

ANTONIO SARNO

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Work Experience

Research Activities

- 28th June 2021-
Present
Researcher RTDA - SC 02/D1 SSD FIS07
Dipartimento di Fisica "E Pancini" Università di Napoli "Federico II", Napoli, Italy
Key Responsibilities: Developing Monte Carlo software for in-silico studies in innovative approaches in x-ray diagnosis and therapy.
- February 2020-
December 2021
INFN individual Grant: "AGATA – Advanced Geant4-based platform for virtual clinical trials in x-ray breast imaging"
INFN sez di Napoli, Napoli, Italy
Key Responsibilities: PI and project coordinator. Directly involved in the development of the platform (hardware and software) and digital models of patient.
- August 2019-
January 2020
Post-Doc Grant: "Virtual clinical trials in dedicated breast CT"
University of Naples Federico II, Napoli, Italy
Key Responsibilities: Development of Monte Carlo code for simulating apparatuses and patients for in-silico clinical trials.
- May 2019-
July 2020
Scientific Collaboration: "Development of innovative algorithms for MRI images"
CeRICT, Napoli, Italy
Key Responsibilities: Development of algorithms for image reconstructions and analysis in MRI.
- August 2017-
July 2019
Post-Doc Grant: "Dosimetry for X-ray breast imaging and radiotherapy"
INFN sez di Napoli, Napoli, Italy
Key Responsibilities: Development of Monte Carlo code for dose assessments and image quality optimizations in X-ray breast imaging and image guided radiotherapy and validation measurements.
- December 2018
Visiting Researcher at UC Davis, Sacramento (USA)
UC Davis, Sacramento (USA)
Key Responsibilities: Developing a digital breast models for Monte Carlo simulations by means of 3D clinical breast images acquired with a dedicated scanner at UC Davis.
- March 2017-
July 2017
Fellowship: "Monte Carlo study of the dose distribution in CT scanners dedicated to the breast"
Dept. of Physics "Ettore Pancini", Università di Napoli Federico II, Naples, Italy
Key Responsibilities: Developing Monte Carlo codes for dose and dose distribution evaluation in CT scanners dedicated to the breast.
- March 2016-
June 2016
Visiting PhD student at the Radboud UMC, Nijmegen (The Netherlands)
Radboud UMC, Nijmegen (The Netherlands)
Key Responsibilities: Developing a model for dose assessments in spot compression mammography via MC simulation; measurements of the entrance skin air kerma distribution in 2D mammography via radiochromic films; characterization of a scanner dedicated to 3D breast imaging.
- March 2014-
February 2017
Research within PhD course in Physics
Dept. of Physics "Ettore Pancini", Università di Napoli Federico II, Naples, Italy
Key Responsibilities: Image quality and dose assessment in 2D and 3D X-ray breast imaging; Monte Carlo code for dose assessment in X-ray breast imaging; assessment of phase-contrast breast images quality.

Teaching Activities

- 2022-present
Lecturer (Regular teacher), Laboratory of biomedical physics, Master degree in Physics
Dept. of Physics "Ettore Pancini", Università di Napoli Federico II, Naples, Italy

2018-2020	Teaching Assistant, Physics II – Electromagnetism and Optics, Bachelor degree in Physics Dept. of Physics “Ettore Pancini”, Università di Napoli Federico II, Naples, Italy
2015-2022	Teaching Assistant, Laboratory of biomedical physics, Master degree in Physics Dept. of Physics “Ettore Pancini”, Università di Napoli Federico II, Naples, Italy
2014-2015	Teaching Assistant, Physics with laboratory, Bachelor degree classes Dept. of Physics “Ettore Pancini”, Università di Napoli Federico II, Naples, Italy
2015-present	Thesis supervisor activities Dept. of Physics “Ettore Pancini”, Università di Napoli Federico II, Naples, Italy

Education, Training

Dec 13 th – 14 th , 2019	Big data, radiomics and artificial intelligence in healthcare Scuola Superiore di Fisica in Medicina P. Caldirola, Reggio Emilia, Italy
May 28 th – June 1 st , 2018	CHO Model Observer Workshop Katholieke University of Leuven, Leuven, Belgium
September 17 th – 19 th , 2018	3 rd MaXIMA Training School: “Applications of computer models for advancement of x-ray breast imaging techniques ” Napoli, Italy (In the framework of the MaXIMA: Three dimensional breast cancer models for X-ray imaging research – Horizon 2020 European Union funding for Research & Innovation.)
March 2014-February 2017	PhD Degree in Physics - PhD received on 25 th May 2017 Dept. of Physics “Ettore Pancini”, Università di Napoli Federico II, Naples, Italy <i>Thesis’ title: “Dose and image quality in X-ray phase contrast breast imaging”</i>
September 2017 – October 2017	Training course “Responsabile del servizio di prevenzione e protezione (RSPP) mod C” Join Academy & Consulting, Naples, Italy
July 12 th – 14 th , 2017	2 nd MaXIMA Training School: “Methods for breast tumour modelling and breast imaging” Varna, Bulgaria (In the framework of the MaXIMA: Three dimensional breast cancer models for X-ray imaging research – Horizon 2020 European Union funding for Research & Innovation.)
March 17 th , 2017	Course on “Scientific Writing” Italian Association of Medical Physics, <i>Napoli, Italy</i>
October 23 rd -28 th , 2016	GEANT4 school INFN, Belgrade, Serbia
January 28 th -30 th , 2016	School for Medical Physics Expert in “Computed tomography imaging: dosimetry, optimization and advanced clinical application” EFOM – European Federation of Organizations for Medical Physics, <i>Prague, Czech Republic</i>
June 17 th -19 th , 2014	LabVIEW Core 1 National Instrument, Naples, Italy
September 2011-September 2013	Master degree in Bioengineering (110 cum laude) Università di Napoli Federico II, Naples, Italy <i>Thesis’ title: “Measurement of the spatial resolution of a cone-beam CT scanner dedicated to the breast”</i>
September 2008-September 2011	Bachelor degree in Bioengineering (110 cum laude) Università di Napoli Federico II, Naples, Italy <i>Thesis’ title: “Spatial and temporal filtering for noise reduction in fluoroscopy”</i>

Professional Skills and Experience

- Overview**
- Fully proficiency in the field of 2D and 3D X-ray imaging and dosimetry;
 - Fully proficiency in developing micro cone-beam CT scanners;
 - Fully proficiency in assessing CT reconstruction algorithms performance;
 - Fully proficiency in developing Monte Carlo code for simulating X-ray based medical diagnostic scanners for dose estimates and parameters optimizations;
 - Fully proficiency in the use of RadioChromic films for dose measurements;
 - Fully proficiency in X-ray based medical scanners quality assessment;
 - Independent user of FDM 3D printers
 - Excellent aptitude in team working and in problem solving;
 - Excellent reliability in terms of duties and deadlines observance.

- Digital skills** Independent user of all applications concerning my activities. In particular advanced expertise in:
- Matlab;
 - Imagej;
 - GEANT4 toolkit;
 - C++ programming;
 - LABWindows/CVI National Instruments;
 - Office package;
 - Windows and Linux operating systems;
 - GGEMS (GPU based Geant4).

- Language proficiency**
- Italian: Native speaking
 - English: highly proficient in spoken and written English

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Interaction	Production	Production
B2	C1	B2	B2	C1

*CEFR descriptors

- Projects participation**
- MEDIPIX4 INFN project (2022 – today); *Role: Participant*. INFN project aiming at developing a single photon counting detector focusing to the use in applied physics and medicine.
 - Next-AIM INFN project (2022 – today); *Role: Participant*. INFN project aiming at exploiting Artificial Intelligence applications for medical purposes.
 - FRIDA INFN project (2022 – today); *Role: Participant*. INFN project aiming at developing technologies for flash radiotherapy.
 - PHENOMENO EU project under H2020-MSCA-RISE-2020 action GRANT AGREEMENT 101008020 (2021–present; *Role: Participant*. The project aimed at developing breast models for 3D breast imaging. I took part in the development of software for generation of breast models from MRI images and to the instruments for their use.
 - AGATA INFN project (2020-2021); *Role: PI and project responsible of the activities*. The project aims at producing a Monte Carlo based platform for in-silico clinical trials in x-ray breast imaging. I contributed in platform development and digital patient development as coordinator and PI of the project.
 - EFOMP Working group – Breast Tomosynthesis QC Protocol (May 2019 – present); *Role: Observer*. The rationale of the WG is to develop a QC protocol for DBT systems.
 - SYRMA-CT/SYRMA-3D INFN project (2014 – 2019); *Role: Participant*. The project aimed at producing the first dedicated CT scanner for imaging of a pendulant breast by adopting synchrotron radiation source and phase-contrast effects. I contributed in acquiring, elaborating and analysing measurements for scanner characterization and optimization.
 - MaXIMA EU twinning project (2016–2018); *Role: Participant*. The project aimed at developing breast models for 3D breast imaging. I took part in measurements run for material characterizations and contributed in developing 3D digital breast phantoms for X-ray breast imaging and dosimetry. I developed MC codes for the adoption of such models in dosimetry. I took part in a measurement run at the KU of Leuven (Belgium) for dosimetric assessment of clinical scanners for 2D and 3D X-ray breast imaging.
 - MC-INFN project (2018 – today); *Role: Local responsible of activities (2019, 2022-present) and participant*. The project gathers national expertise in MC simulations in medicine. I developed and validated Monte Carlo codes for dose and dose distribution estimates in breast imaging and therapy by adopting GEANT4 toolkit.
 - MARIX_RAD INFN project (2019 – 2021); *Role: Participant*. INFN project aiming at developing a Compton source. I am in charge of developing Monte Carlo simulations for studying the feasibility of breast cancer radiotherapy by means of the MARIX source.

- SR3T INFN project (2017 – 2020); *Role: Participant*. The project aims at developing a new technique for breast-cancer radio-therapy by adopting low energy (<180 keV) X-ray photon beams instead of photon beams with energies up to 6 MeV. I took part in preliminary measurements run at the Australian synchrotron and at the European Synchrotron Radiation Facility and developed the Monte Carlo code for simulations, both for dose distribution estimates and apparatus optimization.

Other relevant activities

Outreach

- Participant at the INFN project “A scuola di Astroparticelle III edizione 2018-19” as co-tutor for the activities of one high-school classes and as lecturer for the introductory course on the “Safety in working places”.
- Participant at the INFN project “A scuola di Astroparticelle II edizione 2017-18” as co-tutor for the activities of two high-school classes and as lecturer for the introductory course on the “Safety in working places”.
- Participant at the INFN project “Liceo Attivo – DNA chiavi in mano” as co-tutor for the activities of one high school class.

Congress organization

- Member of the organizing committee of the “IV Geant4 International User Conference at the Physics-Medicine-Biology frontier”, Napoli (Italy) 24th – 26th October 2022
- Member of the organizing committee of the “International Conference of Monte Carlo Techniques for Medical Applications – MCMA2017”, Napoli (Italy) 15th – 18th October 2017.

Participation at beamtimes at Synchrotron radiation facilities

- European Synchrotron Radiation Facility (ESRF), Grenoble, France: 1) February, 2017 (12 shifts – P.I. K. Bliznakova “Validation of complete software platform for phase-contrast breast tomosynthesis”), 2) July, 2016 (6 shifts – P.I. F. Di Lillo “Synchrotron radiation keV Rotational External Beam Radiotherapy for breast cancer (SR-keBRT): a feasibility study”).
- Australian Synchrotron (AS), Melbourne, Australia: August, 2017 (9 shifts – P.I. P. Russo “Breast cancer rotational radiotherapy with synchrotron radiation: energy optimization and study of contrast- and dose-enhancement effect”).
- ELETTRA Synchrotron Radiation Facility, Trieste, Italy: 1) September 2014 (6 shift – SYRMA-CT Project); 2) February 2021 (6 shift – P.I. A. Sarno “Measurement of phase and attenuation properties of materials for 3D printed patient-like phantoms at low photon energies for X-ray breast imaging investigations” Euro-Bioimaging funded project in the framework of AGATA INFN project).

Referee for the following international peer-reviewed journals

- Medical Physics;
- Physics in Medicine and Biology
- European Journal of Medical Physics- Physica Medica;
- Measurement Science and Technology;
- Biomedical Engineering Online;
- IEEE trans. on Radiation and Plasma Medical Sciences.
- European Journal of Radiology
- Scientific reports
- Radiation Physics and Chemistry

Editorial board member

- Associate editor of the *European Journal of Medical Physics – Physica Medica*
- Associate editor for the *international journal Radiation Physics and Chemistry*
- Member of the *Medical Physics Board of Associate Editors (MPBAE), AAPM*

Membership

- Istituto nazionale di fisica nucleare – INFN
- Associazione italiana di fisica medica – AIFM

Professional qualification

- Radiation Protection Expert Level 1
- RSPP

Presentations at conferences and schools

- Oral presentations**
- 1) Innovative models for dosimetry in x-ray breast imaging: impact of the glandular tissue distribution and breast silhouette, Congresso AIFM2023, Firenze (Italy) 8-11 Giugno 2023
 - 2) Cone-beam CT with collimated beam and exotic trajectory for quantitative imaging, European Congress of Radiology 2023, Vienna (Austria) 1-5 Marzo 2023
 - 3) Study of innovative approaches for 3D printed anthropomorphic phantoms for 2D and 3D x-ray breast imaging, European Congress of Radiology 2023, Vienna (Austria) 1-5 Marzo 2023
 - 4) Noise in accelerated in-silico x-ray breast images: impact on the breast anatomy and the detector, IV Geant4 International User Conference at the Physics-Medicine-Biology frontier, Napoli (Italy) 24-26 October 2022
 - 5) Empirical detector model for simulated breast exams with dedicated breast CT scanner, 16th International workshop on breast imaging – IWBI2022, Leuven (Belgium) 22-25 May 2022
 - 6) Noise and spatial resolution characteristics of a clinical Computed Tomography scanner dedicated to the breast, 16th International workshop on breast imaging – IWBI2022, Leuven (Belgium) 22-25 May 2022
 - 7) A fast GPU Monte Carlo code for Virtual Clinical trials in Breast Computed tomography, International Conference on Monte Carlo Techniques for Medical Applications – MCMA2022, Antwerp (Belgium), 11-13 April 2022
 - 8) A Model for a Linear a-Se Detector in Simulated X-Ray Breast Imaging with Monte Carlo Software, IEEE NSS/MIC conference 2021, virtual meeting Tokyo (Japan), 16-23 October 2021
 - 9) Evaluation of glandular dose distribution in 2D and 3D x-ray breast imaging, 3rd European Congress of Medical Physics 2020 - Turin (Italy) 16-19 June 2021
 - 10) AGATA: Advanced Geant4-based Application for in-silico clinical Trial in x-ray breast imaging, 3rd European Congress of Medical Physics 2020 - Turin (Italy) 16-19 June 2021
 - 11) Trials clinici virtuali: uno strumento innovativo per lo sviluppo e comparazione di scanner per l'imaging al tumore alla mammella. 106° congresso nazionale SIF, Broadcasted 14-18 settembre 2020
 - 12) A dataset of patient-derived digital breast phantoms for in-silico computed tomography dedicated to the breast, 6th International Conference on Image Formation in X-ray Computed Tomography, Regensburg (Germany) 3rd–7th August 2020
 - 13) Advanced Monte Carlo application for in-silico clinical trials in x-ray breast imaging, IWBI2020, Leuven (Belgium), broadcasted, 25th–28th May 2020
 - 14) Geant4 Monte Carlo calculation of normalized glandular dose coefficients in mammography, MCMA2019, Montreal (Canada), 19th–21st June 2019
 - 15) Personalised estimates of mean glandular dose and image quality investigations in cone-beam computed tomography dedicated to the breast, European congress of radiology 2019, Wien (Austria), 27th February–3rd March 2019.
 - 16) Dedicated cone-beam breast CT: a patient specific GEANT4 study, 3rd Geant4 international User Conference, Bordeaux (France), 29th–31st October 2019
 - 17) Rotational radiotherapy of breast cancer with synchrotron radiation microbeams, 3rd Geant4 international User Conference, Bordeaux (France), 29th–31st October 2019
 - 18) Rotational radiotherapy of breast cancer with a polyenergetic kilovoltage X-ray beam: a validated Monte Carlo study, 3rd Geant4 international User Conference, Bordeaux (France), 29th–31st October 2019
 - 19) 3D Dose distribution in two clinical digital breast tomosynthesis units: A phantom study, European Congress of Medical Physics, Copenhagen (Denmark), 23rd–25th August 2018.
 - 20) Normalized glandular dose coefficients in mammography, digital breast tomosynthesis and breast dedicated CT. Congresso nazionale fisica medica, AIFM congress, Bari 12th–15th April 2018.
 - 21) Homogeneous vs. patient specific breast models for Monte Carlo evaluation of mean glandular dose in mammography. International Conference on Monte Carlo techniques for medical applications MCMA 2017 Napoli (Italy), 15th–18th October 2017.
 - 22) Monte Carlo evaluation of glandular dose in cone-beam X-ray computed tomography dedicated to the breast: homogeneous and heterogeneous breast models. International Conference on Monte Carlo techniques for medical applications MCMA 2017 Napoli (Italy), 15th–18th October 2017.

- 23) Micro-focus cone-beam computed tomography dedicated to the breast, European congress of radiology 2017, Wien (Austria), 1st–5th March 2017.
- 24) Geant4 calculation of normalized glandular dose coefficients in computed tomography dedicated to the breast, I European congress of medical physics, Athens (Greece), 1st–3rd September 2016
- 25) Volume dose distribution in digital breast tomosynthesis: a phantom study, IEEE-Medical imaging conference 2016 Strasbourg (France), 25th October–5th November 2016.
- 26) Specification of a computed tomography dedicated to the breast with synchrotron radiation. 101° congresso nazionale SIF, Roma 21-25 settembre 2015

**Invited presentation
at international
conferences,
schools and
workshops**

- 1) Monte Carlo applications in x-ray breast imaging virtual clinical trials: Challenges in digital breast phantoms, detector model and computing time, Workshop II: Monte Carlo simulations in Medicine, Phenomeno H2020-MSCA-RISE-2020, 26 October 2022, University of Napoli "Federico II", Napoli (Italy)
- 2) Geant4 Medical Physics applications at University of Napoli "Federico II", IV Geant4 International User Conference at the Physics-Medicine-Biology frontier", Napoli (Italy) 24th – 26th October 2022
- 3) Breast CT and digital anthropomorphic breast models, Workshop I: Anthropomorphic models. Ethical issues in clinical studies, Phenomeno H2020-MSCA-RISE-2020, 4 February 2022, Medical University of Varna, Varna (Bulgaria)
- 4) Virtual clinical trials in breast imaging – Part II, XIII National Medical Physics and Biomedical Engineering Conference NMPEC-2020, Bulgaria, 2nd – 13th November 2020
- 5) Breast model validation for Monte Carlo evaluation of normalized glandular dose coefficients in mammography, 3rd MaXIMA Training School "Application of Computed Models for advancements of X-ray breast imaging technique", Naples 17th – 19th September 2018
- 6) 3D dose distribution in two clinical digital breast tomosynthesis units: a phantom study, 3rd MaXIMA Training School "Application of Computed Models for advancements of X-ray breast imaging technique", Naples 17th – 19th September 2018

Posters

- 1) The AGATA platform for Virtual Clinical Trials x-ray breast imaging: Detector model and anatomical noise validation in 2D mammography, International Conference on Monte Carlo Techniques for Medical Applications – MCMA2022, Antwerp (Belgium), 11-13 April 2022
- 2) Simulated detector characterization in x-ray breast imaging virtual clinical trials, 22nd International Workshop on Radiation Imaging Detector - IWORID 2021, 27 June – 1 July 2021
- 3) Kilovoltage rotational breast radiotherapy with the BriXS source, 15th Topical Seminar on Innovative Particle and Radiation Detectors – IPRD19, 2019, Siena (Italy)
- 4) Monte Carlo Evaluation of Normalized Glandular Dose Coefficients in Mammography, International workshop of digital mammography 2016, Malmo (Sweden).
- 5) A framework for iterative reconstruction in phase-contrast computed tomography dedicated to the breast, IEEE- Medical imaging conference 2016, Strasbourg (France).
- 6) In-line phase contrast tomography of the breast with a dedicated micro-CT scanner, IEEE- Medical imaging conference 2016, Strasbourg (France).
- 7) Performance of the MediPROBE Compact Gamma Camera for Coded Aperture Imaging, IEEE- Medical imaging conference 2016, Strasbourg (France).
- 8) Image quality in synchrotron radiation breast CT, Congresso AIFM 2016, Perugia (Italy)
- 9) Phase-contrast mammography and tomography with a microfocus X-ray source, WSIImaging 2014, Trieste (Italy).

Publications

**Peer reviewed
papers**

- 1) Cerbone LA...**Sarno A** et al, Monte Carlo and experimental evaluation of a Timepix4 compact gamma camera for coded aperture nuclear medicine imaging with depth resolution, Phys Med, under review
- 2) Maddaloni FS, **Sarno A** et al, Patient-specific Monte Carlo-based organ dose estimates in spiral CT via optical 3D body scanning and adaptation of a voxelized phantom dataset: proof-of-principle, Phys Med Biol (2023), 68:084002
- 3) **Sarno A** et al. Physical and digital phantoms for 2D and 3D x-ray breast imaging: Review on the state-of-the-art and future prospects. Radiat Phys Chem (2022), 110715:.

- 4) Mettievier G, **Sarno A** et al. Attenuation coefficient in the energy range 14–36 keV of 3D printing materials for physical breast phantoms. *Phys Med Biol* (2022), 67:175012.
- 5) Varallo A, **Sarno A** et al, Fabrication of 3D printed patient-derived anthropomorphic breast phantoms for mammography and digital breast tomosynthesis: Imaging assessment with clinical X-ray spectra. *Phys Med* (2022), 98:88-97.
- 6) **Sarno A** et al, Comparisons of glandular breast dose between digital mammography, tomosynthesis and breast CT based on anthropomorphic patient-derived breast phantoms, *Phys Med* (2022), 97:50-58.
- 7) Mettievier G, **Sarno A** et al, Virtual Clinical Trials in 2D and 3D X-ray Breast Imaging and Dosimetry: Comparison of CPU-Based and GPU-Based Monte Carlo Codes, *Cancers* (2022), 14:1027.
- 8) Valero C, **Sarno A** et al, On the suitability of XR-SP2 gafchromic films for dosimetry in mammography, *Radiat Phys Chem* (2022), 197:110154.
- 9) **Sarno A** and Tucciariello RM, Simulated sensor characterization for virtual clinical trials in mammography and digital breast tomosynthesis. *JINST* (2022), C01041.
- 10) Tudda A... **Sarno A** et al, Breast radiotherapy with kilovoltage photons and gold nanoparticles as radiosensitizer: an in vitro study X-ray Breast radiotherapy with AuNP, *Med Phys* (2021), 49: 568-578.
- 11) Ricciardi R... **Sarno A** et al, A deep learning classifier for digital breast tomosynthesis. *Phys Medica* (2021), 83:184–193.
- 12) **Sarno A** et al, Dataset of patient-derived digital breast phantoms for in-silico studies in breast computed tomography, digital breast tomosynthesis and digital mammography, *Med Phys* (2021), 48:2682–2693.
- 13) Centracchio J, **Sarno A** et al, Efficient automated localization of ECoG electrodes in CT images via shape analysis, *Int J Comput Ass Rad* (2021), 16:543-554.
- 14) **Sarno A** et al, Normalized glandular dose coefficients for digital breast tomosynthesis systems in craniocaudal view with a homogeneous breast model, *Phys Med Biol* (2021), 065024
- 15) Iuppariello L... **Sarno A** et al, A CT-based method to compute femur remodelling after total hip arthroplasty, *Comput Method Biomec* (2020), 9:1–10.
- 16) Cardarelli P... **Sarno A** et al, BriXS, a new X-ray inverse Compton source for medical applications, *Phys Medica* (2020), 77:127–137.
- 17) Mettievier G... **Sarno A**, et al In-line Phase Contrast Mammography, Phase Contrast Digital Breast Tomosynthesis and Phase Contrast Breast Computed Tomography with a Dedicated CT Scanner and a Microfocus X-ray tube: Experimental Phantom Study, *IEEE Trans Rad Pl Med Sc* (2020), 5:793-806.
- 18) di Franco F, **Sarno A** et al, GEANT4 Monte Carlo simulations for virtual clinical trials in breast X-ray imaging: Proof of concept, *Phys Medica* (2020), 74:133–142.
- 19) Mettievier G... **Sarno A** et al, Radiochromic film dosimetry in synchrotron radiation breast computed tomography: a phantom study, *J Synchrotron Radiat* (2020), 27.
- 20) **Sarno A** et al, Kilovoltage rotational radiotherapy of breast cancer with the BriXS source, *JINST* (2020), 15:C05012.
- 21) Russo P... **Sarno A** et al, CdTe compact gamma camera for coded aperture imaging in radioguided surgery, *Phys Medica* (2020), 69:223–232
- 22) **Sarno A** et al, Real-time algorithm for Poissonian noise reduction in low-dose fluoroscopy: performance evaluation, *BioMed Eng OnLine* (2019), 18:94.
- 23) Drebot I... **Sarno A** et al, BriXS Ultra High Flux Inverse Compton Source Based on Modified Push-Pull Energy Recovery Linacs, *Instruments* (2019), 3:49.
- 24) Bliznakova K... **Sarno A** et al, Development of breast lesions models database, *Phys Medica* (2019), 64:293–303.
- 25) **Sarno A** et al, Monte Carlo calculation of monoenergetic and polyenergetic DgN coefficients for mean glandular dose estimates in mammography using a homogeneous breast model, *Phys Med Biol* (2019), 64:125012.
- 26) Panetta D... **Sarno A** et al, Numerical simulation of novel concept 4D cardiac microtomography for small rodents based on all-optical Thomson scattering X-ray sources, *Sci Rep* (2019), 9:8439.

- 27) Longo R... **Sarno A** et al, Advancements towards the implementation of clinical phase-contrast breast computed tomography at Elettra, *J Synchrotron Radiat* (2019), 26.
- 28) Serafini L... **Sarno A** et al, MariX, an advanced MHz-class repetition rate X-ray source for linear regime time-resolved spectroscopy and photon scattering, *Nucl Instr Meth A* (2019), 930:167–172.
- 29) Buonanno F, **Sarno A** et al, Rotational radiotherapy of breast cancer with polyenergetic kilovoltage X-ray beams: An experimental and Monte Carlo phantom study, *Phys Medica* (2019), 62:63–72.
- 30) Esposito G... **Sarno A** et al, Investigation of the refractive index decrement of 3D printing materials for manufacturing breast phantoms for phase contrast imaging, *Phys Med Biol* (2019), 64:075008.
- 31) **Sarno A** et al, Normalized glandular dose coefficients in mammography, digital breast tomosynthesis and dedicated breast CT, *Phys Medica* (2018), 55:142–148.
- 32) **Sarno A** et al, Monte Carlo evaluation of glandular dose in cone-beam X-ray computed tomography dedicated to the breast: Homogeneous and heterogeneous breast models, *Phys Medica* (2018), 51:99–107.
- 33) **Sarno A** et al, Homogeneous vs. patient specific breast models for Monte Carlo evaluation of mean glandular dose in mammography, *Phys Medica* (2018), 51:56–63.
- 34) Ivanov D... **Sarno A** et al, Suitability of low density materials for 3D printing of physical breast phantoms, *Phys Med Biol* (2018), 63:175020–14.
- 35) Di Lillo F... **Sarno A** et al, Synchrotron radiation external beam rotational radiotherapy of breast cancer: proof of principle, *J Synchrotron Radiat* (2018), 25:857–868.
- 36) Di Lillo F... **Sarno A** et al, Towards breast cancer rotational radiotherapy with synchrotron radiation, *Phys Medica* (2017), 41:20–25.
- 37) **Sarno A** et al, Dose Volume Distribution in Digital Breast Tomosynthesis: a Phantom Study, *Trans Rad Pl Med Sc* (2017), 1:322–328.
- 38) **Sarno A** et al, A Monte Carlo model for mean glandular dose evaluation in spot compression mammography, *Med Phys* (2017), 44:3848–3860.
- 39) Delogu P... **Sarno A** et al, Imaging study of a phase-sensitive breast CT system in continuous acquisition mode, *JINST* (2017), 12:C01016.
- 40) **Sarno A** et al, A framework for iterative reconstruction in phase-contrast computed tomography dedicated to the breast, *Trans Rad Pl Med Sc* (2017), 1:505–510.
- 41) **Sarno A** et al, A Monte Carlo study of monoenergetic and polyenergetic normalized glandular dose (DGN) coefficients in mammography, *Phys Med Biol* (2017), 62:306–325.
- 42) Mettievier G... **Sarno A** et al, Evaluation of the “Breast Simulator” software platform for breast tomography, *Phys Med Biol* (2017), 62:6446–6466.
- 43) **Sarno A** et al, Air kerma calculation in Monte Carlo simulations for deriving normalized glandular dose coefficients in mammography, *Phys. Med Biol.* (2017), 62:N337–N349.
- 44) **Sarno A** et al, Monte Carlo Evaluation of Normalized Glandular Dose Coefficients in Mammography, In: *International Workshop on Digital Mammography*. Springer International Publishing (2016) 190.
- 45) Mettievier G... **Sarno A** et al, Evaluation of the BreastSimulator Software Platform for Breast Tomography: Preliminary Results, In: *International Workshop on Digital Mammography*. Springer International Publishing (2016) 145.
- 46) **Sarno A** et al, Cone-beam micro computed tomography dedicated to the breast, *Med Eng Phys* (2016), 38:1449–1457.
- 47) **Sarno A** et al, Imaging performance of phase-contrast breast computed tomography with synchrotron radiation and a CdTe photon-counting detector, *Phys Medica* (2016), 32:681–690.
- 48) Longo R... **Sarno A** et al, Towards breast tomography with synchrotron radiation at ELETTRA: first images, *Phys Med Biol* (2016), 61:1634–1649.
- 49) Mettievier G... **Sarno A** et al, Glandular dose in breast computed tomography with synchrotron radiation, *Phys Med Biol* (2016), 61:569–587.
- 50) Di Lillo F... **Sarno A** et al, Energy dependent calibration of XR-QA2 radiochromic film with monochromatic and polychromatic X-rays beams, *Med Phys* (2016), 43:583–588.
- 51) **Sarno A** et al, Dedicated breast computed tomography: basic aspects, *Med Phys* (2015), 42:2786–2804.

Conference proceedings

- 1) **Sarno A** et al, Noise and spatial resolution characteristics of a clinical computed tomography scanner dedicated to the breast, 16th Intern Workshop on Breast Imaging (IWBI2022). Vol. 12286, pp. 297-304. SPIE, 2022.
- 2) **Sarno A** et al, Empirical detector model for simulated breast exams with a dedicated breast CT scanner, 16th Intern Workshop on Breast Imaging (IWBI2022). Vol. 12286, pp. 23-28. SPIE, 2022.
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Patents

- 1) Sarno A and Andreozzi E (2022), Sistema per il tracciamento delle interazioni tra soggetti, Brevetto Italiano N. 10202000013369, Ufficio Italiano Brevetti e Marchi.
- 2) Brevetto nazionale in corso di valutazione con prima relazione non negativa con priorità 20/06/2022 n. 102022000012341 “Scanner CT”. L’invenzione propone una geometria innovativa di scansione in Cone-Beam CT per il miglioramento della qualità dell’immagine
- 3) Brevetto internazionale presentato per estensione PCT n. PCT/2023/055989 in data 10/06/2023 “Scanner CT”. L’invenzione propone una geometria innovativa di scansione in Cone-Beam CT per il miglioramento della qualità dell’immagine

Grant & Prizes

- 1) The INFN (Italy) fully funded the AGATA project (P.I. Antonio Sarno) via an individual grant of 164,600 € for two years (2020-2021).
- 2) The submission to the European congress of radiology 2017 “Micro-focus cone-beam computed tomography dedicated to the breast” was elected in the “Rising stars” section of the congress as one of the best 32 abstracts of the section.
- 3) The oral presentation at MCMA 2017 “Monte Carlo evaluation of glandular dose in cone-beam X-ray computed tomography dedicated to the breast: homogeneous and heterogeneous breast models” was selected for a special issue in the European Journal of Medical Physics – Physica Medica.
- 4) The oral presentation at MCMA 2017 “Homogeneous vs. patient specific breast models for Monte Carlo evaluation of mean glandular dose in mammography” was selected for a special issue in the European Journal of Medical Physics – Physica Medica.
- 5) The oral presentation at AIFM congress 2018 “Normalized glandular dose coefficients in mammography, digital breast tomosynthesis and breast dedicated CT” was selected for a special issue in the European Journal of Medical Physics – Physica Medica.

Funded Projects

- 1) AGATA (Advanced GeAnt4-based platform for virtual clinical Trials in X-ray breast imaging) funded by the Italian National Institute for Nuclear Physics (INFN) for 2 years (2020-2021) for 164.600,00 € per 2 anni. The project proposed the development of a platform for virtual clinical trials in x-ray breast imaging
- 2) Q-CT (Non-circular trajectory and collimated beam towards quantitative Cone-beam Computed Tomography) funded by the Italian Ministry of the University in the call “PRIN 2022” for 250.419,00 € for 2 anni. The project investigates an innovative scanning geometry in cone-beam CT for quantitative evaluations.
- 3) “Measurement of phase and attenuation properties of materials for 3D printed patient-like phantoms at low energy for x-ray breast imaging investigations (PID: 117)” funded by Eurobioimaging ERIC which granted the access to the beamline SYRMEP at the ELETTRA synchrotron facility (Trieste, Italia). Allocated time 72 h, 4 – 6 February 2021. The project permitted to evaluate attenuation and phase properties of 3D printing materials for manufacturing breast phantoms. Estimated project cost: 28.800,00 € (400 €/h × 72 h)

Bibliographic indices

Number of publications: 68 (Source: Scopus on 25/07/2023)

Total citations: 1012 (Source: Scopus on 25/07/2023)

H-index: 19 (Source: Scopus on 25/07/2023)

*National academic qualification as “Associated professor” in Applied Physics awarded in 2020.
Abilitazione scientifica nazionale professore di II Fascia per il settore concorsuale 02/D1, Anno
conseguimento: 2020.*

*National academic qualification as “Full professor” in Applied Physics awarded in 2022
Abilitazione scientifica nazionale professore di I Fascia per il settore concorsuale 02/D1, Anno
conseguimento: 2022.*

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July 29th, 2023

A handwritten signature in black ink that reads "Antonio Sarno". The signature is written in a cursive, flowing style.