Breve Curriculum Vitae
Chiara Vignoli

Formazione

1997 Dottorato di Ricerca in Fisica, Università degli Studi di Pavia
1993 Borsa di studio INFN
1993 Laurea in Fisica, Università degli Studi di Milano

Esperienza professionale

Date	02/01/1998 – presente
Datore di lavoro	Istituto Nazionale di Fisica Nucleare (INFN)
Sede attuale	Laboratori Nazionali del Gran Sasso (LNGS)
Attuale posizione ricoperta	Dirigente Tecnologo – Criogenia e Alto Vuoto
Principali attività e competenze	Coordinamento scientifico, tecnico ed economico di esperimenti, progetti e apparati complessi Esperimenti per la ricerca di eventi rari Rivelatori criogenici, impianti criogenici e di purificazione di gas nobili allo stato liquido Rivelazione di luce di scintillazione di liquidi criogenici Laboratori sotterranei, infrastrutture tecnologiche e sicurezza
Partecipazione ad Esperimenti	2019- GERDA, LEGEND-200, LEGEND-1000 2015- SABRE 2014- SBN Program @ FNAL, Neutrino Platform e WA104 @ CERN 2013- LBNE/DUNE 1994- ICARUS 1999-2011 WArP 1992-1993 MI-BETA
Principali responsabilità nell'attività di ricerca e tecnologica svolta	2022- Responsabile Progetto "Cryo4Legend" (Agenzia di Coesione Territoriale) 2021- Responsabile WBS "Host Lab Outfitting" e "Lab Infrastructure & Cryostat" per l'esperimento LEGEND-1000 @ LNGS 2015-2021 Responsabile Nazionale INFN Esperimento SABRE ai LNGS 2015- Technical Coordinator, GLIMOS, RAE Collaborazione Internazionale SABRE NORTH 2015- Responsabile Locale Esperimento SABRE ai LNGS, gestione risorse umane/economiche 2015- Responsabile WA-104 al CERN e dei fondi del Team Account 2010- Responsabile Locale Esperimento ICARUS ai LNGS, gestione risorse umane/economiche 2005-2015 Responsabile Installazione, Commissioning, Run, Decommissioning ICARUS ai LNGS 2012-2013 Responsabile Gruppo Criogenico LNGS 2005-2011 Site Manager, GLIMOS, RAE esperimento WArP ai LNGS 2001-2006 Coordinamento degli impianti tecnologici del Capannone INFN di Pavia finalizzato alla costruzione del rivelatore ICARUS T600, all'esecuzione del test criogenico del Modulo T600 e al montaggio delle camere per la rivelazione di muoni di ATLAS 2000-2002 Responsabile Gruppo di Lavoro sul rivelatore luce di scintillazione del LAr di ICARUS
Altri incarichi e responsabilità INFN	2021- Responsabile Locale LNGS di attività CC3M (Lab2Go, Art&Science) 2010- Membro della Commissione Nazionale Formazione INFN 2017- Referente Locale per il Trasferimento Tecnologico INFN ai LNGS Responsabile di svariate unità di personale borsista, assegnista, tecnologo/ricercatore TD INFN Svariati incarichi RUP, commissioni di gara, commissioni concorso
Pubblicazioni	Autrice di più di 100 pubblicazioni, di cui la maggior parte su riviste internazionali con referaggio, citabili con h-index maggiore di 45, secondo la piattaforma INSPIRE-HEP

Autorizzo il trattamento dei miei dati personali presenti nel curriculum vitae ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 e del GDPR (Regolamento UE 2016/679).

L'Aquila, 3 gennaio 2023 **Chiara Vignoli**

CURRICULUM VITAE

PERSONAL INFORMATION

Name	**RICCARDO MUSENICH**
Address	
Telephone	
E-mail	
Nationality	
Date of birth	

WORK EXPERIENCE

Dates	1988-present
Name and address of employer	Istituto Nazionale di Fisica Nucleare (INFN)
Type of business or sector	Scientific and technologic research
Occupation or position held	Dirigente di ricerca (I level senior scientist), 2019-present Primo ricercatore (II level senior scientist), 2002-2019 Ricercatore (scientist), until 2002
Main activities and responsibilities	Research on superconducting materials for radiofrequency applications. Research on superconducting cables for high energy physics applications. R&D on joints between large superconducting cables. Development of a method to measure critical current of superconducting cables up to 100000 A. R&D for the CMS magnet at LHC (CERN). Deputy Project Leader for the manufacturing of the CMS magnet. Coordinator of the Technological Research Group of INFN-Ge. Responsible for the INFN research activity on MgB_2 applications (P.I. of the projects Ma-Bo, MARIMBO and PUMA). Scientific and Technical manager of the EU-FP7 SR2S project (Space Radiation Superconducting Shields). Responsible of R&D on superconductive proton diverter for the Athena X-ray telescope (LAPUTA project). Responsible of the R&D on high temperature superconductive canted solenoid dipoles (BISCOTTO project). Responsible of a study on the effect of mechanical deformation on the transport properties of Nb3Sn conductors (ASTRACT project) Responsible of WP3 of the PNRR-IRIS project

Dates	1985-1988
Name and address of employer	Ansaldo Componenti
Type of business or sector	R&D on superconducting magnets
Occupation or position held	Technologist (permanent position)
Main activities and responsibilities	Cryogenic tests of superconducting magnets. Development of superconducting joints for MRI magnets. Responsible for the cryogenic tests of the HERA dipole magnets. Responsible of R&D activity on superconducting dipole magnets.

Dates	1984
Name and address of employer	Università degli studi di Genova
Type of business or sector	Scientific research
Main activities and responsibilities	Study of the interaction between hydrogen and silver surface

EDUCATION AND TRAINING

Dates	1977-1983
Name and type of organization providing education and training	Università degli studi di Genova
Title of qualification awarded	Doctor in Chemistry
Principal subjects/occupational skills covered	Specialized in solid state chemical-physics. Thesis about the interaction of hydrogen (n-H_2, p-H_2 and D_2) with silver surface studied by means of molecular beam scattering.

ADDITIONAL INFORMATION

Memberships	Member of INFN MAC (2020-present)
	Member of the Scientific National Board 5 (Technologic and Interdisciplinary Research) of INFN (1997-2003 and 2009-2016).
	Member of the International Organizing Committee of the *International Conference on Magnet Technology* (2005-present).
Collaboration with International Journals	Reviewer of *IEEE Transaction on Applied Superconductivity*, *Superconducting Science and Technology*, *Cryogenics, IEEE Transaction on Nuclear Science*.
	Technical editor of *IEEE Transaction on Applied Superconductivity* (2005-2013, 2017-2018).
Teaching	Professore a contratto di "Fisica e Tecnologia dei Magneti Superconduttori", corso della laurea magistrale in Fisica, Università degli studi di Genova (a.a. 2021-2022, 2022-2023).
	"Applied Cryogenics", course of the PhD school in Physics (curriculum in Applied Superconductivity), Università degli studi di Genova (a.a. 2018-19, 2020-21, 2021-22).
Publications	Author of more than 500 articles on peer reviewed international journals, 115 of which related to magnet technology and applied superconductivity.

Europass Curriculum Vitae

Personal information

First name(s) / Surname(s)	**Fabrizio / Raffaelli**
Address(es)	
Telephone(s)	
Fax(es)	
Nationality	
Date of birth	
Gender	

Desired employment / Occupational field	**Design, construction and simulation of mechanical structures. Design of equipment for high energy physics experiments.**

Work experience

Dates **2021-2022 Dune** Activities**:** Responsible of the dismount tooling of the **Kloe calorimeter (LNF Frascati)**. Design of the carbon fiber mechanical structure of the straw **(SST)(Fermilab)**. Head of group of Pisa of the Neutral beam injector for the **DDT(Frascati)** experiment. **Mu2e** calorimeter assembly and responsible for the cooling station procurement (Fermilab).**KM3net** drawing and design update of LOM followed by the construction of three-units.

2019-2020 Mu2e Design and analysis of the carbon fiber inner cylinder of the calorimeter. Final test and shipment to Fermilab of the Back Plane and crates of Calorimeter. **DDT** R&D on materials for the ring Isolator of the Neutral Beam injector of DDT. **Km3net** drawing update construction and test of 9 LOM. (Launch Optical modules)

2018-2019 Design and construction of the back plane and crates of the calorimeter of mu2e experiment (FERMILAB). Study and construction of grids of the neutral injector accelerator for fusion reactor (ITER). Design and construction of cooling circuit for the inner tracker of CMS (CERN)

2017-2018. Design the system of transportation of Meg chamber and installation at the Paul Scherrer institute Switzerland. Coordinator of the cooling system of the experiment Mu2e. Tender preparation for the mu2e components (Back plane and crates).

2015-2017: Design and construction of five launcher of optical module **(**LOM) for KM3net experiment. Responsible for the cooling system of mu2e experiments. Construction of a wire chamber for meg experiment.

2014-2015: Design of carbon fiber roller of a diameter of 1200 and length 2700mm for printing machine. The research project was founded by the Tuscany region. Design of a cooled crate for electronic of mu2e experiment operate in vacuum. (Fermilab USA). Design of a laser container for undersea experiment KM3Net operate ad 3500 meters under sea.

2013-2009: Design and construction of the vacuum tubes for the NA62 experiment (**CERN Geneva**). The vacuum tubes sizes range from 2100 to 3070 mm diameter and were analysed according the PED code. FEA models were used to address deformation and stress. Specification and detail drawing were made for tender. Reference documents are contained on CERN EDMS LAV mechanical safety. (Ref. Ferdinand Hahn). Design and simulation of the structure of station LAV12 is in progress. The transportation from Italy to CERN was studied, implementing a seismic and a thermal isolation (ref. note CERN EDMS 1154085 v.1).

Design of a wire chamber for the **Mu and Gamma experiment at Paul Scherrer Institute (Switzerland)**. (Ref. A. Baldini, M. Grassi)

Design of Base Anchor for undersea operation of neutrino experiments in collaboration with **CPPM of Marseille, Nikhef of Amsterdam and INFN of Bari Italy.**

Verification and analyses of the frame Tower B1 and B2 and vacuum chamber B1 and B2 for KAGRA SAS **Large-scale Cryogenic Gravitational Wave Telescope (TOKYO UNIV Japan).**

I taught in a National course organized by INFN at Genova: a)**"The implementation of ANSYS on a PED Pressure Equipment Directive EN13445**" and b)"**The use of ANSYS to analyze the composite structure (June 2012).**

I coordinated the engineer's group for **the integration of Super B Detector.** I made the preliminary designs of the experimental area and the support structure of tungsten shielding, the machine detector interface (MDI)**,** and the inner silicon tracker (ref. Prof. Marcello Giorgi, W. Wisniewski).

The 21st October 2011 I presented "The Design and Analysis of the MEG Cryostat" for the **Paul Scherrer Institute (Switzerland)** at the **International ANSYS Conference Italian CAE Technology for Industrie**s

2008: Design and construction of the first module of LAV of NA62. Preliminary design of the inner structure and the first LAV.

2007: 1) I worked to replace some components for **the Refurbishing of the Cooling System of CMS for the Tracker.** We designed, constructed and installed new components. (ref. G. Tonelli); 2) **MEG experiment test on the cold windows of the liquid Xenon calorimeter. Cold test of the cryostat at the SIMIC Italian company.** I studied, designed and followed the construction of lateral cold plugs with hydroforming technology (Ref. C. Bemborad, A. Baldini, Satoshi Mikara).

2001-2006: I was leader engineer for design and construction of the CMS inner tracker, and supervised its **installation at CERN** (resulting from CMS inner tracker prototypes).

Design of the cryostat and internal structure of the MEG liquid Xenon calorimeter.

1997-1999: Design of intermediate Silicon Layer ISL for CDF (USA). The structure was made on thin carbon fiber elements forming a space frame of diameter of 640mm for a length of 2000mm. We used Beryllium parts and thin aluminum tubes for the cooling system. At the time it was the largest silicon detector ever built. Thermal and mechanical analyses were performed for the validation of the requirements. (ref. F. Bedeschi, D. Glenzinski)

1996-1997: **Wire chamber of Babar *(Stamford linear accelerator USA)***: I studied the wire chamber mechanical structure, *performing analysis of* the *structure,* end-plates and the mechanical behavior *under* variation of *temperatures*. I constructed the external carbon fiber honeycomb cylinder and dummy end-plates to test it. (Ref. Marcello Giorgi, Mac.Farlane*, Stewart Smith*).

1995-1996: Design of the first prototype of the inner tracker of CMS. I was the leader engineer of the Inner silicon tracker. *I refereed the* ***thesis "Design and fabrication studies of a carbon fiber structure for high energy physics experiment****" with the aerospace department of the UNIV. Of Pisa.* (Ref. Guido Tonelli). On CMS I refereed three other theses on different aspects of cooling and mechanics with the department of Nuclear and aerospace UNIV. of Pisa.

1993-1995*:* **Design and construction of a liquid *Krypton* cryostat for NA48** *with* **ASME VII div 1 and 2**. FEA analysis was used to evaluate the more critical *elements like the windows*. *I designed the feed-through flanges and tooling for installation.* (Ref. Italo Mannelli, Dieter Schinzel,A. Gonidec*)*

1992-1993: Hired at INFN of Pisa. I designed the mechanical units of the super attenuator for the **Virgo experiment**. Simulation and drawings of the *mechanical* filter and the super attenuator. Analyses on vibration and material mechanical stability considering the non-linear effects, like stress stiffening or softening and large deflection. Theoretical and experimental activities to address materials behavior regarding the micro instability *(*Ref. A. Giazzotto).

1988-1991: Hired at the **Fermilab *USA.*** Design and construction of the silicon vertex for CDF experiment. I had to *face* problem*s* of making high precision structure *addressing issues of mechanical stability,* using light and stiff materials like beryllium, *c*arbon fiber and foam. Various Thermal analyses were performed to make a light cooling system. Mechanical analysis and study of mechanical stability were carried out to develop the project. I designed the new beryllium beam pipe of 1.5" for CDF, also *R&D for construction of beam pipe alternative to the use of beryllium sheet* (ref. Prof. D. Amidei, Paul Tipton, Joe Incandela, G. Bellettini, Alvin Tollestrup, Bob. Kepart)

Occupation or position held	Head of the mechanical design office of National Institute of Nuclear Physis of Pisa
Main activities and responsibilities	I coordinate a group of two engineers and two designers, and I am responsible for all mechanical activities of the Institute.
Name and address of employer	Institute of Nuclear Physics (INFN Pisa) of Pisa Edificio C - Polo Fibonacci Largo B. Pontecorvo, 3 - 56127 Pisa
Type of business or sector	Particle Physics Research

Education and training

Dates :	1987
Title of qualification awarded	Laurea in Nuclear engineer (five years)
Principal subjects/occupational skills covered	A method coarse mesh for solving problems of neutron dynamic on domain 2D and 3D dimensional. A program has been written to solve system of differential parabolic equation. In particular, we analysed a space discretisation method similar to classical FEA and the time integration techniques. A fast-solving method was used for the invert the matrix at each time step. A Crank Nicolson implicit method was chosen method for time integration of the differential equations.
Name and type of organisation providing education and training	University of Pisa • I organized a national composite course for INFN with Ing. A. Pepato of one week in Padova ***in 2002*** where we address all the technical aspects of the use of these materials. • I organize an INFN national course on FEM course in Pisa in **2006** of one week to address all the implication of the use of this technique applied to the mechanical design. • I organize an INFN course of one week (**2010**) for the use of euro-code with the participation of the Professor Mauro Sassu Univ. of Pisa. • I taught a lessons course of Ansys composite analysis INFN Genova **2012**. • I taught a course of Ansys PED analysis INFN Genova **2012**. • I taught a course of analysis of composite material with ESACOMP and Ansys at LNF Frascati 2018. • I have taught courses on composite materials 2020 and 2021.

I participate to various courses of CAE technologies during my working period. I attach separately some participation documents.

Personal skills and competences

Mother tongue(s) **Specify mother tongue** Italian

Other language(s)					
Self-assessment	**Understanding**		**Speaking**		**Writing**
European level (*)	Listening	Reading	Spoken interaction	Spoken production	
Language	English	English	English	English	English
Language					

(*) Common European Framework of Reference for Languages

Technical skills and competences	Base engineer knowledge; experience with composite materials, high performance steel, vacuum, cryogenics application, design light structure. Knowledge on pressure CODE ASME VIII, PED, structural steel code UNI10011, Eurocode 3, and analysis of thermal problems. Computer programs: Ansys/workbench 2021, ACP ansys, Flotran, CFX base, ESACOMP 4.6,Composite Pro, I-DEAS NX6, Inventor 2021, Mathcad15, Prime,Word, Excel, Project 2013.Menber of advisory technical committee of ANSYS since 2005.
Computer skills and competences	Winodws10, Unix, programming language Fortran.
Other skills and competences	Replace this text by a description of these competences and indicate where they were acquired. (Remove if not relevant, see instructions)
Driving licence	Italian and Illinois USA drive licences

Additional information

I receive from CMS an achievement award for CMS construction for outstanding contribution to the mechanics of the CMS TIB March 15th 2010.

Fabrizio Raffaelli

Pisa,25/10/2022