Gaia Rizzo

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Personal information

Name	Gaia Rizzo
Date of birth	April 3, 1983
Researcher unique identifier	**ORCID**: http://orcid.org/0000-0001-7272-8576
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H-index	6 (Google Scholar) 5 (Scopus)*

* SCOPUS does not yet include in its title list the 2014 SPIE journal "Journal of Medical Imaging"

Position

Mar 1st, 2016 – today: post-doctoral researcher (*Assegni di ricerca grant: bando 8-2016*) at the Department of Information Engineering (University of Padova). Research activity on "Development of models and methods for the quantitative analysis of brain inflammatory processes with PET imaging". One-year scholarship funded by the University of Padova.

Education and research work experience

Mar 1st, 2014 – Feb 29th, 2016: post-doctoral researcher (*Assegni di ricerca senior: bando 2013*) at the Department of Information Engineering (University of Padova). Research activity on "Integration of functional brain imaging phenotypes with mRNA gene expression human brain atlas: from basic science to neuropharmacology". Two-year scholarship funded by the University of Padova.

Jan 2014 – Feb 2014: Research activity at University of Padova, Information Engineering Department, with research bursary DEI nr 93/2014 (1 month), on multimodal studies for the integration of genomic data and PET images.

Jan 1st, 2012 – Dec 31st, 2013: post-doctoral researcher (*Assegni di ricerca junior: bando 2011*) at the Department of Information Engineering (University of Padova). Research activity on "Models and methods for quantitative molecular neuroimaging: integrating microarray gene expression data". Two-year scholarship funded by the University of Padova.

Mar 23rd, 2012: received the Ph.D. degree in Information Engineering, specialization in Bioengineering, from the University of Padova.
Dissertation: "Development of novel computational algorithms for quantitative voxel-wise functional brain imaging with positron emission tomography".

Jan 1st, 2009 – Dec 31st, 2011: Ph.D in Information Engineering, specialization in Bioengineering, XXIV School of Information Engineering, University of Padova. Title of research: Development of Bayesian and population methods for the calculation of parametric images from PET data. Supervisor: prof. Alessandra Bertoldo

Jul 1st, 2008 – Dec 31st, 2008: Research activity at University of Padova,

Information Engineering Department, with research bursary DEI nr 35/2008 (6 months), on development of models and methods for quantification of PET images.

2005 – 2007 Master of Science in Bioengineering, University of Padova, Italy, received on Dec 11th, 2007. Degree final mark: 110/110

2002 – 2005 Bachelor of Science in Biomedical Engineering, University of Padova, Italy, received on Sep 26th, 2005. Degree final mark: 99/110

1997 – 2002 Classic High School Diploma, Liceo Classico "M. Foscarini" in Venice, Italy. School leaving examination mark: 95 (out of 100)

Research Activities

My **research activity** covers the following topics: A) quantification of PET images at region and voxel level; B) arterial input function modelling studies; C) correlation of genomic data with PET images of protein density; D) development of methods for the kinetic analysis of ultrasound images; E) network analysis of PET data.

I have at the moment published **16 full papers** in international peer-reviewed journals (7 as first author, 2 as shared first author, 3 as second, 2 as corresponding author), 46 **peer-reviewed contributions** to international (44) and national (2) conferences (18 were presented as oral contribute) and one **invited technical article**. One full paper is currently under review in a peer-review journal. I have been speaker in international conferences with 8 oral contributes, presenting my results in Spain, Texas, Ireland, Canada, The Netherlands, London and Hawaii. I will present my latest results in Boston at the NRM2016.

I have authored a **chapter** on Nuclear Medicine Imaging in the book "Basic neuroimaging: a guide to the methods and their applications" (expected to be published before December 2016, editor: "Create Space Self publication"), written in collaboration with various postdoc specialists from the universities of London, Cambridge, Paris, Karolinska and Padova.

Since 2009, I have been co-advisor of 13 students in 5-year MSc in Bioengineering (details below). I also co-supervised 2 students within the Erasmus placement program.

Part of my research projects included the development and the delivery of **software** for the analysis of neuroimaging data to the scientific community:

1) **SAKE** (Spectral Analysis Kinetic Estimation), a stand-alone license-free application which implements the state of the art of Spectral Analysis methods to be used by expert and not expert ICT users, in collaboration with the Department of Mathematics, University of Padua (10/2011 – 02/2013). SAKE is currently used by 49 research centres worldwide and it is being taught within the course "Experimental Design and Practical Data Analysis in Positron Emission Tomography", held at King's College, London.

   SAKE is available at bio.dei.unipd.it/sake.

2) **MENGA** (Multimodal Environment for Neuroimaging and Genomic

Analysis), a platform for the integration of neuroimaging data and Allen Brain Atlas mRNA data in collaboration with the Institute of Psychiatry, Psychology and Neuroscience (IoPPN), King's College, London, UK (10/2014-01/2016). MENGA is available at http://fair.dei.unipd.it/software, http://www.nitrc.org/projects/menga/, https://github.com/FAIR-CNS/menga and is currently used by 25 research centres worldwide.

My major achievements are divided into the four topics mentioned above.

A. Quantification of PET images at region and voxel level (2008 – today)

An important part of my research interests (and the main topic of my PhD thesis) is related to the quantification of PET data at the region and voxel level with data-driven and model-driven approaches. This project entails both the application of the state-of-the-art methodologies proposed in literature (with particular emphasis on Spectral Analysis (SA) methods) and the development of models and methods for the analysis of PET data, focusing especially on Bayesian and population approaches. The most recent work entails the development of a Variational Bayesian approach for the quantification of PET data and the related publication is currently under review in Neuroimage.

Related publications:

- 10 publications in peer-reviewed journals (*Neuroimage, Journal of Cerebral Blood Flow and Metabolism, Computer Methods and Programs in Biomedicine, European Journal of Nuclear Medicine and Molecular Imaging, Nuclear Medicine Communications, American Journal of Psychiatry*), including two invited reviews on *Clinical and Translational Imaging* and *Biochemical Society Transactions*;
- 25 contributes to international conferences in form of 9 oral presentations and 16 posters;
- 2 contributes to national conferences, in form of posters.

Software: Spectral Analysis Kinetic Estimation **(SAKE)** available at bio.dei.unipd.it/sake) for the elaboration of PET data through the main SA methods, by providing a unified pipeline of analysis from preprocessing to result visualization. Project management for software and website development in collaboration with the Department of Mathematics, University of Padua (10/2011 – 02/2013).

Co-advisor activity in related MSc theses in Bioengineering:

10/2009 – 07/2010: Ilaria Boscolo Galazzo, "Models for the PET quantitative imaging of the adenosine receptor radioligand [11C]SCH442416 in humans", Department of Information Engineering, University of Padova, A.Y. 2009/2010.

11/2011 – 04/2012: Veronica Ceccato, "Multi-level data-driven approaches for voxel-wise quantification of dynamic PET images: application to [11C]WAY100635 data", Department of Information Engineering, University of Padova, A.Y. 2011/2012.

04/2012 – 10/2012: Alberto Merola, "Quantificazione di dati PET con deconvoluzione: un approccio tramite stable spline", Department of Information Engineering, University of Padova, A.Y. 2011/2012.

08/2014 – 12/2014: Emanuele Bello, "Quantification of brain PET data of [11C]Ro15-4513 via multimodal analysis", Department of Information Engineering, University of Padova, A.Y. 2013/2014.

10/2014 – 03/2014: Simone Zanoni, "Variational Bayesian inference for quantification of brain PET data at the voxel level", Department of Information Engineering, University of Padova, A.Y. 2013/2014.

09/2015 – 03/2016: Lucia Moro, "Integration of network analysis methods for comparative statistics", Department of Information Engineering, University of Padova, A.Y. 2015/2016.

11/2015 – 04/2016: Alberto Pellizzon, "Correlation between functional connectivity measures and rCPS as plasticity proxy in humans", Department of Information Engineering, University of Padova, A.Y. 2015/2016.

Co-supervisor of Erasmus project (University of Porto)

03/2014 – 07/2014: Jessica Condesso Delmoral, "Quantification of [11C]Ro15-4513 data with data-driven methods".

B. Arterial input function modeling studies (2011 – today)

Quantification of PET data commonly requires parent tracer measurements and the correction for the presence of metabolites. Aim of this side of the research is the analysis of the arterial input functions and the study of possible alternative non-invasive input function approaches. Currently, we are developing an integrated framework for the automatic and simultaneous analysis of the blood data generally acquired in a PET study. The framework will be integrated in a software and presented at the upcoming Neuroreceptor Mapping congress in Boston.

Related publications:

- 2 publications in peer-reviewed journal (*Journal of Cerebral Blood Flow and Metabolism*);
- 6 contributes to international conferences: 3 oral and 3 poster contributes.

Co-advisor activity in related MSc theses in Bioengineering:

05/2011 – 04/2012: Eleonora Bindi, "Validazione di approcci a campionamento ridotto per la stima della funzione arteriale forzante in studi PET dinamici", Department of Information Engineering, University of Padova, A.Y. 2011/2012.

03/2012 – 10/2012: Matteo Tonietto, "Methods and models for the characterization of arterial input function in dynamic PET studies", Department of Information Engineering, University of Padova, A.Y. 2011/2012.

10/2013 – 04/2014: Matteo Bianchi, "Metodi per l'estrazione automatica di curve arteriali e regioni di riferimento per la quantificazione di immagini PET con tracciante [11C]-PBR28", Department of Information Engineering, University of Padova, A.Y. 2013/2014.

C. Correlation of genomic data with PET images of protein density (2013 – today)

This work aimed to test gene expression levels towards *in vivo* protein density across unrelated normal subjects, comparing transcriptome maps derived from the Allen Human Brain Atlas and receptor distribution parametric maps obtained from PET exams. In addition, we have developed a method using mRNA data to derive PET specific binding estimates without pharmacological blockade (genomic plot). A new release to use genomic plot with MENGA is in preparation.

Related publications:

- 3 publications in peer-reviewed journals (*Journal of Cerebral Blood Flow and Metabolism, PlosOne, Neuroimage*)
- 6 contributions to international conferences: 4 oral and 2 poster contributes.

Software: platform to provide a comprehensive environment to investigate correlation patterns between various imaging modalities and gene expression profiles based on the Allen Brain Atlas. MENGA (Multimodal Environment for Neuroimaging and Genomic Analysis) is available at http://fair.dei.unipd.it/software, http://www.nitrc.org/projects/menga/, https://github.com/FAIR-CNS/menga.
Project in collaboration with the Department of Neuroimaging, IoPPN, King's College London (10/2014-01/2016).

Co-advisor activity in related MSc theses in Bioengineering:

11/2012 – 04/2013: Andrea Stevan, "Analisi multimodale del sistema neurorecettoriale: integrazione tra imaging PET e livelli di espressione genica", Department of Information Engineering, University of Padova, A.Y. 2012/2013.

Co-supervisor of Erasmus project (University of Porto)

03/2014 – 07/2014: Jorge Miguel Ferreira da Silva, "Evaluation of brain cell biomarkers using mRNA gene expression human brain atlas".

D. Development of methods for the kinetic analysis of ultrasound images (2014 – today)

This side of research is related to the kinetic analysis of Contrast Enhanced Ultrasound (CEUS) data. CEUS is a very sensitive imaging technique to assess synovial vascularization and perfusion, and its quantitative assessment is mostly performed by region of interest level analysis. Taking advantage of my experience in voxel-wise quantification, the estimation of the kinetics parameters separately pixel per pixel was proposed to differentiate more effectively different perfusion patterns. In a more recent work, we have developed a novel Variational Bayes approach for the pixel-wise quantification of CEUS data, the method is going to be implemented in a freely-available software and one publication is in preparation.

Another important part of this project is related to the use of perfusion CEUS kinetics and parameters to locate and grade arthritis progression, using clinical and biopsy indexes.

Related publications:

- 1 publication in peer-reviewed journal (*Journal of Medical Imaging*);
- 1 invited technical article (*SPIE newsroom - Biomedical Optics & Medical Imaging*);
- 4 contributions to international conferences: 3 oral contributions and 1 poster contributions.

E. Network analysis with PET images (2016 – today)

In recent years, graph theory seems to be the most appealing way to model and investigate brain connectivity. This aspect of my research focuses on the integration of multi-scale functional connectivity (measured using fMRI) with tissue metabolism or cerebral protein synthesis measured with PET. Also, we aim to extend network-based approaches to PET individual data, using population-based covariance matrixes, to explore topological kinetic differences.

Related publications:

- 3 poster contributions to international conferences.

Major collaborations

Department of Neuroimaging, IoPPN, King's College London, UK (*Paul Expert, Peter Hellyer, Federico Turkheimer, Mattia Veronese*)

Department of Medicine, Imperial College, London, UK, (*Jim Myers*)

Psychiatry Imaging, Imperial College, London, UK (*Peter Bloomfield, Oliver Howes*)

Centre for Neuroscience, Department of Medicine, Imperial College London, London, UK (*Alexander Hammers, Colm Mc Ginnity*)

Molecular Imaging Branch of the National Institute of Mental Health, Bethesda, USA (*Masahiro Fujita, Robert Innis*)

University of Bordeaux, CNRS, France (*Paolo Zanotti Fregonara*)

Policlinico Gemelli, Università Cattolica Sacro Cuore, Rome, Italy (*Maria Luisa Calcagni, Alessandro Giordano, Luca Indovina*)

Department of Medicine, Radiology, University of Padova, Padova, Italy (*Ugo Fiocco, Roberto Stramare*)

Rheumatology Unit, Department of Medicine, General Hospital of Bolzano, Bolzano, Italy (*Bernd Raffeiner*)

Invited talks

18/07/2016: Invited participation at the upcoming "Kinetic Modeling and Image Analysis workshop" at the Department of Psychiatry, Columbia University Medical Campus, New York City, USA.

26/02/2013: Physics seminar "A comparison of parametric imaging PET quantification methods on [11C](r)-rolipram data" at St. Thomas Hospital, King's College, London.

22/03/2013: Relator during the "Basic Kinetic Modeling In Molecular Imaging" course held in Copenhagen, Denmark, within the INMiND training courses initiative, funded by the Seventh Framework Programme of the EU. Seminar topic: "SAKE: Spectral Analysis for Kinetic Estimation: From the theory to the practice"

Research projects

2014-2016: I have been **co-investigator** of the project "Neuroimaging Genetics: Models and Methods to Integrate Brain Phenotype and Genotype", 2014-2015, founded by the University of Padova (principal investigator: Prof. Alessandra Bertoldo).

Awards

04/2016: Winner of a Young Investigator Award at the 11th International Symposium on Functional NeuroReceptor Mapping of the Living Brain (NRM 2016), Boston, USA, 13-17 July 2016

08/2012: Winner of Student Travel Stipend, at World Molecular Imaging Congress 2012, Dublin, Ireland, 5-8 September 2012

12/2011: Winner of a Young Researcher Award at the "Veneto Giovani Ricerca Futuro" event

05/2011: Winner of a ISCBFM Young Investigator travel bursary, at the Xth International Conference on Quantification of Brain Function with PET (BrainPET 2011), Barcelona, Spain, 25-28 May 2011

Visiting periods

10/2014; 03/2015: visiting worker at the Department of Neuroimaging, Institute of Psychiatry, Psychology and Neuroscience, King's College, London (UK), in the PET methodology group in collaboration with Dr Federico E Turkheimer.

09-12/2008; 03-07/2010; 02/2011: visiting worker at the Division of Experimental Medicine, Imperial College of London (UK), in the PET methodology group in collaboration with Dr Federico E Turkheimer.

Membership of scientific societies

2015: Member of "European Society for Molecular Imaging".

2014 – 2015: Member of "Organization for Human Brain Mapping".

Journal review activity

I am reviewer for the following peer-reviewed journals: *Journal of Cerebral Blood*

Flow and Metabolism, PlosOne, European Journal Nuclear Medicine and Molecular Imaging, Neuroimage, Clinical and Translational Imaging.
I have been reviewer for the "Organization of Human Brain Mapping" annual meeting 2015.

Teaching Activity

Teaching Assistance:

2009: "Models and control of system biology" course held by Prof. Claudio Cobelli, for the Master of Science in Bioengineering, University of Padova, A.Y. 2009/2010

2009; 2010; 2012; 2014; 2015: "Neuroengineering" course held by Prof. Alessandra Bertoldo, for the Master of Science in Bioengineering, University of Padova, A.Y. 2009/2010, A.Y. 2010/2011, A.Y. 2012/2013, A.Y. 2014/2015 and A.Y. 2015/2016

Language Skills

English

Reading: Advanced
Listening: Advanced
Writing: Advanced
Speaking: Advanced

French:

Reading: Intermediate
Listening: Beginner
Writing: Beginner
Speaking: Beginner

Computer Skills

OS: Windows, Linux, MacOs X
Programming: Matlab, Java, SQL, Assembly Mips, R, LaTeX
Software: Office, FSL, SPM, SAAM II, SPK, VINCI, MRICroN, Winstondec

Certifications

07/2008: Information engineering licence, after professional practice examination, taken at University of Padova. Final grade: 218/240.

Graduate Record Examinations (GRE) General Test on 08/04/2008 scoring: Quantitative section 800 / 800, Verbal section 450 / 800, Analytical writing: 3.0 / 6.0

Attendance at conferences and courses

07/2016: I will attend the 11th International Symposium on Functional NeuroReceptor Mapping of the Living Brain (NRM 2016), Boston, USA, 13-17 July

2016

02/2016: 11th MRI workshop "Molecular and metabolic imaging in MS", Paris, France

09/2015: World Molecular Imaging Congress (WMIC2015), Honolulu, Hawaii

02/2015: Hot Topics for Molecular Imaging (TOPIM 2015), Les Houches, France

12/2014: BBSRC "Sparking Impact" meeting, London, UK

06/2014: "Organization for Human Brain Mapping" (OHBM 2014) annual meeting, Hamburg, Germany

05/2014: "Tenth International Symposium on Functional Neuroreceptor Mapping of the Living Brain", (NeuroReceptor Mapping 2014), Amsterdam, The Netherlands

06/2013: SNM 60th Annual Meeting, Vancouver, Canada

09/2012: "World Molecular Imaging Congress" 2012, Dublin, Ireland

08/2012: "IXth International Symposium on Functional Neuroreceptor Mapping" (NeuroReceptor Mapping 2012), Baltimore (Maryland, USA)

06/2012: Third National Bioengineering Congress, Rome (Italy)

09/2011: Seminar "Data modeling and algorithms development in MATLAB", Paolo Fabbri, Padova

06 – 07/2011: "Algorithms and Architectures for Computational Science and Engineering", Second Workshop, Padova

06/2011: SNM 58th Annual Meeting, San Antonio, Texas

05/2011: "Xth International Conference on Quantification of Brain Function with PET" (BrainPET 2011), Barcelona, Spain

07/2010: "VIIIth International Symposium on Functional Neuroreceptor Mapping" (NeuroReceptor Mapping 2010), Glasgow (Scotland, UK),

07/2010: "PET Pharmacokinetic" course 2010, Drymen, Glasgow (UK)

03/2010: "R programming" course, South Kensington Campus, Imperial College, London (UK)

07/2010: Second National Bioengineering Congress, Torino (Italy)

09/2009: XXVIII Scuola annuale di Bioingegneria, "Bioingegneria per le neuroscienze cognitive", Brixen (Italy)

07/2009: 21th International School for Computer Science Researchers on "Medical

and Molecular Imaging, and BioInformatics", Lipari (Italy).

10/2008: Attendance at the "Experimental Design and Practical Data Analysis in Positron Emission Tomography" course, at MRC Clinical Sciences Centre, Hammersmith Hospital Campus, Imperial College, London.

05/2008: Attendance at the conference "Coregistration EEG-fMRI and Epilepsy" at University Teaching General Hospital "G.B. Rossi" in Verona

Publications

Journals

[J1] Rizzo G., Turkheimer F.E., Keihaninejad S., Bose S., Hammers A., Bertoldo A. (2012) *Multi-scale hierarchical generation of PET parametric maps: Application and testing on [^{11}C]DPN study*, Neuroimage, 59: 2485 – 2493. Epub 2011 Sep 8. doi: 10.1016/j.neuroimage.2011.08.101

[J2] Rizzo G., Turkheimer F.E., Bertoldo A. (2013) *Multi-scale hierarchical approach for parametric mapping: assessment on multi-compartmental models*, Neuroimage, 67:344-53. Epub 2012 Dec 5. doi: 10.1016/j.neuroimage.2012.11.045

[J3] Rizzo G. and Veronese M., Zanotti-Fregonara P., Bertoldo A. (2013) *Voxel-wise Quantification of [11C](R)-rolipram PET Data: a Comparison between Model-Based and Data-Driven Methods*, J Cereb Blood Flow Metab, 33(7):1032-40. Epub 2013 Mar 20 (*shared first author).* doi: 10.1038/jcbfm.2013.43.

[J4] Veronese M. and Rizzo G., Turkheimer F.E., Bertoldo A. (2013) *SAKE: a new quantification tool for positron emission tomography studies*, Comput Methods Programs Biomed, 111(1):199-213. Epub 2013 Apr 20 (*shared first author)*. doi: 10.1016/j.cmpb.2013.03.016.

[J5] Rizzo G. and Veronese M., Heckemann R, Selvaraj S., et al. (2014) *The predictive power of brain mRNA mappings for in vivo protein density: a Positron Emission Tomography correlation study*, J Cereb Blood Flow Metab, 34(5):827-35. Epub 2014 Feb 5 (*shared first author)*. doi: 10.1038/jcbfm.2014.21.

[J6] Rizzo G., Veronese M., Tonietto M., Zanotti Fregonara P., Turkheimer F.E., Bertoldo A. (2014) *Kinetic modeling without accounting for the vascular component impairs the quantification of [11C]PBR28 brain PET data*, J Cereb Blood Flow Metab, 34(6):1060-9. Epub 2014 Mar 26. doi: 10.1038/jcbfm.2014.55.

[J7] Veronese M. and Rizzo G., Aboagye E.O., Bertoldo A. (2014) *Parametric imaging of 18Ffluoro-3'-deoxy-3'-l-fluorothymidine PET data to investigate tumor heterogeneity*, Eur J Nucl Med Mol Imaging, 41(9):1781-92. Epub 2014 Apr 5 (*shared first author)*. doi: 10.1007/s00259-014-2757-z.

[J8] Bertoldo A., Rizzo G., Veronese M. (2014) *Deriving physiological information from PET images: from SUV to compartmental modelling*, Clin Transl Imaging, 2:239-251. doi:10.1007/s40336-014-0067-x

[J9] Zanotti Fregonara P., Leroy C., Rizzo G., Roumenov D., Trichard C., Martinot J-L., Bottlaender M. (2014) *Imaging of monoamine-oxidase A in the human brain with [11C]befloxatone: quantification strategies and correlation with mRNA transcription maps,* Nuclear Medicine Communications, 35(12):1254-61. Epub 2014 Sep 2. doi: 10.1097/MNM.0000000000000196.

[J10] Tonietto M., Veronese M., Rizzo G., Zanotti-Fregonara P., Lohith T.G., Fujita M., Zoghbi S.S., Bertoldo A. (2015) *Improved models for plasma radiometabolite correction and their impact on kinetic quantification in PET studies*, J Cereb Blood Flow Metab, 35, 1462–1469. Epub 2015 Apr 15. doi: 10.1038/jcbfm.2015.61.

[J11] Turkheimer F.E., Rizzo G., Bloomfield P.S., Howes O.D., Zanotti-Fregonara P., Bertoldo A., Veronese M. (2015) *The methodology of TSPO imaging with Positron Emission Tomography*, Biochemical Society transaction, 43 (4) 586-592; doi:10.1042/BST20150058

[J12] Bloomfield P.S., Selvaraj S., Veronese M., Rizzo G., Bertoldo A., Owen D.R., Bloomfield M.A.P., Bonoldi I., Kalk N., Turkheimer F.E., McGuire P., de Paola V., Howes O.D. (2015) *Microglial activity in people at ultra high risk of psychosis and in schizophrenia; an [11C]PBR28 PET brain imaging study*, The American Journal of Psychiatry, 2016 Jan 1;173(1):44-52. Epub 2015 Oct 16. doi: 10.1176/appi.ajp.2015.14101358

[J13] Tonietto M., Rizzo G., Veronese M., Fujita M., Zoghbi S.S., Zanotti-Fregonara P., Bertoldo A. (2015) *Plasma radiometabolite correction in dynamic PET studies: insights on the available modeling approaches*, J Cereb Blood Flow Metab, 2016 Feb;36(2):326-39. Epub 2015 Oct 14. doi: 10.1177/0271678X15610585

[J14] Rizzo G., Raffeiner B., Coran A., Ciprian L., Fiocco U., Botsios C., Stramare R., Grisan E. (2015) *Pixel-based approach to assess CEUS kinetics parameters for differential diagnosis of rheumatoid arthritis*, Journal of Medical Imaging, 2 (3), 034503-1 034503-13. Epub 2015 Sep 11 (*corresponding author, without my PhD supervisor*). doi: 10.1117/1.JMI.2.3.034503

[J15] Rizzo G., Veronese M., Expert P., Turkheimer F.E., Bertoldo A. (2016) *MENGA: a new comprehensive tool for the integration of neuroimaging data and the Allen human brain transcriptome atlas*, PlosOne 11(2): e0148744, (*corresponding author)* doi:10.1371/journal.pone.0148744.

[J16] Veronese M., Zanotti-Fregonara P., Rizzo G., Bertoldo A., Innis R.B., Turkheimer F.E. (2016) *Measuring specific receptor binding of a PET radioligand in human brain without pharmacological blockade: the genomic plot*, Neuroimage, 130:1–12, Epub 15 April 2016,

doi:10.1016/j.neuroimage.2016.01.058

Invited contribution (technical article)

[1] Grisan E., Rizzo G., Coran A., Raffeiner B., Stramare R. (2015) *Quantitative ultrasound for diagnosis and assessment of rheumatoid arthritis*, SPIE newsroom Biomedical Optics & Medical Imaging, Epub 2015 Jul 6, doi: 10.1117/2.1201506.006000

Proceedings - International Conferences

[C1] Rizzo G., Turkheimer F.E., Keihaninejad S., Bose S., Hammers A., Bertoldo A. *Multi-Scale Hierarchical Generation Of PET Parametric Maps: Application And Testing On [^{11}C]DPN Study*, Eighth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2010), Glasgow (Scotland, UK), 22-24 July 2010, Neuroimage, Volume 52, Supplement 1, S179-S180 *(poster, presenting author)*

[C2] Boscolo Galazzo I., Bose S.K., Ramlackhansingh A.F., Ahmed I., Pavese N., Rizzo G., Brooks D.J., Turkheimer F.E., Bertoldo A. "*Kinetic modeling of the adenosine A_{2A} subtype receptor radioligand [^{11}C]SCH442416 in humans*", Eighth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2010), Glasgow (Scotland, UK), 22-24 July 2010, Neuroimage, Volume 52, Supplement 1, S178 *(poster, presenting author)*

[C3] Rizzo G., Turkheimer F.E., Bose S.K., Bertoldo A. *Multi-scale hierarchical approach for parametric mapping: assessment on multi-compartmental models*, Book of Abstracts, Xth International Conference on Quantification of Brain Function with PET (BrainPET 2011), Barcelona, Spain, 25-28 May 2011 *(oral, presenting author)* **Winner of ISCBFM Young Investigator travel bursary**

[C4] Rizzo G., Moresco R.M., Turkheimer F.E., Florea I., Matarrese M., Panzacchi A., Bertoldo A. *Voxel-wise quantification of 5HT$_{2A}$ receptor with [^{11}C]MDL100907*, Book of Abstracts, Xth International Conference on Quantification of Brain Function with PET (BrainPET 2011), Barcelona, Spain, 25-28 May 2011 *(poster, presenting author)*

[C5] Rizzo G., Turkheimer F.E., Bose S.K., Bertoldo A. *A new hierarchical method for PET parametric maps generation: assessment on multi-compartmental models*, SNM 58th Annual Meeting, San Antonio, Texas, 4-8 June 2011, J Nucl Med Meeting Abstracts, May 2011, 52: 162 *(oral, presenting author)*

[C6] Rizzo G., Veronese M., Turkheimer F.E., Zanotti-Fregonara P., Fujita F., Innis R.B., Schmidt K.C., Smith C.B., Bertoldo A. (2012) *Evaluation Of PET quantification sensitivity to the arterial input function modeling*, Ninth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2012), Baltimore (Maryland, USA),

9-12 August 2012, J Cereb Blood Flow Metab 32, S148-S149 *(poster, presenting author)*

[C7] Rizzo G., Veronese M., Zanotti-Fregonara P., Fujita M., Innis R.B., Bertoldo A. (2012) *Voxel-wise quantification of [^{11}C](R)-Rolipram PET data in human brain*, Ninth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2012), Baltimore (Maryland, USA), 9-12 August 2012, J Cereb Blood Flow Metab 32, S152-S153 *(poster, presenting author)*

[C8] Veronese M. and Rizzo G., Bertoldo A. (2012) *Spectral Analysis Kinetic Estimation: an integrated tool for quantification of PET data*, Ninth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2012), Baltimore (Maryland, USA), 9-12 August 2012 *(late abstract, poster, presenting author)*

[C9] Veronese M., Schmidt K.C., Smith C.B., Rizzo G., Turkheimer F.E., Bertoldo A. (2012) *Spectral analysis iterative filter for voxel-wise quantification of PET tracers with irreversible uptake*, Ninth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2012), Baltimore (Maryland, USA), 9-12 August 2012, J Cereb Blood Flow Metab 32, S147 *(poster)*

[C10] Rizzo G., Veronese M., Ramlackhansingh A.F., Brooks D.J., Turkheimer F.E., Bertoldo A. (2012) *Voxel-wise quantification of adenosine A2A receptor with [11C]SCH442416 PET images in humans*, WMIC 2012, Dublin, Ireland, 5-8 September 2012, Mol Imaging Biol 14(2), S1922 *(oral, presenting author)* **Winner of Student travel stipend**

[C11] Rizzo G., Veronese M., Bertoldo A. (2012) *An integrated tool for quantification of dynamic PET studies: Spectral Analysis Kinetic Estimation*, WMIC 2012, Dublin, Ireland, 5-8 September 2012, (late abstract, *poster, presenting author)*

[C12] Veronese M., Rizzo G., Goodpaster B.H., Price J.C., Aboagye E., Bertoldo A. (2012) *Spectral Analysis Iterative Filter method for voxel-wise quantification of PET tracers with irreversible uptake in not brain tissues*, WMIC 2012, Dublin, Ireland, 5-8 September 2012, Mol Imaging Biol 14(2), S2040 *(oral)*

[C13] Veronese M., Rizzo G., Aboagye E., Bertoldo A. (2013) *Assessment of early therapy response with [18F]FLT PET images in breast cancer patients*, SNMMI, Vancouver, Canada, 8-12 June 2013, J Nucl Med Meeting Abstracts, May 2013, 54(S2): 21 *(oral)*

[C14] Peruzzo D., Rizzo G., Pillonetto G., Bertoldo A. (2013) *A kernel-based approach for quantification of dynamic PET studies*, SNMMI, Vancouver, Canada, 8-12 June 2013, J Nucl Med Meeting Abstracts, May 2013, 54(S2): 261 *(oral, presenting author)*

[C15] Tonietto M., Rizzo G., Veronese M., Zanotti-Fregonara P., Lohith T.G., Fujita M., Zoghbi Z.Z., Innis R.B., Bertoldo A. (2013) *Plasma metabolite correction: improvements of current parent plasma models*, SNMMI, Vancouver, Canada, 8-12 June 2013, J Nucl Med Meeting Abstracts, May 2013, 54(S2): 43 *(oral)* **Finalist at the Computer and Instrumentation Council Young Investigator Award Symposium**

[C16] Tonietto M., Rizzo G., Veronese M., Zanotti-Fregonara P., Lohith T.G., Fujita M., Zoghbi Z.Z., Innis R.B., Bertoldo A. (2013) *Effect of input function modeling on kinetic quantification*, SNMMI, Vancouver, Canada, 8-12 June 2013, J Nucl Med Meeting Abstracts, May 2013, 54(S2): 263 *(oral)*

[C17] Rizzo G., Veronese M., Bertoldo A. (2013) *Spectral Analysis for quantification of dynamic PET studies: application through SAKE*, SNMMI, Vancouver, Canada, 8-12 June 2013, J Nucl Med Meeting Abstracts, May 2013, 54(S2): 1251 *(poster, presenting author)*

[C18] Grisan E., Raffeiner B., Coran A., Rizzo G., Ciprian L., Stramare R. (2014) *A comparison of region-based and pixel-based CEUS kinetics parameters in the assessment of arthritis*, SPIE Conference Proceedings, SPIE Proceedings Vol. 9040: Ultrasonic Imaging and Tomography, SPIE Medical Imaging, San Diego (CA, USA), February 2014 (*oral, without my PhD supervisor*)

[C19] Grisan E., Raffeiner B., Coran A., Rizzo G., Ciprian L., Stramare R. (2014) *Dynamic automated synovial imaging (DASI) for differential diagnosis of rheumatoid arthritis*, SPIE Conference Proceedings, SPIE Proceedings Vol. 9035: Computer-Aided Diagnosis, SPIE Medical Imaging, San Diego (CA, USA), February 2014 (*oral, without my PhD supervisor*)

[C20] Rizzo G., Veronese M., Heckemann R.A., Selvaraj S., Howes O., Hammers A., Turkheimer F.E., Bertoldo A. (2014) *Linking brain mRNA mappings and in vivo protein density: a positron emission tomography correlation study*, Tenth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2014), Amsterdam (The Netherlands), 21-24 May 2014 *(oral, presenting author)*

[C21] Rizzo G., Veronese M., Tonietto M., Zanotti-Fregonara P., Turkheimer F.E., Bertoldo A. (2014) *A new modelling approach for quantification of [11C]PBR28 brain PET data including a vascular component,* Tenth International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2014), Amsterdam (The Netherlands), 21-24 May 2014 *(poster, presenting author)*

[C22] Tonietto M., Rizzo G., Veronese M., Zanotti Fregonara P., Masahiro F., Bertoldo A. (2014) *Optimal metabolite curve fitting for [11C]PBR28*, Tenth

International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2014), Amsterdam (The Netherlands), 21-24 May 2014 *(poster)*

[C23] Rizzo G., Veronese M., Tonietto M., Zanotti-Fregonara P., Turkheimer F.E., Bertoldo A. (2014) *Kinetic modeling using a two-tissue compartment model and an additional irreversible vascular component improves the quantification of [11C]PBR28 brain PET data*, SNM 2014, St. Louis (MO, USA), J Nucl Med Meeting Abstracts, 55(S1): 2020 *(poster)*

[C24] Rizzo G., Veronese M. Heckemann R.A., Selvaraj S., Howes O., Hammers A., Turkheimer F.E., Bertoldo A. (2014) *Multimodal genomic-PET study: linking brain mRNA mappings and in vivo protein density*, Organization for Human Brain Mapping, (OHBM 2014), Hamburg (Germany), 8-12 June 2014 *(poster, presenting author)*

[C25] Rizzo G., Raffeiner B., Coran A., Ciprian L., Stramare R., Grisan E. *Data-driven learning to detect characteristic kinetics in ultrasound images of arthritis*, 3rd MICCAI Workshop on Clinical Image-Based Procedures: Translational Research in Medical Imaging (CLIP 2014), Boston, USA, LNCS 8680, 17-24 (*oral, without my PhD supervisor*)

[C26] Rizzo G, Veronese M, Zanotti-Fregonara P, Turkheimer FE, Bertoldo A. *Quantification of [11C]PBR28 brain data at the voxel level modelling of the endothelial TSPO binding*, BBSRC "Sparking Impact" meeting, London, UK, 16-17 December 2014 *(oral, presenting author)*

[C27] Rizzo G, Veronese M, Zanotti-Fregonara P, Turkheimer FE, Bertoldo A. *Voxel-wise quantification of [11C]PBR28 brain data accounting for endothelial TSPO binding*, Hot Topics for Molecular Imaging (TOPIM 2015), Les Houches, France, 01-06 February 2015 *(poster, presenting author)*

[C28] Veronese M, Rizzo G, Zanotti-Fregonara P, Turkheimer FE, Bertoldo A. *Spectral-based quantification of [11C]PBR28 brain PET data*, Hot Topics for Molecular Imaging (TOPIM 2015), Les Houches, France, 01-06 February 2015 *(poster)*

[C29] Selvaraj S., Bloomfield P., Veronese M., Rizzo G., Bertoldo A., Owen D.R., Bloomfield M., Bonoldi I., Kalk N., Turkheimer F.E., McGuire P., De Paola V., Howes O. *Microglial Activity in People at Ultra High Risk of Psychosis and in Schizophrenia: An [11C]PBR28 PET Brain Imaging Study,* 70th Soc Biol Psychiat, Toronto, Canada, May 2015, Biol Psychiat 77(9):S510 (*oral*)

[C30] Rizzo G., Veronese M., Expert P., Turkheimer F.E., Bertoldo A. *MENGA: a comprehensive tool for the integration of brain imaging modalities and Allen brain genomic atlas,* WMIC 2015, Honolulu, Hawaii, 2-5 September 2015 *(oral, presenting author)*

[C31] Rizzo G., Tonietto M., Zanoni S., Chappell M.A., Castellaro M., Bertoldo A. *Use of a Variational Bayesian inference approach for the quantification of brain PET data at the voxel level,* WMIC 2015, Honolulu, Hawaii, 2-5 September 2015 *(poster, presenting author)*

[C32] Tonietto M., Rizzo G., Veronese M., Bertoldo A. *Modelling arterial input functions in Positron Emission Tomography dynamic studies* Conf Proc IEEE Eng Med Biol Soc. 2015 Aug;2015:2247-50. doi: 10.1109/EMBC.2015.7318839, Milan, Italy, 25-30 August 2015 (*oral*)

[C33] Veronese M., Rizzo G., Expert P., Bertoldo A., Turkheimer F.E. *Multimodal Environment for Neuroimaging and Genomic Analysis: MENGA*, 2015 International Conference on Brain & Health Informatics (BIH'15), London, UK, 30 August – 2 September 2015 (*poster*)

[C34] Selvaraj S., Bloomfield P., Veronese M., Rizzo G., Bertoldo A., Owen D.R., Bloomfield M., Bonoldi I., Kalk N., Turkheimer F.E., McGuire P., De Paola V., Howes OD. *Imaging Translocator Protein (TSPO) in Subjects at High Risk of Psychosis and in Schizophrenia: An [11C] PBR28 Pet Brain Imaging Study,* 54th Annual Meeting of the American-College-of-Neuropsychopharmacology (ACNP), Hollywood, Florida, Dec 2015, Neuropsychopharmacology, 40(S1):S559-S560 (*poster*)

[C35] Selvaraj S., Bloomfield P., Veronese M., Rizzo G., Bertoldo A., Owen D.R., Bloomfield M., Bonoldi I., Kalk N., Turkheimer F.E., McGuire P., De Paola V., Howes OD. *Elevated Translocator Protein (TSPO) in Subjects at High Risk of Psychosis and in Schizophrenia: an [11C] PBR28 PET Brain Imaging Study,* 2016 International Society for CNS Clinical Trials and Methodology (ISCTM) 12th Annual Scientific Meeting, Washington DC, USA, 16 - 18 February 2016 (*poster*)

[C36] Hellyer P.J., Barry E., Pellizzon A., Veronese M., Rizzo G., Bertoldo A., Tonietto M., Turkheimer F. *Exploring the relationship between structure, multi-scale functional dynamics and objective measurements of neural plasticity*, Organization for Human Brain Mapping, (OHBM 2016), Geneva (Switzerland), 26-30 June 2016 *(poster)*

[C37] Rizzo G., Castellaro M., Tonietto M., Veronese M., Turkheimer F.E., Chappell M.A., Bertoldo A. *Parametric imaging of brain PET data using a Variational Bayesian inference approach*, Eleventh International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(oral, presenting author)* **Winner of a Young Investigator Award**

[C38] Hellyer P.J., Barry E., Pellizzon A., Veronese M., Rizzo G., Tonietto M., Bertoldo A., Turkheimer, F.E. *Exploring the relationship between multi-scale brain functional dynamics and cerebral protein synthesis measured with L-[1-^{11}C]leucine PET*, Eleventh International Symposium on

Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(poster)*

[C39] Veronese M., Zanotti-Fregonara P., Rizzo G., Bertoldo A., Innis R.B., Turkheimer F.E. (2016) *The genomic plot: a new method for measuring specific receptor binding of a PET radioligand in human brain without pharmacological blockade*, Eleventh International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(oral)* **Winner of a Young Investigator Award**

[C40] Veronese M., Moro L., Rizzo G., Expert P, Khan W.., Bertoldo A., Turkheimer, F.E. *Network analysis of brain PET data: application to cross-sectional studies*, Eleventh International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(poster)*

[C41] Tonietto M., Rizzo G., Veronese M., Bertoldo A. *A unified framework for the automatic blood data modelling in dynamic PET studies*, Eleventh International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(poster)*

[C42] McGinnity C.J., Riaño Barros D.A., Rosso L., Veronese M., Rizzo G., Hinz R., Turkheimer F.E., Koepp M.J., Hammers A. *Test-retest reproducibility of [^{11}C]Ro15 4513, a PET ligand for GABA$_A$ receptors containing alpha 5 subunits*, Eleventh International Symposium on Functional Neuroreceptor Mapping of the Living Brain, (NeuroReceptor Mapping 2016), Boston (MA, USA), 13-17 July 2016 *(poster)*

[C43] Zanotti-Fregonara P., Veronese M., Rizzo G., Bertoldo A., Innis R.B., Turkheimer F.E. (2016) *A new method for measuring specific receptor binding of a PET radioligand in human brain without pharmacological blockade*, SNMMI 2016, San Diego (CA, USA), J Nucl Med Meeting Abstracts, ***in press*** *(poster)*

[C44] Raffeiner B., Grisan E., Rizzo G., Botsios C., Doria A., Ometto F., Punzi L. *Presence, grade and location of power doppler predict progression of radiographic damage in TNFα blocker induced clinical remission in rheumatoid arthritis patients*, Annual meeting of European League Against Rheumatism (EULAR 2016), London, UK, 8-11 June 2016, Annals of Rheumatic Diseases ***in press****, (poster)*

Proceedings - National Conferences

[NC1] Rizzo G., Turkheimer F.E., Keihaninejad S., Bose S., Hammers A., Bertoldo A. *A Bayesian Hierarchical Method For Generation Of PET Parametric Maps: Application On [^{11}C]DPN Test-Retest Study*, Atti di Secondo Congresso Nazionale di Bioingegneria, Torino (Italy), 8 - 10 July 2010 *(poster, presenting author)*

[NC2] Rizzo G., Turkheimer F.E., Bertoldo A. (2012) *Novel hierarchical approach for voxel-wise PET quantification: application on multi-compartmental models,* Atti del Terzo Congresso Nazionale di Bioingegneria, Rome (Italy), 26 – 29 June 2012 *(poster, presenting author)*

PhD Thesis

[T1] Rizzo G. "Development of Novel Computational Algorithms For Quantitative Voxel-Wise Functional Brain Imaging With Positron Emission Tomography", Università degli Studi di Padova (2012). Deposited in Jan 30, 2012. ID 4814. Available at http://paduaresearch.cab.unipd.it/4814/.

MSc Thesis

[T2] Rizzo G. "Quantitative analysis of the serotoninergic cerebral system from PET images of [11C]MDL-100,907", Università degli Studi di Padova (2007). Supervisor: Prof. Alessandra Bertoldo

BSc Thesis

[T3] Rizzo G. "AIDA model for simulation of glucose – insulin system: applications in diabetes mellitus therapy"; Università degli Studi di Padova (2005). Supervisor: Prof. Alessandra Bertoldo; Co-supervisor: Dott. Ing. Chiara Dalla Man

The undersigned GAIA RIZZO, born in Venice (VE) on April 3rd 1983, resident in Venice (VE) in San Marco 5383, 30124, under her own liability, in full understanding of the criminal liability for false declarations and statements, in accordance with Art. 76 of Italian Presidential Decree DPR no. 445 dated 28/12/2000, hereby declares that all information provided in the present curriculum vitae is true.

Padova, 04/05/16

(place and date)

(signature)