

University of L'Aquila, Natural Sciences

L'Aquila, Italy

MASTER'S DEGREE IN PHYSICS, FINAL MARK 105/110

2006 - 2010

- Thesis: Development of high field MRI methods for the quantification of iron in human brain.

Jülich Research Center, Germany

Jülich, Germany

ERASMUS PLACEMENT

1/2010 - 6/2010

- An Investigation of Iron Deposition in Parkinson's Disease Using Quantitative T2* Mapping: An in vivo 3T MRI Study.

Center for Advanced Nano-Technologies

L'Aquila, Italy

INTERNSHIP AT NANOCAT S.R.L.

2/2007 - 4/2007

- Synthesis and Characterization of Hafnium Oxide and Hafnium Tantalum Oxide Nanocomposite Thin Films by a Sol-gel Spin Coating Process as High k Dielectric Materials for MEMS Applications.
- Development, design and realization of the PCB for the electrical measurements.

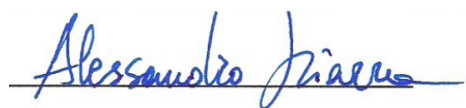
- Thesis: Study by electronic spectroscopy and electrical measurements of the interaction between films of carbon nanotubes and organic molecules.
- Technology used: Chemical vapor deposition (CVD), Scanning Electron Microscopy (SEM), X-ray Powder Diffraction (XRD), X-ray photoelectron spectroscopy (XPS).

Istituto Tecnico Industriale, Leonardo Da Vinci

Lanciano, Italy

- Specialized Technician in Electronic & Telecommunications.

In compliance with the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize the recipient of this document to use and process my personal details for the purpose of recruiting and selecting staff and I confirm to be informed of my rights in accordance to art. 7 of the above mentioned decree.



Peer-reviewed journal articles _____ also available here:

- **Computers in Biology and Medicine.** StRegA: Unsupervised anomaly detection in brain MRIs using a compact context-encoding variational autoencoder. S. Chatterjee, A. Sciarra, M. Dünwald, P. Tummala, S. K. Agrawal, A. Jauhari, A. Kalra, S. Oeltze-Jafra, O. Speck, A. Nürnberger. (<https://doi.org/10.1016/j.combiomed.2022.106093>)
- **Magnetic Resonance in Medicine.** Quantitative evaluation of prospective motion correction in healthy subjects at 7T MRI. A. Sciarra, H. Mattern, R. Yakupov, S. Chatterjee, D. Stucht, S. Oeltze-Jafra, F. Godenschweger, O. Speck. (<https://doi.org/10.1002/mrm.28998>).
- **Nature, Communications Biology.** Perceived and mentally rotated contents are differentially represented in cortical depth of V1. P. Iamshchinina, D. Kaiser, R. Yakupov, D. Haenelt, A. Sciarra, H. Mattern, F. Lüsebrink, E. Duezel, O. Speck, N. Weiskopf, R. M. Cichy. (<https://doi.org/10.1038/s42003-021-02582-4>).
- **Magnetic Resonance in Medicine.** Prospective motion correction improves high-resolution quantitative susceptibility mapping (QSM) at 7 Tesla. H. Mattern, A. Sciarra, F. Lüsebrink, J. Acosta-Cabronero, O. Speck. (<http://dx.doi.org/doi:10.1002/mrm.27509>).
- **Journal of Vision.** Perceived and mentally rotated contents are differentially represented in cortical layers of V1. I. Polina, D. Kaiser, R. Yakupov, D. Haenelt, A. Sciarra, H. Mattern, E. Duezel, O. Speck, N. Weiskopf, R. M. Cichy. (<https://doi.org/10.1167/jov.20.11.766>).
- **Magnetic Resonance in Medicine.** Prospective motion correction enables highest resolution time-of-flight angiography at 7T. H. Mattern, A. Sciarra, F. Godenschweger, D. Stucht, F. Lüsebrink, G. Rose, O. Speck. (<http://dx.doi.org/doi:10.1002/mrm.27033>).
- **Nature Scientific Data.** T1-weighted in vivo human whole brain MRI dataset with an ultrahigh isotropic resolution of 250 μm . Falk Lüsebrink, Alessandro Sciarra, Hendrik Mattern, Renat Yakupov, and Oliver Speck. (<http://www.nature.com/articles/sdata201732>).
- **Magnetic Resonance in Medicine.** Model-based Iterative Reconstruction for Single-shot EPI at 7T. U. Yarach, M.H. In, I. Chatnuntaweck, B. Bilgic, F. Godenschweger, H. Mattern, A. Sciarra, O. Speck. (<http://dx.doi.org/10.1002/mrm.26633>).
- **Physics in Medicine and Biology - IOPscience -Topical Review.** Motion correction in MRI of the brain. F.

Godenschweger, U. Kägebein, D. Stucht, U. Yarach, A. Sciarra, R. Yakupov, F. Lüsebrink, P. Schulze, O. Speck. (<http://dx.doi.org/10.1088/0031-9155/61/5/R32>).

- **Behavioural Brain Research, Vol. 250, 08/2013, 326-333.** Switching Ability of Over Trained Movements in a Parkinson's Disease Rat Model. T.M. Florio, G. Confalone, A. Sciarra, A. Sotgiu, M. Alecci (<http://dx.doi.org/10.1016/j.bbr.2013.05.020>).

Book _____ also available here:

- **Springer International Publishing, Intelligent Systems Reference Library, 2022, ISBN: 9783031111532.** Artificial Intelligence and Machine Learning for Healthcare: Vol. 1: Image and Data Analytics. Chapter 3: Artificial Intelligence Based Strategies for Data-Driven Radial MRI. G. Placidi, L. Cinque, F. Mignosi, M. Polsinelli, A. Sciarra. (<https://books.google.de/books?id=qR44zwEACAAJ>)

Peer-reviewed conference contributions _____ also available here:

- **MIDL, July 2022, Zürich, Switzerland.** Reference-less SSIM Regression for Detection and Quantification of Motion Artefacts in Brain MRIs. A. Sciarra, S. Chatterjee, M. Dünnwald, G. Placidi, A. Nürnberger, O. Speck, S. Oeltze-Jafra. (<https://openreview.net/pdf?id=24cqMfboXhH>).
- **ISMRM-ESMRMB, May 2022, London, England, UK.** Uncertainty quantification for ground-truth free evaluation of deep learning reconstructions. S. Chatterjee, A. Sciarra, M. Dünnwald, A. B. T. Ashoka, M. G. C. Vasudeva, S. Saravanan, V. T. Sambandham, S. Oeltze-Jafra, O. Speck, A. Nürnberger
- **ISMRM-ESMRMB, May 2022, London, England, UK.** StRegA: Unsupervised Anomaly Detection in Brain MRIs using Compact Context-encoding Variational Autoencoder. S. Chatterjee, A. Sciarra, M. Dünnwald, P. Tummala, S. K. Agrawal, A. Kalra, S. Oeltze-Jafra, O. Speck, A. Nürnberger
- **EUSIPCO2021, August 2021, Virtual Conference.** ShuffleUNet: Super resolution of diffusion-weighted MRIs using deep learning. S. Chatterjee*, A. Sciarra*, M. Dünnwald, R. Vinaykanth Mushunuri, R. Podishetti, R. Nagaraja Rao, G. Doddapaneni Gopinath, S. Oeltze-Jafra, O. Speck, A. Nürnberger
- **29th ISMRM, May 2021, Virtual Conference.** Unsupervised reconstruction based anomaly detection using a Variational Auto Encoder. S. Chatterjee, A. Sciarra, M. Dünnwald, D. Setlur, A. Kalra, S. Oeltze-Jafra, O. Speck, A. Nürnberger
- **29th ISMRM, May 2021, Virtual Conference.** Going beyond the image space: undersampled MRI reconstruction directly in the k-space using a complex valued residual neural network. S. Chatterjee, S. Chompunuch, A. Sciarra, M. Breitkopf, S. Oeltze-Jafra, A. Nürnberger, O. Speck
- **29th ISMRM, May 2021, Virtual Conference.** Resolving to super resolution multi-dimensional diffusion imaging (Super-MUDI). V. Nath, M. Pizzolato, M. Palombo, N. Gyori, K. G. Schilling, C. Hansen, Q. Yang, P. Kanakaraj, B. A. Landman, S. Chatterjee, A. Sciarra, M. Dünnwald, S. Oeltze-Jafra, A. Nürnberger, O. Speck, T. Pieciak, M. Baranek, K. Bartocha, D. Ciupek, F. Bogusz, A. Hamidinekoo, M. Afzali, H. Lin, D. C. Alexander, H. Lan, F. Sepehrband, Z. Liang, T.-Y. Wu, C.-W. Su, Q.-H. Wu, Z.-Y. Liu, Y.-P. Chao, E. Albay, G. Unal, D. Pylypenko, X. Ye, F. Zhang, J. Hutter
- **MED-NeurIPS (official NeurIPS workshop), December 2020, Virtual Conference.** Retrospective Motion Correction of MR Images using Prior-Assisted Deep Learning. S. Chatterjee*, A. Sciarra*, M. Dünnwald, S. Oeltze-Jafra, A. Nürnberger, O. Speck
- **37th Annual Scientific Meeting ESMRMB, October 2020, Virtual Conference.** Classification of Motion Corrupted Brain MR Images using Deep Learning Techniques. A. Sciarra, M. Dünnwald, S. Chatterjee, O. Speck, S. Oeltze-Jafra
A. Sciarra, M. Dünnwald, S. Chatterjee, O. Speck, S. Oeltze-Jafra
- **28th ISMRM, August 2020, Virtual Conference.** Evaluation of Deep Learning Techniques for Motion Artifacts Removal. A. Sciarra, S. Chatterjee, M. Dünnwald, O. Speck, S. Oeltze-Jafra
- **28th ISMRM, August 2020, Virtual Conference.** Super-Resolution with Conditional-GAN for MR Brain Images. A. Sciarra, M. Dünnwald, H. Mattern, O. Speck, S. Oeltze-Jafra

- **28th ISMRM, August 2020, Virtual Conference.** Contrast prediction-based regularization for iterative reconstructions (PROSIT). *H. Mattern, A. Sciarra, M. Dünwald, S. Chatterjee, U. Müller, S. Oeltze-Jafra, O. Speck*
- **28th ISMRM, August 2020, Virtual Conference.** Simultaneously multi-slice VAT-DIADEM at ultra-high field. *Y.-H. Tung, F. Godenschweger, M.-H. In, A. Sciarra, O. Speck*
- **Organization for Human Brain Mapping (OHBM), June-July 2020, Virtual Conference.** Perceived and mentally rotated contents are differentially represented in cortical layers of V1. *I. Polina, D. Kaiser, R. Yakupov, D. Haenelt, A. Sciarra, H. Mattern, E. Düzel, O. Speck, N. Weiskopf, R. M. Cichy*
- **BVM Workshop, March 2020, Berlin, Germany.** Automated Segmentation of the Locus Coeruleus from Neuromelanin sensitive 3T MRI using Deep Convolutional Networks. *M. Dünwald, M.J. Betts, A. Sciarra, E. Düzel, S. Oeltze-Jafra*
- **36th Annual Scientific Meeting ESMRMB, October 2019, Rotterdam, Netherlands.** Isotropic High-Resolution DIADEM-VAT at UHF. Magn Reson Mater Phy (2019) 32 (Suppl 1):S72-73. DOI. *Y.-H. Tung, M.-H. In, S. Ahn, A. Sciarra, O. Speck*
- **26th ISMRM, June 2018, Paris, France.** Machine learning algorithms for detection of motion artifacts: a general approach. *A. Sciarra, H. Mattern, O. Speck*
- **26th ISMRM, June 2018, Paris, France.** Accelerated Distortion-Free Diffusion Imaging at 7T - by Fusing PSF and VAT. *Y.-H. Tung, M.-H. In, S. Ahn, A. Sciarra, O. Speck*
- **ISMRM German Chapter, November 2017, Göttingen, Germany.** T1-weighted in vivo human whole brain MRI dataset with an ultrahigh isotropic resolution of 250 μm . *F. Lüsebrink, A. Sciarra, H. Mattern, R. Yakupov, O. Speck*
- **34th Annual Scientific Meeting ESMRMB, October 2017, Barcelona, Spain.** Wavelet entropy: quantifying small-scale head motion artifacts. *H. Mattern, A. Sciarra, O. Speck*
- **34th Annual Scientific Meeting ESMRMB, October 2017, Barcelona, Spain.** Non-iterative, retrospective background suppression in time of flight angiography. *H. Mattern, A. Sciarra, O. Speck*
- **25th ISMRM, April 2017, Honolulu, Hi, USA.** Quantitative evaluation of prospective motion correction for structural imaging at 7T. *A. Sciarra, H. Mattern, R. Yakupov, D. Stucht, P. Schulze, F. Godenschweger, O. Speck*
- **25th ISMRM, April 2017, Honolulu, Hi, USA.** Beyond the biological resolution limit: Prospectively motion corrected Time of Flight angiography at 7T. *H. Mattern, A. Sciarra, F. Godenschweger, D. Stucht, F. Lüsebrink, O. Speck*
- **25th ISMRM, April 2017, Honolulu, Hi, USA.** More than meets the eye: Quantitative evaluation of prospective motion correction at 7T. *H. Mattern, F. Lüsebrink, A. Sciarra, O. Speck*
- **25th ISMRM, April 2017, Honolulu, Hi, USA.** Quantitative and qualitative evaluation of bias field correction methods. *F. Lüsebrink, H. Mattern, A. Sciarra, O. Speck*
- **25th ISMRM, April 2017, Honolulu, Hi, USA.** Impact of Prospective Motion Correction in 7T fMRI Studies. *A. Cardenas-Blanco, D. Berron, Y. Chen, H. Mattern, R. Yakupov, A. Sciarra, O. Speck, E. Düzel*
- **4th International Workshop on Quantitative Susceptibility Mapping. September 2016, Graz.** Prospective motion correction for high-resolution QSM. *H. Mattern, J. Acosta-Cabronero, A. Sciarra, O. Speck*
- **33rd Annual Scientific Meeting of European Society for Magnetic Resonance in Medicine and Biology. ESMRMB, September 2016, Vienna.** Prospectively motion-corrected QSM at 7T. *H. Mattern, J. Acosta-Cabronero, A. Sciarra, O. Speck*
- **28th Annual International Conference of Society of Magnetic Resonance Angiography. SMRA, September 2016, Chicago.** Beyond high resolution: Prospectively motion corrected Time of Flight angiography with 150 μm isotropic resolution at 7T under SAR constraints. *H. Mattern, A. Sciarra, F. Godenschweger, D. Stucht, F. Lüsebrink, O. Speck*
- **ITN Network HiMR Final Meeting. June 2016, Magdeburg.** Prospective Motion Correction Applications at 7T. *A. Sciarra, H. Mattern, D. Stucht, R. Yakupov, P. Schulze, F. Godenschweger, O. Speck*

- **7th Annual Scientific Symposium Ultrahigh Field Magnetic Resonance. June, 2016 Berlin.** Prospectively motion corrected QSM-based venograms at 7 Tesla. *H. Mattern, J. Acosta-Cabronero, A. Sciarra, O. Speck*
- **24th ISMRM, May 2016, Singapore.** Prospective motion correction for ultra-high resolution Time of Flight angiography at 7T under SAR constraints. *H. Mattern, A. Sciarra, F. Godenschweger, D. Stucht, F. Lüsebrink, O. Speck*
- **24th ISMRM, May 2016, Singapore.** Beyond High Resolution MPAGE: In Vivo T1-Weighted Imaging at 7T with 250 μ m Isotropic Resolution Using Prospective Motion Correction. *F. Lüsebrink, A. Sciarra, H. Mattern, R. Yakupov, O. Speck*
- **24th ISMRM, May 2016, Singapore.** Combination of Individual Coil QSM at High Field Strength (7T). *U. Yarach, H. Mattern, A. Sciarra, O. Speck*
- **XII International Conference on the Applications of Magnetic Resonance in Food Science: Defining Food by Magnetic Resonance, FOODMR 2014, Tuesday 20 - Friday 23, Cesena, Italy.** Low field (0.14 T) Magnetic Resonance Imaging for freshness assessment of truffle Tuber melanosporum. *G. Pacioni, A. Sciarra, E. Stagnini, A.M. Ragnelli, A. Sotgiu, P. Sebastiani, A. Galante, M. Alecci*
- **SIF - University of L'Aquila - Italy 26/09/2011- 30/09/2011.** A study of lipid droplets accumulation in human tumour cells by high resolution fluorescence microscopy. *E. Benedetti, D. Aversa, A. Sciarra, A.M. Cimini, M. Alecci*
- **ISMRM Italian Chapter - Rome 31/03/2011- 01/04/2011.** An Accurate T2* Mapping Method in the Human Brain at 3T. *A. Sciarra, A.M. Oros-Peusquens, K. Reetz, M. Alecci, N.J. Shah*
- **ISMRM Italian Chapter - Rome 31/03/2011- 01/04/2011.** An investigation of iron deposition in Parkinson's disease using quantitative T2* mapping: an in vivo 3T MRI study. *A. Sciarra, A.M. Oros-Peusquens, K. Reetz, M. Alecci, N.J. Shah*
- **3rd International Conference Smart Materials, Structures and Systems - Acireale, Italy, 08/06- 13/06/2008.** Synthesis and Characterization of Hafnium Oxide and Hafnium Tantalum Oxide Nanocomposite Thin Films by a Sol-gel Spin Coating Process as High k Dielectric Materials for MEMS Applications. *A.R. Phani, A. Sciarra, S. Santucci*