



# Lorenzo Manganaro

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## ● WORK EXPERIENCE

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01/2023 – CURRENT

**SENIOR DATA SCIENTIST, TECHNICAL LEADER** AIZOON TECHNOLOGY CONSULTING S.R.L.

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Coordination of research projects in AI/ML and bioinformatics in the health and precision medicine domains, applications to new calls for tenders and technical offer to customers

Turin, Italy

**FACULTY MEMBER** UNIVERSITY OF TURIN

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Teaching (Introduction to Machine Learning for Precision Oncology course): International PhD Programme in Translational Oncology

10/2021 – 12/2022

**SENIOR DATA SCIENTIST** AIZOON TECHNOLOGY CONSULTING S.R.L.

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Coordination of research projects in AI/ML and bioinformatics in the health and precision medicine domains

10/2018 – 10/2021

**DATA SCIENTIST** AIZOON TECHNOLOGY CONSULTING S.R.L.

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Research in AI/ML and bioinformatics applied to precision medicine and healthcare in general

2016 – 2019 Turin, Italy

**TEACHING ASSISTANT** UNIVERSITY OF TURIN

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Assistant professor of the applied physics course, supporting teaching and written/oral examinations

2016 – 2018

**PROFESSOR (PHYSICS)** DOTTO - FORMAZIONE A TUTTO TONDO

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Physics course

2018

**COLLABORATOR** VIDEDELTA S.R.L.

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Scientific supervision of the Italian version of the documentary: "Masters of Engineering"

05/2017 – 11/2017 Boston, MA, United States

**RESEARCHER** MASSACHUSETTS GENERAL HOSPITAL

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Research in the field of spatiotemporal optimisation of prostate proton therapy treatments

2015 – 2017 Turin, Italy

**TEACHING ASSISTANT** UNIVERSITY OF TURIN

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I held the course of introductory physics for biologist at the "Life Sciences and Systems Biology" department

01/2013 – 07/2013

**RESEARCHER** PLASMA NANO-TECH, ENVIRONMENT PARK S.P.A.

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Research in the field of OES spectroscopy: plasma-torch HDMSO-based SiO<sub>x</sub> film deposition

2011 – 2014

**COLLABORATOR** PUNTOACAPO S.R.L.

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I conceived the exercises to be included in high school textbooks and workbooks (physics and mathematics)

## ● **EDUCATION AND TRAINING**

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2022 Turin, Italy

**DEEPHEALTH: DL AND HPC TO BOOST BIOMEDICAL APPLICATIONS FOR HEALTH** The Deep Health project

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10/2015 – 01/2019 Turin, Italy

**PH.D. IN PHYSICS AND ASTROPHYSICS** University of Turin

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**Address** Via Giuseppe Verdi, 8, 10124, Turin, Italy

2018 Italy

**COMPUTATIONAL SOCIAL SCIENCE & COMPLEX SYSTEMS** Italian Physics Society (SIF)

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2016 Pavia, Italy

**HADRONTHERAPY SCHOOL** National Center for Oncological Hadrontherapy

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**Address** Via Emilio Borloni, 1, 27100, Pavia, Italy

2016 Italy

**XIII SEMINAR ON SOFTWARE FOR NUCLEAR, SUBNUCLEAR & APPLIED PHYSICS** National Institute for Nuclear Physics (INFN)

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**Final grade** A

09/2013 – 07/2015 Turin, Italy

**MASTER'S DEGREE IN PHYSICS (LM-17)** University of Turin

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**Address** Via Giuseppe Verdi, 8, 10124, Turin, Italy **Field of study** Fisica Medica **Final grade** Summa cum Laude |

**Thesis** Stochastic modelling of spatial and temporal correlations of the dose delivery structure in particle therapy: from radiobiological evaluations to treatment planning

09/2010 – 07/2013 Turin, Italy

**BACHELOR DEGREE IN PHYSICS (L-30)** University of Turin

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**Address** Via Giuseppe Verdi, 8, 10124, Turin, Italy **Final grade** Summa cum Laude |

**Thesis** Deposition of nanometric films of silicon oxide (SiO<sub>x</sub>): correlation between OES spectroscopy and surface characterization

09/2005 – 07/2010 Turin, Italy

**SCIENTIFIC DIPLOMA** Istituto Sociale, Turin

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**Address** Corso Siracusa, 10, 10136, Turin, Italy **Final grade** 97/100

## ● **HONOURS AND AWARDS**

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2016

**Scholarship – Compagnia di San Paolo**

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Scholarship awarded to fund the Ph.D. studies

2011

**Marco Polo project grant – Regione Piemonte and CRT Foundation**

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Awarded to reward students who have distinguished for academic achievements during the first academic year

18/03/2024

IOP Trusted Reviewer – IOP Publishing

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## ● PUBLICATIONS

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### [The true latency of biomedical research papers](#)

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**L. Manganaro**

*Scientometrics* 2024, ePub ahead of print

### [Non-small cell lung cancer survival estimation through multi-omic two-layer SVM: A multi-omics and multi-sources integrative model](#)

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**L. Manganaro**, G. Sabbatini, S. Bianco, P. Bironzo, C. Borile, D. Colombi, P. Falco, L. Primo, S. Vattakunnel, F. Bussolino and G.V. Scagliotti

*Curr. Bioinform.* 2023, **18(8)**:658-669

### [Consensus clustering methodology to improve molecular stratification of non-small cell lung cancer](#)

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**L. Manganaro**, S. Bianco, P. Bironzo, F. Cipollini, D. Colombi, D. Corà, G. Corti, G. Doronzo, L. Errico, P. Falco, L. Gandolfi, F. Guerrero, V. Monica, S. Novello, M. Papotti, S. Parab, A. Pittaro, L. Primo, L. Righi, G. Sabbatini, A. Sandri, S. Vattakunnel, F. Bussolino and G.V. Scagliotti

*Sci Rep* 2023, **13**:7759

### [On potential limitations of differential expression analysis with non-linear machine learning models](#)

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G. Sabbatini and **L. Manganaro**

*EMBnet.journal* 2023, **28**:e135

### [Clinical-Molecular Prospective Cohort Study in Non-Small Cell Lung Cancer \(PROMOLE study\): A Comprehensive Approach to Identify New Predictive Markers of Pharmacological Response](#)

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P. Bironzo, L. Primo, S. Novello, L. Righi, S. Candeloro, **L. Manganaro**, F. Bussolino, F. Pirri and G.V. Scagliotti  
*Clin Lung Cancer* 2022, **23(6)**:e347–352

### [Spatiotemporal optimisation of prostate intensity modulated proton therapy \(IMPT\) treatments](#)

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**L. Manganaro**, A. Attili, T. Bortfeld and H. Paganetti

*Phys Med Biol* 2022, **67(4)**:045005

### [RIDOS: A new system for online computation of the delivered dose distributions in scanning ion beam therapy](#)

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S. Giordanengo, A. Vignati, A. Attili, M. Ciocca, M. Donetti, F. Fausti, F. Mas-Milian, **L. Manganaro**, S. Molinelli, V. Monaco, G. Russo, R. Sacchi, M. Varasteh and R. Cirio

*Physica Medica* 2019, **60**:130-149

### [Single Event Upset tests and failure rate estimation for a front-end ASIC adopted in high-flux-particle therapy applications](#)

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F. Fausti, G. Mazza, S. Giordanengo, O. Hammad-Ali, **L. Manganaro**, V. Monaco, R. Sacchi and R. Cirio

*Nucl Instr Meth Phys Res A* 2019, **918**:54–59

### [Radiobiological quantities in proton-therapy: Estimation and validation using Geant4-based Monte Carlo simulations](#)

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G. Petringa, L. Manti, L. Pandola, A. Attili, F. Cammarata, G. Cuttone, **L. Manganaro**, J. Pipek, P. Pisciotta, F. Romano, G. Russo, G. Antonio and P. Cirrone  
*Physica Medica* 2019, **58**:72–80

### **"Survival": a simulation toolkit introducing a modular approach for radiobiological evaluations in ion beam therapy**

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**L. Manganaro**, G. Russo, F. Bourhaleb, F. Fausti, S. Giordanengo, V. Monaco, R. Sacchi, A. Vignati, R. Cirio, and A. Attili  
*Phys Med Biol* 2018, **63**:08NT01

### **Tumour control in ion beam radiotherapy with different ions in presence of hypoxia: an oxygen enhancement ratio model based on the microdosimetric kinetic model**

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L. Strigari, F. Torriani, **L. Manganaro**, T. Inaniwa, F. Dalmaso, R. Cirio and A. Attili  
*Phys Med Biol* 2018, **63**:065012

### **A Monte Carlo approach to the microdosimetric kinetic model to account for dose rate time structure effects in ion beam therapy with application in treatment planning simulations**

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**L. Manganaro**, G. Russo, R. Cirio, F. Dalmaso, S. Giordanengo, V. Monaco, S. Muraro, R. Sacchi, A. Vignati and A. Attili  
*Med Phys* 2017, **44(4)**:1577–1589

### **Review of technologies and procedures of clinical dosimetry for scanned ion beam radiotherapy**

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S. Giordanengo, **L. Manganaro** and A. Vignati  
*Physica Medica* 2017, **43**:77–79

### **Design and characterization of a 64 channels ASIC front-end electronics for high-flux particle beam detectors**

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F. Fausti, G. Mazza, A. Attili, A. Fadavi-Mazinani, S. Giordanengo, M. Lavagno, **L. Manganaro**, F. Marchetto, V. Monaco, R. Sacchi, A. Vignati and R. Cirio  
*Nucl Instr Meth Phys Res A* 2017, **867**

### **Control of the dose distribution in charged particle therapy**

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**L. Manganaro**, A. Attili, F. Dalmaso, F. Fausti, S. Giordanengo, G. Mazza, V. Monaco, R. Sacchi, A. Vignati and R. Cirio  
in **Proceedings of The 26th International Nuclear Physics Conference INPC2016**, *PoS Proc Sci* 2017, **281**: 123

### **Investigation of the use of inhomogeneous fractional dose distributions in IMPT to improve the therapeutic index**

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**L. Manganaro**, G. Russo, F. Dalmaso, F.M. Milian, F. Bourhaleb, R. Cirio, and A. Attili  
*Radiother Oncol* 2016, **118**(suppl.1):S69

### **Advanced modeling of the temporal effects in particle therapy: from radiobiological evaluations to treatment planning**

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A. Attili, **L. Manganaro**, F. Dalmaso, G. Russo, S. Giordanengo, A. Vignati and F. Bourhaleb  
in **Proceedings to the 54th Annual Meeting for the Particle Therapy Cooperative Group (PTCOG) and the 2nd Annual Meeting of PTCOG – North America**, *Int J Part Ther* 2015, **2(1)**:55–365

## ● **PATENTS**

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### **Procedimento per monitorare e controllare lo stato di funzionamento di un impianto industriale, relativo sistema di elaborazione e prodotto informatico**

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Manganaro L, Sabbatini G, Falco P

IT Patent No. 102024000010975 filed May 15, 2024. Patent pending.

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**Procedimento per fornire un supporto a decisioni cliniche, relativo sistema di supporto alle decisioni cliniche e prodotto informatico**

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Manganaro L, Sabbatini G, Bianco S, Cipollini F, Colombi D, Vattakunnel S, Falco P

IT Patent No. 102022000015624 filed Lug 25, 2022. Patent pending.

(Process for providing a support to clinical decisions, related clinical decision support system and informatic product)

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**Procedimento per stimare una variabile di interesse associata ad una data malattia in funzione di una pluralità di diversi dati omici di un paziente**

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Manganaro L, Sabbatini G, Bianco S, Cipollini F, Colombi D, Vattakunnel S, Falco P

IT Patent No. 102022000005861 filed Mar 24, 2022. Patent pending.

(Method for estimating an interest variable associated with a given disease from a plurality of a patient's omic data)

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**Procedimento per la prognosi di una malattia in seguito ad un trattamento terapeutico, relativo sistema e prodotto informatico**

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Manganaro L, Sabbatini G, Bianco S, Cipollini F, Colombi D, Vattakunnel S, Falco P

IT Patent No. 102022000001817 filed Feb 2, 2022. Patent pending.

(Method for the prognosis of a given disease following a therapeutic treatment, including informatic system and product)

- **MASTER'S THESIS (AS SUPERVISOR/CO-SUPERVISOR)**

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**Development of an XAI (eXplainable Artificial Intelligence) approach for the interpretation of histological classification models of non-small cell lung cancer (NSCLC)**

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Candidate: Elio Pusceddu

Supervisor: Matteo Osella

Co-supervisor: Lorenzo Manganaro

Academic year: 2021-2022

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**Algoritmi di machine learning per l'analisi in sopravvivenza di non-small cell lung cancer**

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Candidate: Gianmarco Sabbatini

Supervisor: Michele Caselle

Co-supervisor: Lorenzo Manganaro

Academic year: 2019-2020

- **CERTIFICATIONS**

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12/06/2023

**SMC - SCRUM Master Certified**

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Released by: SCRUMstudy

24/11/2022

**ISIPM - Base**

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Released by: Istituto Italiano di Project Management (ISIPM)

08/02/2010

**FCE - First Certificate in English**

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Level: B2

**European Computer Driving License (ECDL)**

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## ● LANGUAGE SKILLS

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Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## ● DIGITAL SKILLS

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### Programming

SQL | bash | awk | Mathematica | R | C++ | Java | Python

### IDE/Environments

Anaconda | Docker | Eclipse | RStudio | Jupyter | MLOps

### Operating Systems

Linux | S. O. macOS | Windows

### Repository

GitHub | GitLab | Git

### Other

Microsoft Office (Outlook, Excel, Word, PowerPoint) | LaTeX

### Bioinformatics

GATK | pindel | samtools | bwa | snakemake | Picard | RSEM | bedtools | STAR | Bioconductor

F.TO

Lorenzo Manganaro