

Alessandra Lombardi

Curriculum vitae

July 2024

Born on [REDACTED]

**PROFESSIONAL EXPERIENCE**

1992-present	Fellow (1992-1995) and Staff Member (1995 onwards) at CERN. Indefinite contract granted in 2002, Senior staff since July 2015
1889-1991	Graduate Research Assistant at Los Alamos National Laboratories
From Oct 2014	Leader of the section 'Hadron Sources and LINACS' composed of 10 staff members and 15 temporary staffs
2010-2016	LINAC4 deputy project leader
2017-2020	LINAC4 project leader
2005-2008	Deputy coordinator of the European Program HIPPI (High Intensity Proton Pulsed Injectors) in the framework of CARE
April 2000 to January 2003	Leader of the section "Beam dynamics and linear accelerator design" in the Particle Production group. The section was composed of two staff members and eight temporary staff.

**ACTIVITIES AT CERN (1992-present)**

2016-present	Designer of a compact low power acceleration system, based on high frequency RadioFrequencyQuadrupole to produce a 2MeV proton beam for use in artistic diagnostics (PIXE,PIGE). Design of low energy pre-injectors for societal applications.
2018-2022	Responsible for LINAC4 beam quality and particle source optimization. Conception and realization of a novel source extraction system to maximise beam quality (emittance and intensity)
2013-present	<u>in the medical accelerator study group</u> : designer of LINACs for medical purposes. This entailed the conception and definition of a compact and efficient 750MHz RFQ, as injector for a new-generation hadron-therapy facility. This novel RFQ design was granted a patent.
2010-2020	<u>in the LINAC4 project</u> : holder of 3 work-packages, , LINAC4 (deputy) project leader, and beam performance coordinator. This entailed the procurement of 130 Permanent Magnet Quadrupoles for the Drift Tube LINAC, the definition of the commissioning strategy and the preparation of the commissioning. Leader of the beam commissioning, successfully completed in 2016.
2003-2010	<u>in the SPL/LINAC4 project</u> : coordination of beam dynamics activities for the entire accelerator (LINAC4 to 160MeV and SPL up to 5 GeV).This entailed the definition of the focusing and accelerating elements of the LINAC and its transfer lines to determine the reference layout. A novel concept of chopping was introduced, which allowed reducing the need for a high voltage on the plates. On the reference layout sensitivity studies have been run in view of defining the machine error tolerances and the map of the losses for radioprotection studies.
2003-2005	<u>in the LHC beam optics team</u> : responsible for the field quality specification of the LHC short straight sections, including the main quadrupoles and the lattice correctors. Responsible for the optics of the interaction point IR8.

1999-2002	<u>in the Neutrino Factory Working Group (NFWG)</u> : designed a system for the collection, cooling and acceleration of muons which allows achievement of very high neutrino fluxes. The system was adopted as the CERN reference scenario. Participation and coordination of beam dynamics studies for a Muon Cooling Experiment (MICE).
1996-2000	<u>in the Radio Frequency Quadrupole Decelerator (RFQ-D) project</u> : provided beam-dynamics design for a system capable of decelerating 5 MeV antiprotons to a pre-selected energy (in the range 10-120 keV); design of measurements lines to validate the decelerator performance and flexibility; The RFQ-D is in operation since November 2000.
1994-1996	<u>in the Automated Beam Steering (ABS) project</u> : optics study of the LINAC-to-BOOSTER transfer line in the framework of ABS led to a redefinition of the transverse beam optics which improved the performance of the PS complex with respect to steering sensitivity and current limit.
1994-1996	<u>in the Laser Ion Source (LIS) project</u> : designed a Radio Frequency Quadrupole (RFQ) for a 10mA lead-ion beam to inject in the Interdigital H structure of LINAC3; followed up of the vane profile machining with the workshop and, participated in the RFQ commissioning with an equivalent proton beam. The theoretical expectations were fully met at the test stand.
1993-1994	<u>in the CERN HEAVY ION FACILITY (LINAC3 Project)</u> : study of the effect of higher order multipoles in the RFQ and modifications to the vane profile to minimize their effect; end-to-end simulation from the RFQ input to the IH input; participation in the setting up and running in of the LINAC and, participation in several machine development sessions to improve the overall performance of the LINAC complex.
1992-1993	<u>in the RFQ2 Project</u> : beam dynamics calculations, test-stand measurements and their analysis; study and optimization of the LINAC2 with the new injector; participation to the re-commissioning of the LINAC2 and, participation in several machine development sessions to increase the performance of LINAC2, first stage of the proton accelerator chain working reliably since 20 years.

Other activities include:

1995-present	Main driver for the development of design and beam-dynamics codes for linear accelerators and transfer lines. The main additions include space charge routines, error studies modules to define machining tolerances and interface with accelerator operation.
1995-present	Reference person in the collaboration with laboratories and universities in Europe and the United States on the themes of LINAC design and commissioning and code development.
1997-2013	Lecturer at the Joint University Accelerator School (JUAS).
2005,2014	Lecturer at CERN Accelerator School.
2012-2013	Lecturer at Second level master in hadron therapy at University of Pavia.
2002-2011	Member of the ICFA beam dynamics panel.

## CURRICULUM VITAE

Serge Mathot

Nationality :

Activity :

Applied Physicist at CERN since September 1995. Technical coordinator of the CLOUD experiment <http://cloud.web.cern.ch/cloud> until 01/2024.

CERN responsible of the PIXE-RFQ / MACHINA project: CERN/INFN international collaboration for the development of a transportable accelerator for the analysis of cultural heritage artworks.

ELISA project leader, a compact proton accelerator for physics demonstration at Science Gateway.

Formation :

**Post-Doctorat :**

(02/94 – 08/95) - Institute for Reference Materials and Measurements  
Commission of the European Communities, Joint Research Center, Geel (Belgique)

Subject: Hydrogen Depth Profile Analysis by using a Nitrogen Ion Beam.

(03/92 – 01/94) - Laboratoire d'Analyses par Réactions Nucléaires, Facultés Universitaires Notre-Dame de la Paix à Namur (Belgique)

Subject: Etude d'alliages Au-Ag et Au-Al. Réalisation d'une chambre UHV pour la modification de polymères organiques par irradiation de protons.

**Doctorat en Sciences Physiques :**

(07/98 – 02/92) - Facultés Universitaires Notre-Dame de la Paix à Namur

Mention : La plus grande distinction.

Dissertation : Etude et production de soudures par diffusion de silicium dans l'or.

Thèse annexe : Des polymères aux silicium pourraient avoir été conçus il y a 4500 ans.

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## **Francesco Taccetti – Curriculum**

ORCID: <https://orcid.org/0000-0003-2657-2990>

Dirigente tecnologo presso la Sezione INFN di Firenze, autore di circa 100 pubblicazioni ISI.

### **Attività di Ricerca:**

Impegnato in molteplici fronti (ricerca, servizio, coordinamento di collaborazioni, trasferimento tecnologico), con coinvolgimento di altre Strutture, sia dell'Ente che di altri EPR. In sintesi:

- ricerca in ambito tecnologico (elettronica, meccanica, rivelatori, acceleratori)
- commissioning e modifiche dell'acceleratore tandem del LABEC
- costruzione acceleratori e sistemi di diagnostica per i beni culturali
- sviluppo di firmware e software per sistemi di acquisizione
- definizione dei laboratori digitali per i dataset scientifici prodotti dalle Strutture INFN

Dal Settembre 2017 ad oggi: coordinatore della rete di Beni Culturali INFN\_CHNet

### **Referente operativo per le seguenti convenzioni INFN:**

- Dal 11/2019: convenzione INFN – New York Uni. Abu Dhabi - Universidad Nacional de San Martin (Buenos Aires).
- Dal 09/2018: Rappresentante INFN nell'Assemblea Generale della Joint Research Unit E-RIHS.it composta da CNR-INFN-ENEA
- Dal Luglio 2018: responsabile operativo per le convenzioni INFN - La Venaria Reale e INFN – Opificio delle Pietre Dure
- Dal 07/2015 ad oggi: rappresentante INFN per E-RIHS (European Research Infrastructure for Heritage Science)
- Dal 03/2015 al 02/2020 oggi: rappresentante INFN per IPERIONCH.it (italian joint research unit (CNR-INFN))
- Dal 06/2014 al 10/2018: rappresentante INFN nel CdA di CoIRICH (Consortium of Italian Research Infrastructure for Cultural Heritage)

### **Responsabilità in progetti EU o nazionali:**

- 2020: coordinatore europeo del progetto 4CH per la creazione di un centro di competenza EU sui beni culturali.
- 2020: coordinatore per INFN per il progetto europeo IPERION-HS

- 2019: coordinatore locale (INFN-FI) nel progetto EOSC-Pillar per lo use case dedicato ai beni culturali.
- 2019: coordinatore per INFN per il progetto europeo AriadnePlus sull'archeologia digitale.
- 2017: principal investigator del progetto MACHINA-FISR. Il progetto, finanziato dal MIUR (FISR), prevede la costruzione in collaborazione col CERN di un acceleratore di particelle trasportabile.
- 2017: INFN principal investigator per la Preparatory Phase dell'infrastruttura Europea di Heritage Science E-RIHS.
- Dal 2015 ad oggi responsabile INFN per i fondi FOE (progetti a valenza internazionale) per le sigle IPERIONCH.it e E-RIHS.it

**Esperimenti INFN: Responsabile Nazionale** dei seguenti esperimenti finanziati dalla V Commissione Scientifica Nazionale:

- Dal 1-1-2014 al 31-12-2014 – **CHNet**: Studio di fattibilità per l'integrazione dei sistemi di acquisizione per sistemi di misura mobili e fissi.
- Dal 1-1-2013 al 31-12-2013 - **INFN-DATING**: miglioramento delle prestazioni nelle misure in situ con strumentazione mobile basata sui raggi X (radiografie digitali, tomografie, fluorescenze X).
- Dal 1-1-2012 al 31-12-2012 - **CICAS**: studio di fattibilità per misure con isotopi rari ( $^{36}\text{Cl}$  e  $^{129}\text{I}$ ) presso l'acceleratore tandem della Sezione di Firenze
- Dal 1-1-2009 al 31-12-2011 - **RIDAGMA**: Riduzione delle incertezze nelle misure di datazione con  $^{14}\text{C}$  e Termoluminescenza
- Dal 1-1-2006 al 31-12-2008 – **MARASMA**: Studio dei contaminanti nella preparazione campioni per misure di datazione col  $^{14}\text{C}$

Francesco Taccetti