

Valter Bonvicini – Curriculum sintetico

Ruolo:

Dirigente di Ricerca, Istituto Nazionale di Fisica Nucleare

Sede:

Sezione di Trieste

Attività scientifica

Nel corso della mia attività di fisico sperimentale mi sono occupato principalmente di sviluppo di rivelatori a stato solido e della relativa elettronica di front-end a basso rumore per esperimenti di fisica delle particelle e di fisica astroparticellare (tracking e calorimetria), con particolare riguardo ad esperimenti per la ricerca di antimateria e di Materia Oscura nella radiazione cosmica e dello studio della composizione isotopica dei raggi cosmici. In particolare: rivelatori al silicio a microstrip e a pixel per rivelatori di vertice in fisica delle particelle, camere a deriva di silicio per spettroscopia e per tracciamento (per applicazioni alla fisica nucleare, all'astrofisica X ed alle sorgenti di luce avanzate), calorimetri al silicio-tungsteno con capacità di identificazione di carica per esperimenti di fisica astroparticellare, sviluppo di fotomoltiplicatori al silicio, progettazione e sviluppo di ASICs di front-end. Mi sono occupato inoltre dell'applicazione delle tecniche sviluppate per HEP e *astroparticle* ad attività interdisciplinari: fisica medica (*imaging* diagnostico, in particolare mammografia), dosimetria a bordo di stazioni orbitanti nello spazio, effetti della radiazione cosmica sul sistema visivo e nervoso umano.

Esperienze professionali, responsabilità e incarichi:

2014-presente: Presidente della Commissione Scientifica Nazionale 5 dell'INFN.

2013-2016: Responsabile Nazionale dell'esperimento astroparticellare internazionale su satellite GAMMA-400.

2013-2016: Componente del Comitato Nazionale Trasferimento Tecnologico (CNTT) dell'INFN.

2012-2013: Responsabile locale dell'esperimento GAMMA-400-RD (Gruppo II).

2010-2013: Responsabile Nazionale dell'esperimento TWICE (Techniques for Wide-range Instrumentation in Calorimetry Experiments).

2009-2014: Coordinatore locale per la linea scientifica V presso la Sezione INFN di Trieste e membro della Commissione Scientifica Nazionale 5 dell'INFN.

2006-2010: Responsabile Nazionale dell'esperimento FACTOR (Fiber Apparatus for Calorimetry and Tracking with Optoelectronic Readout).

2006-2009: Responsabile Nazionale dell'esperimento CASIS2 per lo sviluppo di elettronica di front-end VLSI ad altissimo range dinamico e conversione A/D integrata per calorimetria al silicio.

2003-2005: Responsabile Nazionale dell'esperimento INFN di Gr. V CASIS (Calorimetria al Silicio per lo Spazio).

2001-2016: Responsabile scientifico del Laboratorio di Elettronica e Rivelatori della Sezione di Trieste dell'INFN.

2001-2002: Coordinatore del Progetto "Sistema di Rivelazione ad Alto Range Dinamico e Basso Rumore Basato su ASIC CMOS di Front-End e Rivelatori al Silicio per Esperimenti di Astroparticelle" - ASI - Bando ASI per la Ricerca Scientifica 2001 - Finanziato con contratto ASI nr. I/R/132/02.

2000-2001: Coordinatore del Progetto "Sistema di Rivelazione ad Alto Range Dinamico e Basso Rumore Basato su ASIC CMOS di Front-End e Rivelatori al Silicio per Esperimenti di Astroparticelle" - ASI - Bando ASI per la Ricerca Scientifica 2000 - Finanziato con contratto ASI nr. I/R/177/01.

1999-2000: Responsabile locale dell'esperimento UV-Drift sullo sviluppo e l'applicazione alla rivelazione UV e raggi X "mollini" di camere a deriva di silicio.

1998: Responsabile locale dell'esperimento DSI (Drift Silicon) sullo sviluppo di camere a deriva di silicio.

1997-2006: Responsabile della progettazione, dello sviluppo e della realizzazione del Calorimetro Elettromagnetico tracciante al silicio-tungsteno dell'esperimento su satellite PAMELA per lo studio della componente di antimateria nei raggi cosmici (lanciato nel giugno 2006).

1992-1995: Componente della Collaborazione CERN RD19 per lo sviluppo di rivelatori a pixel ibridi di silicio ("Hybrid Pixel Detectors").

1991-1993: Responsabile del Laboratorio di Elettronica del Gruppo Microvertice di Milano dell'esperimento DELPHI al LEP.

1990-1994: Università degli Studi di Milano, associato all'INFN.

Altri titoli:

Abilitato alle funzioni di Professore di prima fascia nel settore concorsuale 02/A1 (Fisica sperimentale delle interazioni fondamentali) per il periodo 23/01/2014 - 23/01/2020 a seguito dell'esito dell'Abilitazione Scientifica Nazionale - Bando 2012 (D.D. n. 222/2012) del MIUR.

2010-2014: Referente Locale per il Trasferimento Tecnologico per la Sezione di Trieste.

Membro dell'esperimento di R&D T995 ("Muon Detector/Tail Catcher R&D") approvato al Fermilab per il programma di test su fasci MTBF, anno 2010.

Membro dell'esperimento di R&D T1004 ("Total Absorption Dual Readout Calorimetry R&D") approvato al Fermilab per il programma di test su fasci MTBF, anno 2011.

Membro dell'esperimento di R&D T1015 ("Dual Readout Calorimetry with Heavy Glasses R&D") approvato al Fermilab per il programma di test su fasci MTBF, anni 2011-2012.

Reviewer per la rivista *Nuclear Instruments and Methods in Physics Research Section A, Accelerators, Spectrometers, Detectors and Associated Equipment* (2008 - presente).

Reviewer per la rivista *IEEE Transactions on Nuclear Science* (2009 - presente).

Autore o coautore di oltre 330 pubblicazioni tra articoli su riviste internazionali con *peer review*, proceedings di conferenze ed altri lavori.

Numero totale di citazioni esclusi RPP (da INSPIRE): > 8000

Numero medio di citazioni per articolo escluse autocitazioni (da INSPIRE): 35.9

Attività didattica:

Membro (marzo 2013 - presente) del Collegio dei docenti della Scuola di Dottorato in Fisica, Università degli Studi di Trieste.

Docenza: 2004 - presente: Corso "Rivelatori al silicio ed elettronica di lettura" Università degli Studi di Trieste, Scuola di Dottorato in Fisica (cicli: XIX - XXXII).

Docenza: 1999: Corso "Fisica dei rivelatori a stato solido ed elettronica associata" - Università degli Studi di Trieste, Scuola di Dottorato in Fisica, XIII ciclo.

Docenza: 1998: Corso "Fisica dei rivelatori a stato solido ed elettronica associata" - Università degli Studi di Trieste, Scuola di Dottorato in Fisica, XII ciclo.

Relatore o correlatore di 8 tesi di Laurea (tra triennale, specialistica e vecchio ordinamento) in Fisica e in Ingegneria Elettronica presso l'Università degli Studi di Milano e l'Università degli Studi di Trieste.

Coordinatore di una tesi di Dottorato in Fisica presso l'Università degli Studi di Trieste.

Organizzazione di workshop, scuole e conferenze

Comitato Organizzatore del workshop internazionale “Trends in Photon Detectors for Particle Physics and Calorimetry”, Trieste, 3-4 giugno 2008.

Comitato Organizzatore e docente della II Scuola Nazionale Rivelatori Innovativi dell'INFN, Trieste, 18-22 ottobre 2010.

Comitato Scientifico e Organizzatore di diversi workshop tematici internazionali organizzati dalla CSN5:

- Workshop su Elettronica VLSI nell'INFN, Padova, 13 novembre 2013;
- Miniworkshop sugli acceleratori, LNL, 17 febbraio 2015;
- Workshop “La Radiobiologia in INFN”, Trento, 12-13 maggio 2016.

Comitato organizzatore workshop internazionale “Science with GAMMA-400”, International Centre for Theoretical Physics (ICTP), Trieste, 2-4 maggio 2013.

Comitato organizzatore “IWORID 2014” (International Workshop on Radiation Imaging Detectors), Trieste, 22-26 giugno 2014.

Comitato scientifico della Conferenza Internazionale “FISMAT 2015”, Palermo, 28 settembre – 2 ottobre 2015.

Comitato scientifico “IFD 2015” (INFN Workshop on Future Detectors), Torino, 16-18 dicembre 2015.

BIOGRAPHICAL SKETCH

NAME		POSITION TITLE	
Tangaro Sabina, Ph.D.		Researcher	
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
<i>Ministero del Lavoro (Italy)</i>	<i>Qualified Experts in Radiological Protection - III Degree</i>	<i>2008</i>	<i>Radiological Protection</i>
<i>University of Bari (Italy)</i>	<i>PhD in Physics</i>	<i>2005</i>	<i>Medical Physics</i>
<i>University of Pisa (Italy)</i>	<i>Post- graduate School in Medical Physics</i>	<i>2001</i>	<i>Medical Physics</i>
<i>International Institute for Advanced Scientific Studies "Eduardo R. Caianiello", Vietri sul Mare (SA, Italy)</i>	<i>Master degree</i>	<i>2001</i>	<i>Advanced Information and Communication Technologies</i>
<i>University of Pisa (Italy)</i>	<i>Laurea Degree</i>	<i>1999</i>	<i>Physics</i>

A. Positions and Honors.

RESEARCH ACTIVITY:

- 1) *Since 2014 - Abilitazione Scientifica Nazionale al Ruolo di Professore di Seconda Fascia (SD 02/D1)*
- 2) *2006-present: Researcher of Physics at Istituto Nazionale di Fisica Nucleare, section of Bari (Italy)*
- 3) *2005-2006: Post-doc fellow at Physics Department, University of Bari (Italy).*
- 4) *2000-2001: Fellow at CNR, Istituto Elaborazione Segnali e Immagini, Bari (Italy)*

Dr. Sabina Tangaro is a researcher at Istituto Nazionale di Fisica Nucleare (INFN).

Dr. S. Tangaro's research activity regards the field of Medical Physics, with particular reference to both hardware and software systems of signal and image acquisition. The activity has been carried out with growing responsibilities in experiments and projects.

Since 1999 Dr. S. Tangaro focuses on activities related to the analysis and understanding of images and patterns in general gaining an expertise on image processing, computer vision and pattern recognition, machine learning, and related applications and takes part to the research projects founded by INFN and Ministry of Research. These Projects aims at developing Computer Aided Detection (CAD) software systems for Medical Applications on distributed databases by means of a GRID Infrastructure Connection approach.

The use of automatic systems for analyzing medical images is of paramount importance in screening programs, due to the huge amount of data to check. In these project medical images analysed are: Mammographic images for breast cancer detection, Computer Tomography images for lung cancer analysis and Magnetic Resonance images for the diagnosis of the Alzheimer disease. Up to date, the research activities have led to the implementation of two different CAD systems, one for mass lesion detection in

mammograms, the other for nodule detection in lung CT. In both cases, the results are published on Medical Physics. In PON RECAS she collaborates to development of distributed infrastructure for medical big data analytics.

2008-2012 S. Tangaro coordinates a research group, which is engaged with the BEATS project. The group's activities was focused on the study of the potentiality of imaging sources Thomson (TS) conducted in terms of visibility of details in images of phase contrast (PC) and the mapping phase (PRI) compared to the detail visibility in absorption images. In fact it has been developed a new method of analytical/numerical, called Combined Mixed Approach (CMA), for the reconstruction of phase maps from X-ray images. The PRI allows a quantitative approach because the map phase is directly proportional to the electron density of the object and can, therefore, access to essential information of the internal structures of objects/tissues. Some experiments were done at synchrotron sources, with different samples, showing significant increases in image quality compared to X-ray absorption imaging.

Since 2006 dr. S. Tangaro has begun the analysis of magnetic resonance images (MRI) which aims at studying the brain morphological alterations due to the Alzheimer's disease. This activity is previously part of MIND (Medical Imaging for Neurodegenerative Diseases) project funded by INFN and now part of 'nextMR-advancing Magnetic Resonance Imaging and Data Analysis', granted by INFN, research *project* where S. Tangaro have the role of Principal Investigator.

Using the developed algorithms, we have investigated the statistical distribution of some observable morphometric calculated around the right and left hippocampal volumes in MRI images. The distribution of observable is correlated with the clinical diagnosis in patients potentially suffering from Alzheimer's disease, to verify the possibility of building a complementary test to the cognitive assessment. The interest for the volume property is a prerequisite for the automatic segmentation process of the hippocampus, and in the same time provides an efficient method and relatively insensitive to the possible extraction of the volume inaccuracies.

In the study of predictive methods for early diagnosis and personalized staging of neurodegenerative diseases, it is increasingly important to analyze both medical image and genetic data and EEG time series data. For these analysis methods based on complex networks have been studied.

In the last years my the research activity also includes the dynamic study of brain connectivity. Functional connectivity in human brain through functional magnetic resonance imaging (fMRI) is assessed by partitioning the whole brain volume into regions of interest (ROIs) and by computing statistical interactions between couple of fMRI time series. Usually the signal is windowed over time and the local connectivity, i.e., the one resulting from the single window, and its temporal evolution, i.e., its variation over adjacent windows are examined to follow the functional organization of the brain during specific activities such as learning, memory tasks, or in resting state. In this work, a phase-space framework is used to map pairs of signals of each region of interest, in their reconstructed phase space, i.e. a topological representation of their behaviour under all possible initial conditions.

For this type of analysis (big data analytics) we use Bari ReCaS which consists of about 12000 CPU and 6 PB of storage.

TEACHING ACTIVITY:

Tutor of Ph.D. Thesis in Ingegneria delle Telecomunicazioni titled 'Multidimensional Dynamic Analysis of Human Brain Connectivity', ing. A Lombardi

Engaged in institutional training activities from University of Bari, Politecnico di Bari and University of Sassari. The subjects include

- signal processing and images processing for the the Master degree and Ph.D. degree in Physics (since 2007)*
- Physics for the degree in Biology and degree in Engineering (2001-2010)*

HONORS:

The algorithms and the methods proposed by the members of the MIND research team of Bari Unit, reached the first positions in two challenges whose goal was the assessment of brain related pathological conditions.

- 1) Disease Module Identification DREAM Challenge, DREAM Challenge, organized by Sage*

Bionetworks (USA) to discover novel network modules/pathways in genomic networks underlying complex diseases.

- 2) *Mild Traumatic Brain Injuries – MICCAI mTOP Challenge, winner*
- 3) *Alzheimer's Disease Big Data DREAM Challenge #1, organized by Sage Bionetworks (USA), over 500 scientist participant (paper 9, ALZHEIMER'S & DEMENTIA)*
- 4) *Challenge on Computer-Aided Diagnosis of Dementia Based on Structural MRI Data in MICCAI CADDementia Challenge, organized by the Biomedical Imaging Group Rotterdam, Erasmus MC, Rotterdam, The Netherlands (paper 15, NEUROIMAGE).*
- 5) *Machine Learning Challenge: Predicting Binary and Continuous Phenotypes from Structural Brain MRI Data in MICCAI MLC Challenge, organized by the "Laboratory for Computational Imaging Biomarkers", Harvard Medical School, (Boston, USA), winner.*
- 6) *Comparing and combining algorithms for computer-aided detection of pulmonary nodules in computed tomography scans ANODE 09, organized by the Image Sciences Institute, University Medical Center Utrecht, The Netherlands (paper 20, MEDICAL IMAGE ANALYSIS)*

B. Selected peer-reviewed publications (in chronological order).

1. N. Amoroso, ..., S Tangaro, Multiplex Networks for Early Diagnosis of Alzheimer's Disease. – Front Aging Neuroscience 2018 Nov 14;10:365. doi: 10.3389/fnagi.2018.00365
2. N. Amoroso, ..., S Tangaro, Complex networks reveal early MRI markers of Parkinson's disease – Medical Image Analysis, Vol 48, Aug. 2018, pp 12-24
3. Fazio et al. Transcriptomic context of DRD1 is associated with prefrontal activity and behavior during working memory, Proc Natl Acad Sci U S A. 2018 May 22;115(21):5582-5587
4. N. Amoroso, ..., S Tangaro, Salient networks: a novel application to study Alzheimer disease. Biomed Eng Online. 2018 Nov 20;17(Suppl 1):162. doi: 10.1186/s12938-018-0566-5.
5. N. Amoroso, ..., S Tangaro Deep learning reveals Alzheimer's disease onset in MCI subjects: results from an international challenge - Journal of Neuroscience Methods
6. A Monaco,..., S. Tangaro*, Roberto Bellotti A complex network approach reveals a pivotal substructure of genes linked to Schizophrenia, - Plos one, January 5, 2018 <https://doi.org/10.1371/journal.pone.0190110>
7. Da Pelo P., ..., Tangaro, S. Trial latencies estimation of event-related potentials in EEG by means of genetic algorithms by - Journal of neural engineering. J Neural Eng. 2018 Apr;15(2):026016. doi: 10.1088/1741-2552/aa9b97.
8. N. Amoroso, ..., S Tangaro, Alzheimer's disease diagnosis based on the Hippocampal Unified Multi-Atlas Network (HUMAN) algorithm , Biomed Eng Online. 2018 Jan 22;17(1):6.
9. J. Rasero, et al. Multivariate Regression Analysis of Structural MRI Connectivity Matrices in Alzheimer's Disease - Plos one
10. A. Lombardi, S. Tangaro, et al. - A Novel Synchronization-based Approach for Functional Connectivity Analysis - Complexity
11. Allen et al., Crowdsourced estimation of cognitive decline and resilience in Alzheimer's disease. ALZHEIMER'S & DEMENTIA, IF 12.4, ISSN: 1552-5260
12. A. Tateo et al. Hybrid X-Space: a new approach for MPI Reconstruction. Physics in Medicine and Biology, ISSN: 0031-9155
13. CHINCARINI A. et al., (2016). Integrating longitudinal information in hippocampal volume measurements for the early detection of Alzheimer's disease . NEUROIMAGE, 125, pp. 834-847, ISSN: 1053-8119
14. AMOROSO N. et al., (2015). Hippocampal unified multi-atlas network (HUMAN): protocol and scale validation of a novel segmentation tool. PHYSICS IN MEDICINE AND BIOLOGY, vol. 60, p. 8851-8867, ISSN: 0031-9155
15. INGLESE P. et al., (2015). Multiple RF classifier for the hippocampus segmentation: method and validation on EADC-ADNI Harmonized Hippocampal Protocol. European Journal of Medical Physics- Physica Medica, 31 (8), pp. 1085-1091, ISSN: 1724-191X
16. Maglietta R. et al. Automated hippocampal segmentation in 3D MRI using random undersampling

with boosting algorithm. *PATTERN ANALYSIS AND APPLICATIONS*, 19 (2), pp. 579-591, ISSN: 1433-7541.

17. E. E. Bron et al., (2015). Standardized evaluation of methods for computer-aided diagnosis of dementia based on structural MRI: the CADDementia challenge. *NEUROIMAGE*, IF 6.36, 111, pp. 562-579, ISSN: 1053-8119.
18. TANGARO S., et al. (2014). Automated voxel-by-voxel tissue classification for hippocampal segmentation: Methods and Validation. *European Journal of Medical Physics- Physica Medica*, IF 2.5, vol. 30, pp. 878–887, 2014
19. Chincarini A., et al. (2012). Neurodegeneration markers from structural MRI and FDG-PET brain images: the Alzheimer's disease case study.. *THE EUROPEAN PHYSICAL JOURNAL PLUS*, vol. 127, p. 127-135
20. TANGARO S, et al. (2008). MAGIC-5: An Italian mammographic database of digitized images for research. *LA RADIOLOGIA MEDICA*, vol. 113 - 4, p. 477-485

C. Research Support.

Ongoing Research Support

- 1) 2018-2021 – Coordinator of the INFN-Bari Unit of project ‘Artificial Intelligence in Medicine’, granted by Istituto Nazionale di Fisica Nucleare.
- 2) 2018-2019 - Coordinator of the INFN Unit of project ‘Data-drivEn Customer Service InnovatiON (DECiSION)’, granted by Regione Puglia (Italy) in call ‘INNONETWORK’.

Completed Research Support

- 3) 2018-2019 – Coordinator of the INFN Unit of project ‘ERHA- Radiotherapy advanced with adrons’, granted by Ministero per lo Sviluppo Economico MISE in call Horizon PON 2016-2020.
- 4) 2014-2017: Principal Investigator of the ‘nextMR-advancing Magnetic Resonance Imaging and Data Analysis’ reserch project, granted by Istituto Nazionale di Fisica Nucleare. The research programme involved a team of about 50 researchers from 6 italian universities (Bari, Genova, Pisa, Trieste, L’Aquila, Palermo, Cagliari, Bologna).
The core of this proposal is to advance in the understanding of MR-based imaging and their data analysis, to serve as better quantitative measurements in clinical practice thus increasing the prognostic value.
- 5) 2015-2017: Coordinator of the INFN Unit of the research project ‘Pervasive game for personalized treatment of cognitive and functional deficits associated with chronic and neurodegenerative diseases (PERSON)’, granted by Regione Puglia (Italy).
The goal of this project is to develop an ICT platform for the diagnosis and treatment of pathological conditions, in particular arising from neurodegenerative diseases. The platform integrates in a comprehensive base of knowledge heterogeneous data (online and offline acquisition): MRI scans, EEG data and clinical metadata
- 6) 2016-2017: Coordinator of the INFN Unit of the project “Cognitive impairment in Pediatric Multiple Sclerosis: searching for biomarkers predictive of progression”, granted by Fondazione Italiana Sclerosi Multipla (FISM, Italy).
- 7) 2014: Coordinator of the INFN Unit of the training project CASAP – high performance scientific computing, on behalf of the Italian Ministry of University and Scientific Research. The project includes six Master degree fellows on high performance scientific computing.
- 8) 2012-2014: Coordinator of the Bari Unit of the MIND (Medical Imaging for Neurodegenerative Diseases) project, granted by Istituto Nazionale di Fisica Nucleare.
The goal of this project is the analysis of magnetic resonance images (MRI) which aims at studying the brain morphological alterations due to the Alzheimer's disease.

Angelo Taibi è Professore Associato ed insegna Fisica Medica. Laureatosi in Fisica all'Università di Ferrara nel 1992, presso la stessa Università ha ottenuto il dottorato di ricerca in Fisica Medica nel 1997 con una tesi nel campo della mammografia digitale utilizzando raggi X quasi monocromatici.

Essendo risultato vincitore di una borsa di studio della Commissione Europea per attività post-dottorato (Marie Curie fellowship) ha lavorato in Inghilterra presso il Department of Medical Physics and Bioengineering, University College London. Utilizzando codici Monte Carlo, ha sviluppato un modello per la caratterizzazione dei tessuti biologici attraverso l'analisi dello scattering coerente in mammografia digitale. Tornato a Ferrara nel 2000, ha ottenuto vari assegni di ricerca e contratti di collaborazione e tenuto numerosi insegnamenti di Fisica. Attualmente insegna Fisica di base e Fisica Applicata presso la Scuola di Medicina.

La sua esperienza è essenzialmente nel campo della radiologia diagnostica, medicina nucleare e biofisica della circolazione sanguigna. Recentemente ha partecipato a diversi progetti riguardanti le applicazioni avanzate in mammografia digitale come la doppia energia e la tomosintesi, collaborando anche con aziende del settore come consulente scientifico.

Nel corso degli anni ha ottenuto diversi finanziamenti nazionali ed internazionali e ha guidato gruppi di ricerca nel campo della Fisica Medica. Recentemente, grazie ad una collaborazione con il Centro Malattie Vascolari dello stesso Ateneo (Resp. Prof. Paolo Zamboni), ha ricevuto un finanziamento dall'Agenzia Spaziale Italiana (ASI) per studiare il ritorno venoso cerebrale in condizioni di microgravità ed è stato nominato *project manager* dell'esperimento "Drain Brain".

E' autore o coautore di circa 90 pubblicazioni scientifiche su riviste con referee. Ha inoltre contribuito alla stesura di quattro libri scientifici. Referee per le riviste scientifiche internazionali *Medical Physics*, *Physics in Medicine and Biology*, *Physica Medica* e *European Radiology*.

Da circa quindici anni svolge attività di formazione per Medici Radiologi e Tecnici di Radiologia ed è attualmente componente del corpo docente per i corsi itineranti della SIRM (Sezione di Senologia). E' inoltre componente del corpo docente presso l'Università di Tor Vergata (Roma) "Master in Diagnostica ed interventistica senologica" e componente del corpo docente presso l'Università di Padova "Master in Surface Treatments for Industrial Applications".

In qualità di associato alla ricerca, ha partecipato a diversi esperimenti finanziati dall'Istituto Nazionale di Fisica Nucleare (INFN) ed è attualmente coordinatore per la sezione INFN di Ferrara della Commissione Scientifica Nazionale V.

Ha contribuito alla stesura del protocollo europeo per lo screening mammografico e dal 2003 svolge anche attività di consulenza presso la Commissione Europea a Bruxelles come esperto valutatore di progetti comunitari.

E' attualmente membro della Commissione di Dipartimento per l'Assicurazione della Qualità della Ricerca (VQR) ed è stato componente del Consiglio della Ricerca dell'Ateneo e della Giunta di Dipartimento. E' inoltre coordinatore di Dipartimento per la Mobilità Internazionale.

ALBERTO QUARANTA

CURRICULUM VITAE

Generalities

Born	Padova, 12 aprile 1964.
E-mail	alberto.quaranta@unitn.it
Citizen	Italian

Cursus Studiorum

1982	Classical Diploma.
1989	Master Degree in Physics.
1993	PhD in Physics, University of Padua "Studio dei processi di diffusione degli ioni metallici all'interno dei vetri per l'ottica integrata".
1992-1994	INFM grants, Padova, Department of Physics.
1995	Post doc grant, Padova, Department of Physics.

Posizioni accademiche

1995-2006	Researcher, Engineering Faculty, University of Trento, FIS/03 (Physics of Matter).
2006-2016	Associate Professor, Engineering Faculty, University of Trento, FIS/01 (Experimental Physics).
2016-	Full Professor, Department of Industrial Engineering, University of Trento, 02/B1, FIS/01 (Experimental Physics).

Members of the *Teaching Council* of the Materials, Mechatronics and System Engineering Doctorate School of the Department of Industrial Engineering, University of Trento.

2016-2019 Contact-person for the Master course Materials and Production Engineering, Department of Industrial Engineering, University of Trento.

Dal 2019 Contact-person for the Bachelor course Industrial Engineering, Department of Industrial Engineering, University of Trento.

Teaching

- 1992-1995 assistant of *Physics Laboratory* and *Physics Experiments II* for Engineering and Physics courses, University of Padova.
- 1995-2016 assistant for the courses of Solid State Physics and Surface Physics, Materials Engineering, University of Trento.
- 1995-2000 assistant for the course *Fisica 2* for Engineering, University of Trento.
- 2001-2014 *Physics*, Viticulture and Enology, University of Trento.
- 2004-2009 *Physics 3*, Bachelor course Industrial Engineering, University of Trento.
- 2009- *Physics 2* Bachelor course Industrial Engineering, University of Trento.
- 2001- *Optical Properties of Nanomaterials*, Doctorate School of Materials, Mechatronics and System Engineering, Department of Industrial Engineering, University of Trento.
- 2016- *Optical Properties of Nanomaterials*, Doctorate School of Physics, Department of Physics, University of Ferrara.

Tutor of 11 PhD Theses, 17 Master theses and 30 Bachelor theses.

Scientific Official Roles

Research positions

- 1995-2008 INFN - Associate Researcher, INFN Laboratori Nazionali di Legnaro.
- 2008-2014 In charge as INFN Technology Researcher, INFN Laboratori Nazionali di Legnaro.
- 2015-2017 Member of Board of Delegates European Materials Research Society (E-MRS).
- 2015- In charge as INFN Technology Researcher, INFN-TIFPA, Trento.
- 2015- Coordinator for INFN 5th Committee research activities, INFN-TIFPA, Trento.

Research Projects

- 2002-2004 Spokenperson at Laboratori Nazionali di Legnaro (Padova) 5th Committee INFN Experiment ASTHICO (Advanced Scintillating THin COatings).
- 2007 Spokenperson at Laboratori Nazionali di Legnaro (Padova) 5th Committee INFN Experiment LUPO (LUAg – POLyimide scintillating fibers).
- 2009 Spokenperson for a project on Optical Techniques for the evaluation of the pasteurization impact on food quality, Federazione Trentina della Cooperazione.
- 2009-2011 Principal Investigator 5th Committee INFN Experiment ORIONE (ORGanic scIntillator fOR NEutrons).
- 2012-2014 Principal Investigator 5th Committee INFN Experiment HYDE (HYbrid DETectors for neutrons).
- 2012-2016 WP Leader, Training and Networking, project NEDENSAA (NEutron DETector developments for Nuclear Structure, Astrophysics and Applications) for NuPNET (ERA-NET for Nuclear Physics Infrastructures).
- 2015-2017 Spokenperson at TIFPA 5th Committee INFN Experiment NADIR (NANo Dosimetry of Ionizing Radiation).
- 2018-2019 Principal Investigator 5th Committee INFN Experiment ELOFLEX (ELEctro-Optical FLEXible detectors for mixed radiation fields).

- 2019- Spokenperson at TIFPA 5th Committee INFN Call FIRE (Flexible Ionizing Radiation detectors).
- 2017-2018 Principal Investigator CARITRO project MILA, “**M**ateriali **I**nnovativi per rivelazione di Luce nell’UV-NIR per Automotive Ambiente e Agro-food”.
- 2019-2020 Spokenperson at unitn for a H2020-ATTRACT project CHEDDAR, “**C**Hipl**E**ss RFID RaDi**A**tion Detecto**R**”.

Investigator for research activities at international laboratories

- 2003-2019 *Spokenperson* for runs at AN2000 and CN accelerators at Laboratori Nazionali di Legnaro.
- 2005-2007 *Spokenperson* for analyses runs “Ion Beam Induced Luminescence for cultural heritage” in the European network EU-ARTECH Program, at C2RMF Centre de recherche et de restauration des musées de France.
- 2013 *Spokenperson* at CANAM cyclotron and RLV15 reactor, Prague, for a study intitled “Innovative hybrid detectors for neutrons”.
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Organization

2011. *Organizing and Scientific Committees member TICME* (Trento Innovation Conferences on Materials Engineering) on *Advances in Materials for Energy and Environment*, Trento, 12-14 December 2011.
2014. *Principal Organizer* E-MRS Symposium, Fall Meeting di Varsavia (15-19 settembre 2014) entitled:“Advances on functional doped glasses: technologies, properties and applications”.
- Since 2014 *Principal Organizer* of a biennial “Summer School on Neutron Detectors and Related Applications”, Riva del Garda (TN), NDRA2014, NDRA2016, NDRA2018, NDRA2020.
- 2015 *Scientific Committee member* AISEM 2015, Trento, 3-5 February 2015.
- 2016 *Organizing Committee Member* ICTON-2016, International Conference on Transparent Optical Networks, Trento, 10-14 July 2016.
- 2017 *Organizing Committee Member* international school SQUAD 2017: Advanced School on Quantum Detectors, Trento, 16-18 October 2017.
- 2020 *Scientific Committee member* of the national workshop “Quantum technologies within INFN: status and perspectives”, Padova, 20-21 January 2020.
- 2020 *Organizer* of the workshop “International Workshop on Nuclear Technology and Nonproliferation for Society”, Venice, 18-20 May 2020.

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Parametri bibliometrici

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Work experience

position held from 1996 to 2006 scientist at INFN (National Institute for Nuclear Physics)
position held since 2007 senior scientist at INFN (National Institute for Nuclear Physics)

main research project and scientific collaboration

since 2019 Position: design engineer
Design and construction of two prototype of high temperature superconductive CCT dipoles for the INFN experiment BISCOTTO

2015-2019 Position: responsible for INFN WP5 activities
Design of a Nb₃Sn 16 T superconducting dipole for the Future Circular Collider at CERN for the European experiment EuroCircol.

since 2014 Position: deputy project leader
Design and construction of a model and a prototype of the superconducting dipole D2 for the High Luminosity upgrade of the Large Hadron Collider at CERN

2014-2016 Position: design engineer
Design and construction of a vacuum calorimeter to measure with high accuracy the heat generated by a 100kCi ¹⁴⁴Ce-¹⁴⁴Pr antineutrino generator for the SOX (Short distance neutrino Oscillations with BoreXino) experiment.

2014-2015 Position: design engineer
Design and construction of the first prototype out of 27 modules of the Transport Solenoid for the Mu2e experiment at Fermilab

since 2013 Position: design engineer
Participation to the upgrade study of the gravitational wave detector Virgo (analysis of the electromagnetic and Newtonian noise)

2013-2015 Position: design engineer
Design of a superconducting toroidal magnet for astroparticle shielding in interplanetary manned missions for the European experiment SR2S (Space Radiation Superconductive Shield).

2011-2013 Position: design engineer
Design, construction and test of a model superconducting quadrupole for the interaction region of SuperB factory.

2005-2010 Position: design engineer and responsible of the mechanical design
Design and construction of a fast ramped bent superconducting dipole for the FAIR SIS300 synchrotron.

1995-2005 Position: responsible for the quality assurance and design engineer
Design and construction of the CMS superconducting solenoid at CERN LHC.

2005-2007 Position: responsible for INFN-Genoa activities
Development of a high performance Nb₃Sn conductor for the European NED project

2003-2004 Position: responsible for INFN-Genoa activities
Design of the superconducting solenoid for the cyclotron SCENT (Superconducting Cyclotron for Exotic Nuclei and Therapy) at the LNS Laboratory of INFN.

2001-2003 Position: design engineer
Design of a heavy ion gantry for oncologic radiotherapy at the CNAO center.

1994-1996 Position: design engineer
Design and construction of the BABAR superconducting solenoid for the SLAC facility at Stanford.

Editorial tasks

- since 2005 Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the Applied Superconductivity Conference and the Magnet Technology Conference.
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- 2007 Chief Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 20th Magnet Technology Conference.
- 2009 Lead Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 21st Magnet Technology Conference
- 2010 Chief Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 2010 Applied Superconductivity Conference.
- 2011 Chief Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 22nd Magnet Technology Conference.
- 2012 Lead Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 2012 Applied Superconductivity Conference.
- 2013 Chief Editor of the journal "IEEE Transaction on Applied Superconductivity" for the issues containing the proceeding of the 23rd Magnet Technology Conference.
- 2013 Chief Editor of "Journal of Physics: Conference Series" for 2013 European Conference on Applied Superconductivity
- since 2019 Editor of the regular issues of the journal "IEEE Transaction on Applied Superconductivity"

Scientific committees

- 2013 Member of the Scientific Program Committee of the 23rd Magnet Technology Conference.
- 2013 Member of the Scientific Program Committee of the 2013 European Conference on Applied Superconductivity.
- 2014-2018 Elected member of Applied Superconductivity Conference Board Committee.
- 2014 Member of the Scientific Program Committee of the 2014 Applied Superconductivity Conference
- 2016 Member of the Scientific Program Committee of the 2016 Applied Superconductivity Conference
- 2018 Member of the Scientific Program Committee of the 2018 Applied Superconductivity Conference
- 2019 Member of the Scientific Program Committee of the 2019 European Conference on Applied Superconductivity.

Education and training

- 1990-1994 Degree in Physics from University of Genoa
Thesis about the theoretical and experimental study of the spectral response of superconducting materials exposed to varying magnetic field

Personal skills and competences

- Languages Good English, in speaking and writing, poor knowledge of French
- Technical skills and competences in-depth knowledge of design through finite element tools