

Curriculum vitae

PERSONAL INFORMATION

Family name, First name: Marafini Michela

CURRENT AND PREVIOUS POSITIONS

- 31/12/2018 - Researcher
Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Rome, Italy
Sapienza Università di Roma, Italy – Scienze di Base e Applicate per l'Ingegneria
- 2/2016-9/2018 Researcher (RTD)
Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Rome, Italy
Sapienza Università di Roma, Italy – Scienze di Base e Applicate per l'Ingegneria
- 7/2015-1/2016 Researcher Grant
Istituto Nazionale Fisica Nucleare (INFN), Rome division, Italy
- 8/2013-6/2015 Researcher Post-Doc
Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Rome, Italy
Sapienza Università di Roma, Italy – SBAI Department
- 5/2011-4/2013 Researcher Grant
Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Rome, Italy
Sapienza Università di Roma, Italy – Physics Department

EDUCATION

- 2008-2011 **Ph.D.** in Physics “*Physics studies and R&D towards the MEMPHYS experiment: a water Cherenkov Detector in Europe*” (Mention très honorable)
Supervisor: Prof. T. Patzak
Université Paris 7 - Laboratoire Astro Particules et Cosmologie (APC), Paris, France
- 2004-2007 **Master Degree** in Physics “*A water Cherenkov prototype for neutrino detection: light collection simulation studies and efficiency measurements*” (110/110 cum laude)
Supervisor: Prof. F.Ceradini and Prof. T.Patzak
Università Roma Tre, Roma, Italy – Master **Stage at APC** - Université Paris 7
- 2001-2004 **Bachelor Degree** in Physics “*The MDT detector for the ATLAS experiment at CERN: final certification procedure*” (Full mark) Supervisor: Prof. A. Tonazzo
Università Roma Tre, Roma, Italy – Bachelor **Stage at CERN**

FUNDED PROJECTS as *Principal Investigator*

- 2023 – 2025 “*reSPECT: Towards a new family of nuclear imaging gamma detectors*” – Funding: 304 keuro. PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando Prin 2022 - Decreto Direttoriale n. 104 del 02-02-2022 - Prot. 2022Z72Y3K. The aim of the project is to realise a next generation SPECT for diagnosis imaging.
- 2020 – 2022 “*FlashDC*” – Funding: 149 keuro. Domanda n. PROT. A0375-2020- 36748. Avviso Pubblico “Gruppi di ricerca 2020” - POR FESR Lazio 2014-2020.

- 2015 – 2018 “*A fast neutron-tracking device tailored for hadrontherapy dose monitoring applications*” – Funding: 539 keuro. Id: RBSI140VL4. Italian Ministry of Education, University and Research (MIUR) with SIR Program (Scientific Independence of young Researchers): competitive funding (success rate of 2%) of research projects with high scientific quality developed by independent research teams, under the scientific coordination of a Principal Investigator at the start of his research activity.
- 2015 – 2017 “*MONDO (Monitor for Neutron Dose in hadrontherapy)*” – Funding: 132 keuro. INFN Young Researcher Grant award funding research projects to foster excellence among researchers working in the research and technological developments.

FUNDED PROJECTS as a member

- 2024 – 2026 “*MULTIPASS: MULTIPLE tracker for Secondary particleS monitoring*” – Funding: 225 keuro. PRIN PNRR 2022: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE Prot. P2022FZAC3 –. The aim of the project is to realise a tracker for the detection of secondary radiation of different types, charged and neutral, for the beam monitoring in particle therapy. PI: Ilaria Mattei (INFN)
- 2022 – “*FRIDA*” – Call CSNG5 INFN. Flash radiotherapy with high dose-rate. I participate in WP2 in the beam monitor development. Funding 2022: 225 keuro. PI: Alessio Sarti (Dipartimento SBAI, Sapienza)
- 2020 – 2022 “*3DIT*” – Bando di Ateneo Progetti Medi 2021. 3D Printed Plastic Scintillator. I am one of the main actors in this multidisciplinary chemistry-physics development. Funding 10 keuro. PI: Leonardo Mattiello (Dipartimento SBAI, Sapienza)
- 2018 – 2021 “*SPARE (Space Radiation Shielding)*” - Premiale 2016. Irradiation facilities in INFN laboratories (TIFPA and LNL) for space radiation applications. I have been part of WP400 “*Detectors*”. Funding 1.432 Meuro. PI: Marco Durante (TIFPA, GSI)
- 2013 – 2016 “*INSIDE*” - MIUR PRIN 2011. Development of monitoring for charged particles. I have been part of WP5 “*Dose Monitoring for Hadrontherapy*” and WP6 “*Nuclear Fragmentation Studies for Hadrotherapy*”. Funding: 977.9 keuro. PI: Alberto Del Guerra (Università di Pisa).

ASN National Scientific Qualification

ABILITAZIONE SCIENTIFICA NAZIONALE FASCIA: II

- ▶ 29/09/2023 - 29/09/2034 ACADEMIC RECRUITMENT FIELD, PRIMA FASCIA: 02/D1
ACADEMY DISCIPLINE: FIS/07
- ▶ 23/05/2023 - 23/05/2034 ACADEMIC RECRUITMENT FIELD, SECONDA FASCIA: 02/A1
ACADEMY DISCIPLINE: FIS/02
- ▶ 05/10/2018 - 05/10/2024 ACADEMIC RECRUITMENT FIELD, SECONDA FASCIA: 02/A1
ACADEMY DISCIPLINE: FIS/04

TEACHING ACTIVITIES

- 2017 - 2022 *Assistant* for the course of *Physics Laboratory II* held by Prof. G.Cavoto.
Università di Roma, Italy - Physics Department
- 2016 - 2017 *Assistant* for the course of *Nuclear and Sub-nuclear laboratory* held by Prof. S.Veneziano. Università di Roma, Italy - Physics Department
- 2004 – 2005 *Assistant* for the course of *Classical Mechanics and Thermodynamics* held by Prof. F. De Notaristefani. Università Roma Tre - Faculty of Science

SUPERVISION OF STUDENTS AND POSTDOCTORAL FELLOWS

- 4 Post-Doc (employed with my projects funds)
- 2 Ph.D.
- > 15 Master and >15 Bachelor Students

from different universities: Sapienza Università di Roma, Italy - Physics and Engineering Departments and Université Paris 7 - Physics Department - Laboratoire APC, Paris, France

COMMISSIONS OF TRUST

- Member of **PhD Commission** - Juri de Thèse: 1 PhD (ITM Atlantique et Ecole Doctorale 3M) commission for the PhD in Physique Subatomique et Instrumentation Nucléaire.;
- Member of **Commissions**:
 - ▶ 6 LNF (Laboratori Nazionali di Frascati, INFN) call for applications for “*Collaboratore Tecnico e Collaboratore Amministrativo a tempo Determinato/Indeterminato degli enti di ricerca*”.
 - ▶ 5 CREF call for applications for research fellowship
- International scientific journals activities:
 - ▶ **Associate Editor** of: Frontiers in Physics - Medical Physics and Imaging
 - ▶ **Reviewer** of: Scientific Reports - Physics in Medicine and Biology – Measurement Science and Technology – Journal of Physics Communications - Nuclear Instruments and Methods in Physics A - Frontiers in Oncology.
- National **Scientific Responsibilities**:
 - ▶ From 2021 Local Responsible for the INFN FOOT (Member of the IB)
 - ▶ From 2020 Responsible of all Radio-hAdron Therapy (RAT) at CREF
 - ▶ 2015-2016 National Responsible for the INFN MONDO
- 2019 Early Career Investigator (ECI) Membership of Radiation Research Society.

RESEARCH PERFORMANCES, EXPLOITATION AND DISSEMINATION

My research focuses on research and development of innovative detectors and to the application of particle physics detection technique to different fields, in particular to the medical one. The scientific outcome of my research is explicated in several publications on referred journals and presentations at conferences and seminars.

- h index of 20, with more than 130 publications in refereed international journals for a total of more than 1200 citations (database: <http://www.scopus.com>);
- 19 publications in refereed international journals as first, last or corresponding author;
- More than 15 presentations and seminars at international conferences and workshops;

The technology transfer is of large importance in applied physics. I devote a huge effort to make TT of our research possible through the exploitation of different possible paths.

- 2 Granted patents:
 - ▶ 2021 P3080IT00, request accepted. Development of a new class of plastic scintillators for the realisation of fast timing detectors. Shared ownership between SBAI and CREF.
 - ▶ 2014 PCT/IT2014/00002: “*Intraoperative detection of tumour residues using beta- radiation and corresponding probes*” WO 2014118815 A2. Shared ownership between INFN, SBAI and CREF.
- Realisation of an international consortium of companies and research organisations as the *scientific and technical coordinator* for the reSPECT project (6 partners: Fondazione

Bruno Kessler Italy, Museo Storico della Fisica e Centro Studi e Ricerche E.Fermi Italy, Università degli Studi di Roma La Sapienza Italy, Synective Labs Aktiebolag Sweden, Univeritair Medisch Centrum Utrecht Netherlands, Molecubes NV Belgium);

- Collaboration with the SIT- Sordina IORT Technologies for a TPS IORT development
- Participation to projects with dedicated call-funding opportunities:
 - ▶ POR Regione Lazio 2020 dedicated to the technology transfer to companies (funding obtained)
 - ▶ HORIZON-EIC-2022-PATHFINDEROPEN-01 and HORIZON-EIC-2021-PATHFINDEROPEN-01 (excellent evaluations, 4.15/5, not selected because of the budgetary resources available for the call)
 - ▶ H2020-FETOPEN-2018-2019-2020-01 (excellent evaluation, 4.20/5, not selected because of the budgetary resources available for the call)

My large public communication and dissemination activity is mainly focused to the Enrico Fermi Museum and the organisation of events at CREF (Museo Storico della Fisica e Centro Studi e Ricerche E.Fermi).

- Creation of an activity for kids *Memory delle Particelle*
 - ▶ conducted at NET Scienza Insieme 2023, *Notte dei Ricercatori Roma* (<https://www.scienzainsieme.it/il-memory-delle-particelle/>)
 - ▶ conducted at *Festival della Scienza* Genova 2023 (<https://www.festivalscienza.it/programma-2023/il-memory-delle-particelle>)
- Organisation and participation of:
 - ▶ scientific aperitif event - *aperitivo scientifico* (NET Scienza Insieme, 6/2021)
 - ▶ event of *Talenti per la Scienza* (NET Scienza Insieme, 7/2021) at parco Talenti
 - ▶ open projection of the movies: *Una cattedra per Laura Bassi*, *Bruno Pontecorvo*, *La particella Fantasma* (9/2021)
 - ▶ open access of the center for the *Notte dei Ricercatori 2021* (9/2021)
- Guides to of the museum “*L’Eredità scientifica di Enrico Fermi*”, to about 300 visitors and students (2019 - 2023);
- Organisation of the inauguration event of CREF infrastructure (10/2019);

TRACK RECORD

My research career has taken place along a path closely related to the application of particle physics techniques to the development of novel detectors and their various applications either to fundamental or applied research topics. I grew my experience in an international R&D environment, facing both hardware and software challenges. I have steadily increased my skills profiting from the participation to the work of different experimental groups, across different countries in an international environment, whose main activities were focused in different fields. The Particle Therapy field offered me the opportunity to investigate different new detectors with growing responsibilities. I finally gained my independency in leading projects, coordinating teams and finalising R&D studies with an always-growing responsibility.

I started my Ph.D. research work focusing on the neutrino oscillation investigations and the related innovative R&D projects. I worked on the large-scale next generation detectors neutrino measurements in the framework of the LAGUNA and the EUROnu European projects [10]. I presented MEMPHYS [9], megaton water Cherenkov, in international conferences (xiii, ix). I developed, design, mechanical assembled and instrumented with a readout system the MEMPHYS prototype, which was needed to implement a new electronic readout based on PARISROC system (LAL-ORSAY). During the realisation of the prototype I was the responsible of the associated budget. The R&D experience has given me the opportunity to explore many aspects of particle detection.

In 2011 I decided to continue this activity on development of photo-sensor devices in a different context: the Particle Therapy (PT). I joined the ARPGroup at Sapienza Università di Roma. At the time the activities were focused on the characterisation of the secondary particles produced in PT treatments and to their exploitation in the monitoring of the dose delivered to patients during oncological treatments. Within the ARPG group **I have directly contributed to the study of the secondary particles emission, aiming to a precise measurement of rates, energy and spatial distributions, for charged particles and photons** (prompt and PET-gamma). In all the different phases of my work, I have faced and overcame different hardware and software challenges: I assembled and tested the detectors needed for the secondary fragments production measurements, performed the data analysis and published the results on peer-reviewed international journals.

Since 2013 I have focused my activity on the construction of an on-line tracker, the Dose Profiler (DP), within the INSIDE framework. I characterised different layouts using scintillation fibres of various sizes and performing the related first efficiency evaluations.

From 2012, with the ARPGroup I took part to **many data taking campaigns with proton, carbon, helium and oxygen ion beams in different particle therapy centres** (HIT, GSI, CNAO, APSS). I personally took care the several experimental setups planning and construction. I contribute to the data analysis of the several performed study and I presented and published the results in several international conferences (viii) and papers [2,5].

The DP continued with MonteCarlo and data taking studies and in 2017 it started a clinical trial on monitoring operation at CNAO. I reviewed and presented the DP status, on behalf of the INSIDE collaboration (xi) and the first results of inter fractional monitoring has been published [4].

My interest in the development of new detectors led me to work with different crystals and scintillating materials. In 2011-2012, I decided to join a small group of researchers in the experimental effort of studying (and publish) the Cherenkov light emitted by TeO_2 crystals (for $0\nu 2\beta$ -decay). I was also involved in p-terphenil characterisation (organic plastic scintillator): I measured and published its transparency and attenuation length, opening to the ARPG group the opportunity to design an innovative probe for radio-guided surgery [7], for which an international patent is now pending.

Since 2014 I started **my own new research effort devoted to the study of the experimentally most challenging PT secondary radiation type: neutrons**. Neutrons produced in PT treatments are poorly known, therefore I proposed a neutron-tracking detector to be used in PT centres to characterise their production. The related project, MONDO, in December 2014 was funded by the INFN and in spring 2015 (upgraded version) I received a larger funding by the Italian Ministry of Research (SIR2014). Since 2015 I am the coordinator of the project. The research work performed within the MONDO project led to **the implementation of a new SPAD array sensor**. Fondazione Bruno Kessler (FBK) has developed the SBAM sensor in collaboration with CREF that shares now its intellectual property. In March 2016 I started the construction of a MONDO prototype at SBAI department in close collaboration with the mechanical service. I organised data taking campaigns at the electron Beam Test Facility of Laboratori Nazionali di Frascati and at the protons experimental room of the Trento Proton Therapy Centre. In 2019 the first SBAM chips have been produced and tested at SBAI and FBK. The evaluation of the expected MONDO performances (via FLUKA MC Simulation) and the results obtained with the prototype irradiation with different readout systems have been presented in international conferences (iii,vi,viii, x) and have been published in referred international journals [1].

During the optimisation of the MONDO detector layout I start working on the **development of an optical readout for triple-GEM detectors (ORANGE)**. **I demonstrated, for the first time, the feasibility of such detectors**. In less than two years a triple-GEM detectors readout with commercial camera and lens has been successfully built. The results have been presented to the RD51 collaboration (CERN) (xi) and put the basis for a joined effort in the development of next generation gaseous detectors. The promising performances obtained within ORANGE tracking detector [8], resulted in a proposal for optimised detectors (ex. LEMON) currently exploited and considered for several different applications from the medical field up to the dark matter search. Up to now the optical GEM technology is exploited by the CYGNO experiment, funded by INFN, dedicated to the **dark matter detection** at LNGS.

From 2016 I joined the effort of building the FOOT collaboration, an experiment devoted to the **proton Relative Biological Effectiveness (RBE)** evaluation for PT applications. I worked in the development of the calorimeter and the start detectors making available the experience I gained in handling inorganic crystals for calorimetric purpose and organic scintillators for time detectors developments. In the FOOT collaboration I gave an important contribution to the R&D of a phoswich detector made by the combination of fast plastic scintillator and BGO crystal. I presented the status of the FOOT on behalf of the collaboration at (iv) and (v) international conferences.

During the FOOT data taking with oxygen ion in spring 2019 at GSI I coordinated the installation of the beam monitor detectors allowing the emulsion setup to be fully online controlled during the irradiation. In winter 2020 I have been the **run coordinator of the carbon ion data taking at GSI** with the electronic FOOT setup. From summer 2021 I am the FOOT local responsible at INFN Rome1 and I am the member of the FOOT Internal Board.

In 2019 I had the chance to put in use the know-how I gained on tracking detectors in the Particle Therapy field supporting a young national grant (PAPRICA, PAir PRoduction Imaging ChAmber), devoted to the **detection of prompt photons** emitted in PT treatments, to monitor the range of the beam in the patient. The detector expected performances have been studied through a MC FLUKA simulation and have been published in [3].

In 2018 I start cooperating in a joint effort between chemistry, engineering and physics researchers at SBAI. We decided to **investigate and develop a new family of fluorens for plastic scintillators developments**. I selected the most promising attempts in order to optimise fast plastic scintillators (Time Of flight Plastic scintillators, TOPs). I personally coordinate the laboratory tests and the characterisation of the new materials with different sources of radiation. From 2019 I characterised the new TOPs scintillators with proton beam (at CNAO) and carbon ion (at GSI) at different energy and with m.i.p. at SBAI. I also provide the analysis of the collected data and the promising results [6] has been accepted for contribution in several international conferences. A paper is in preparation. With the results obtained so far a patent request has been submitted in December 2021. In this framework, I am coordinating a feasibility study dedicated to the development of a plastic scintillator dissolved in the 3D printer resins. The *veroclear* material (<https://www.stratasys.com/materials/search/veroclear>) is highly transparent and we demonstrate the possibility of dissolved the TOPs scintillator in this solvent. The study has been supported by the 3DIT university funding (**3D Printed Plastic Scintillator**: SBAI, INFN Roma1 and CREF collaboration).

From 2019 I start investigating the possibility of integrate the increasing chemistry skills in our activities. Together with the same chemistry, engineering and physics team of researchers I elaborate the reSPECT idea: a new family of gamma imaging detectors based on organic scintillators combined with 3D printed collimators, allowing for a significant cost reduction while achieving a beyond state-of-the-art resolution and count-rate capability. The reSPECT active material is an **enriched hi-Z organic scintillator** [6] that allows for a detector integration in MRI systems, leading to a 10 time better signal to noise ratio. The key aspect is the possibility to detect via photoelectric effect the few hundred of keV photons in a doped organic scintillator. Up to now an international consortium has been constituted and the test on the sample of enriched Hi-Z organic scintillator is under going under my supervision at SBAI.

In the last two years the radiotherapy community has been pleasantly shocked by the more and more scientifically trustable evidences of the so called Flash effect. Within the ARPGroup I propose a **beam monitor dedicated to next generation beams at Flash intensities** based on the **air fluorescence**. In 2020 I ask and obtained a regional funding to support the investigation in this topic (FlashDC project) and up to now two prototypes of beam monitors for electron flash beam have been constructed and tested at the SIT electron machines (i). The FlashDC project is now (from November 2021) part of a larger community (FRIDA) that collects the effort of the INFN researchers on the Flash innovation.

Beside the Flash effect the SIT company asked for a tool capable of dose computation for an IOERT mobile electron linear accelerator. Therefore, since 2020 I cooperate to the development with a GPU-based fast Monte Carlo of a fast MC tool tuned for IOERT application (ii).

- **Scientific products: selection of 10 publications highlighting my personal contributions**

1. M. Marafini et al. *Mondo: A neutron tracker for particle therapy secondary emission characterisation*. doi: 10.1088/1361-6560/aa623a
2. M. Marafini et al. *Secondary radiation measurements for particle therapy applications: Nuclear fragmentation produced by 4He ion beams in a pmma target*. doi: 10.1088/1361-6560/aa5307
3. M. Toppi et al. *Paprica: The pair production imaging chamber- proof of principle*. doi: 10.3389/fphy.2021.568139
4. M. Fischetti et al. *Inter-fractional monitoring of 12C ions treatments: results from a clinical trial at the cnao facility*. doi: 10.1038/s41598-020-77843-z
5. L. Piersanti et al. *Measurement of charged particle yields from pmma irradiated by a 220 Mev/u 12C beam*. doi: 10.1088/0031-9155/ 59/7/1857
6. R. Mirabelli et al. *Tops project: Development of new fast timing plastic scintillators*. doi: 10.1393/ncc/i2020-20017-4. and D.Rocco et al. *TOPS fast timing plastic scintillators: Time and light output performances* doi:10.1016/j.nima.2023.168277
7. E.S. Camillocci et al. *A novel radio-guided surgery technique exploiting beta- decays*. doi: 10.1038/srep04401
8. M. Marafini et al. *High granularity tracker based on a triple-gem optically read by a cmos-based camera*. doi: 10.1088/1748-0221/10/12/P12010
9. L. Agostino et al. *Study of the performance of a large scale water- cherenkov detector (Memphys)* doi: 10.1088/1475-7516/2013/01/024
10. M. Wurm et al. *The next-generation liquid- scintillator neutrino observatory Lena*. doi: 10.1016/j. astropartphys.2012.02.011

- **Conferences and Seminars: Selection of my most important contributions in conferences**

- i) 03/2023 Geneva: Spring Seminar - Université de Genève 2023 “*News from Radio and Particle Therapy against tumours: the flash effect and the potential of the almost empty (or full?!)*”. Invited Seminar.
- ii) 11/2022 FRPT: Flash Radiotherapy and Particle Therapy Conference. “*An online beam monitor for flash radiotherapy: the FlashDC project*”. E-Poster Presentation.
- iii) 09/2022 SIF: 107 Congresso Nazionale Società Italiana di Fisica - online. “*Dose computation with a GPU-based fast Monte Carlo for an IOeRT mobile electron linear accelerator*”. Invited talk.
- iv) 6/2019: PTCOG58 Manchester, UK. “*Characterisation of the secondary neutron production with the MONDO project: an innovative tracker of ultra-fast neutrons optimised for Particle Therapy applications*”. Poster Contribution.
- v) 11/2019 RRS: 65th Annual Radiation Research Society Meeting - San Diego, USA. “*Measuring the impact of Nuclear Interaction in Particle Therapy and in Radio Protection in Space: the FOOT Experiment*”. Invited talk.
- vi) 6/2018 NRM: 15th Varenna Conference on Nuclear Reaction Mechanisms - Varenna, Italy. “*The FOOT Experiment*”.
- vii) 11/2017 PRESS: PProton thErapy research SeminarS – Krakow, Poland. “*Secondary neutrons in particle therapy: the Mondo project*” Invited talk.
- viii) 6/2017 MLZ: Neutrons for Health - Bad Reichenhall, Germany. “*Characterisation of the secondary fast and ultrafast neutrons emitted in Particle Therapy with the MONDO experiment*”.
- ix) 4/2016 Seminar: Colloqui di Fisica, Università Roma Tre, Italy. “*The particle therapy and the role of secondary neutrons: the MONDO project*”. Invited talk.

- x) 6/2015 RAD: Montenegro. “*Measurement of charged particle yields from therapeutic beams in view of the design of an innovative hadrontherapy dose monitor*”. Contribution on RAD 2015 Proceeding.
- xi) 5/2015 SRHITS: Space Radiation and Heavy Ions in Therapy Symposium - Osaka, Japan. “*The MONDO Project*”.
- xii) 3/2015 RD51: Second Special Workshop on Neutron Detection with MPGDs - CERN. “*MONDO: A neutron tracker for particle therapy secondary emission fluxes measurements*”. Invited talk.
- xiii) 9/2014 SPET: II Symposium on Positron Emission Tomography - Krakow, Poland. “*The INSIDE project: Innovative solutions for in-beam dosimetry in hadrontherapy*”. Invited talk.
- xiv) 1/2010 EC: Epiphany Conference - Krakow, Poland “*Physics with the MEMPHYS Detector*”. Contribution on Acta Physica Polonica B 41(7), pp. 1733-1748 (cit 2)
- xv) 10/2009 NNN09: Workshop on Next Generation Nucleon decay and Neutrino Detectors - Estes Park, Colorado (USA). “*Water Cherenkov R&D in Europe*”. Invited talk.

**Rome,
17.01.2024**

Michela Marafini

Antonello Paoletti (INFN) – CV

Ha una laurea magistrale in ingegneria informatica conseguita con lode nel 2011

Si occupa di informatica in termini di progettazione, sviluppo e integrazione di applicativi web e infrastrutture a servizi.

Dal 2002 al 2012 ha lavorato presso il servizio coordinamento banche dati ricerca, occupandosi dello sviluppo di pagine e applicazioni web per l'amministrazione.

Dal 2012 è responsabile dell'area scientifica della divisione sistema informativo, con compiti di coordinamento, progettazione e sviluppo di strumenti di gestione economica (Preventivi), del personale (Timesheet) e di pianificazione (DB Progetti) a supporto della comunità scientifica dell'Ente.

Francesco SERAFINI

TITOLI DI STUDIO

- 14/11/2017 **Laurea magistrale** in Ingegneria Informatica presso l'Università degli Studi di Roma "Guglielmo Marconi". Voto: 106/110
- 18/02/2009 **Laurea triennale** in Ingegneria Informatica presso l'Università degli Studi di Roma "Tor Vergata". Voto: 97/110
- 16/07/2001 **Diploma di maturità** come Perito Informatico presso l'Istituto Tecnico Industriale "Enrico Fermi" di Frascati (RM). Voto: 96/100

COMPETENZE LINGUISTICHE

ITALIANO: madrelingua

INGLESE: livello C1

CROATO: livello B2

CERTIFICATI E CORSI DI LINGUA

- 2022 – (C1) Wall Street English
- 2019 – (B2) Spexx Certificate
- 2008 – (B2) First Certificate in English - University of Cambridge

ESPERIENZA PROFESSIONALE

Dal 16/12/2005 ad oggi – Software Architect e Developer presso **Istituto Nazionale di Fisica Nucleare**

CONTRATTI

- **Tecnologo 3 livello** dal 04/07/2023 ad oggi
- **CTER 4 livello – 1 grad.** dal 01/01/2022 al 03/07/2023
- **CTER 4 livello** dal 01/01/2020 al 31/12/2021
- **CTER 5 livello** dal 04/02/2013 al 31/12/2019
- **CTER 6 livello** dal 16/12/2005 al 02/02/2013

INCARICHI DI RESPONSABILITÀ

- **Dal 24/07/2023 ad oggi:** responsabile del Servizio Sviluppo e Gestione Applicativi della Direzione Sistemi Informativi dell'Amministrazione Centrale;
Persone coordinate: 12 developer
- **Dal 01/08/2021 al 23/07/2023:** responsabile dell'"Ufficio Area del Personale" della Direzione Sistemi Informativi dell'Amministrazione Centrale;
Persone coordinate: 4 developer
- **Dal 12/03/2018 al 31/07/2021:** responsabile dell'"Ufficio Sviluppo Applicativi" della Divisione Sistema Informativo dell'Amministrazione Centrale;

- **Dal 01/03/2015 al 11/03/2018:** responsabile dell'“Ufficio Servizi e Applicativi” del Servizio Sistema Informativo dell'Amministrazione Centrale.

ATTIVITÀ LAVORATIVA

- Analisi, progettazione e sviluppo di servizi e applicativi web full-stack, sia a microservizi che non, a supporto della gestione del personale (Human Resource) e dell'attività scientifica dell'istituto e relativa reportistica;
 - I linguaggi utilizzati sono: Java, PHP, Typescript, Groovy, HTML, Python.
 - I database utilizzati sono: Oracle DB, MySQL, PostgreSQL, MongoDB.
- Sviluppo e manutenzione del software di Identity Management - GODiVA, per la gestione centralizzata del personale dipendente e associato dell'istituto, nonché la gestione dell'organigramma delle sedi INFN e integrazione con l'infrastruttura di autenticazione e autorizzazione (AAI);
GODiVA è scritto interamente in Java e si basa su OracleDB. Ha un motore di scripting in Groovy ed espone API sia di tipo REST che SOAP.
- Supporto alla Direzione Risorse Umane per i processi necessari al passaggio ad un nuovo sistema stipendiale;
- Inoltre, ho curato e coordinato analisi, progettazione e sviluppo dei seguenti applicativi:
 - Reclutamento telematico – raccolta candidature online per concorsi (*Java + OracleDB + framework Vaadin*)
 - Benefici Assistenziali – raccolta delle richieste per i benefici erogati dall'ente (*PHP + OracleDB*)
 - Corsi di Formazione – gestione dei corsi di formazione, iscrizione partecipanti e rendicontazione economica (*PHP + MySQL*)
 - Assegni di Ricerca – gestione informatizzata delle richieste di Assegno di Ricerca (*Java + OracleDB + framework Vaadin*)
 - Concorsi – gestione informatizzata dell'iter di richiesta di borse di studio e assegni di ricerca e relativa pubblicazione (*Java, Spring Boot + MongoDB + Angular*)
 - Job Opportunities – gestione della pubblicazione dei concorsi (*PHP + MySQL*)
 - Associazioni – gestione dell'iter di richiesta di associazione presso l'INFN (*Java + OracleDB + framework Vaadin*)
 - Circolari – pubblicazione delle circolari delle direzioni e dei servizi dell'Amministrazione Centrale (*PHP + MySQL*)
 - Determine – pubblicazione delle determine del Direttore Generale dell'INFN (*Java + OracleDB + framework Vaadin*)
 - Disposizioni – pubblicazione delle disposizioni del Presidente dell'INFN (*PHP + MySQL*)
 - Consulenze – pubblicazione delle contratti di consulenza per la trasparenza (*PHP + MySQL*)
 - Report – report di tutti i dati del personale riguardanti la carriera e l'attività scientifica all'interno dell'ente (*PHP5.4 + OracleDB*)
- Gestione di siti per servizi all'utente, quali Agenda, Business Intelligence; visualizzazione online dei cedolini dello stipendio e della certificazione unica (CU);

- Analisi, sviluppo e manutenzione della libreria **Baselib**, basata su Spring Framework, sulla quale sono costruiti tutti i nuovi progetti di backend, sviluppati all'interno della Direzione Sistemi Informativi.

CONOSCENZE INFORMATICHE

- Sistemi operativi: MacOS, Windows e Linux
- Linguaggi di programmazione: Java, PHP, Groovy, Python
- Database utilizzati:
 - Relazionali: OracleDB, MySQL, PostgreSQL
 - NoSQL: MongoDB, ZODB
- Framework utilizzati: Spring (Java), Vaadin(Java), Angular (Typescript), jQuery (javascript), Bootstrap (HTML, Javascript, CSS)
- Build automation tool: Gradle, Maven
- Versioning tool: Git

TITOLI DI FORMAZIONE

1. RED HAT VIRTUALIZATION – RH318

argomento: Red Hat Virtualization (RH318) offre ai professionisti IT le competenze necessarie per amministrare, gestire ed eseguire il deployment delle macchine virtuali in azienda, utilizzando Red Hat® Virtualization.

durata: 28 ore (dal 06/06/2013 al 09/06/2013)

verifica finale: non prevista

2. RED HAT SYSTEM ADMINISTRATION III – RH254

argomento: Red Hat System Administration III è pensato per gli amministratori esperti di sistemi Linux che desiderano apprendere tecniche di automazione a livello aziendale mediante script, il metodo per implementare e proteggere i servizi di rete e il modo di gestire altre funzioni chiave di sicurezza di Red Hat Enterprise Linux.

durata: 28 ore (dal 04/04/2017 al 07/04/2017)

verifica finale: non prevista

3. NEW C++ DEVELOPMENT PRACTICES

argomento: Il corso ha l'obiettivo di fornire una conoscenza di base dei concetti fondamentali del linguaggio di programmazione C++ e della sua libreria, secondo gli standard più recenti e recependo le buone pratiche consolidate.

durata: 18 ore (dal 08/05/2017 al 10/05/2017)

verifica finale: non prevista

4. PROJECT MANAGEMENT NEI SISTEMI INFORMATIVI - BUSINESS SCHOOL POLITECNICO DI MILANO

argomento: Corso per specialisti di sistemi informativi e partecipanti di team di progetti informatici che devono ricoprire il ruolo di capo progetto o contribuire con le proprie competenze tecniche e gestionali alla riuscita del progetto.

durata: 37 ore (dal 26/11/2018 al 05/12/2018)

verifica finale: non prevista

5. CORSO ANGULAR

argomento: Il corso ha l'obiettivo di formare una solida base teorica che permetta di inquadrare architeturalmente il framework e dare conoscenze pratiche che

permettano allo sviluppatore di muoversi con indipendenza in un progetto Angular.

durata: 27 ore (dal 15/04/2019 al 18/04/2019)

verifica finale: non prevista

6. REQUIREMENTS MANAGEMENT (SMRM)

argomento: Il corso ha l'obiettivo di migliorare la capacità di tradurre la missione di un progetto software in una serie di requisiti condivisi, qualitativamente validi e compatibili con le risorse a disposizione e mettere in grado i partecipanti di impostare ed utilizzare un processo strutturato e flessibile per la gestione del ciclo di vita dei requisiti di progetto.

durata: 18 ore (dal 21/10/2020 al 23/10/2020)

verifica finale: non prevista

7. SPRING FRAMEWORK – INTRODUZIONE (SFI)

argomento: Acquisire familiarità con il Framework Spring, nell'ottica dell'utilizzo lato server in un'ambiente a microservizi.

durata: 24 ore (dal 09/11/2020 al 11/11/2020)

verifica finale: non prevista

8. AGILE CON SCRUM (AGSC)

argomento: Illustrare cos'è un "approccio Agile" sia attraverso sessioni teoriche, sia attraverso l'ausilio di simulazioni pratiche.

durata: 20 ore (dal 16/12/2020 al 18/12/2020)

verifica finale: non prevista

9. DOCKER E ORCHESTRAZIONE DI CONTAINER

argomento: Obiettivo del corso è fornire ai partecipanti nozioni di base sulla tecnologia dei container, su come distribuire il software e le sue dipendenze (runtime) incapsulando il tutto in un pacchetto (immagine), su come automatizzare il deployment e la gestione di container ricorrendo a piattaforme di orchestrazione come Mesos o Kubernetes.

durata: 24 ore (dal 15/06/2021 al 18/06/2021)

verifica finale: non prevista

10. TESTING E ANALISI DEL CODICE

argomento: Introdurre i partecipanti alle tecniche di testing del software, presentando le metodologie e le buone prassi per migliorare l'affidabilità del codice nel tempo. Mostrare operativamente alcuni fra gli strumenti di analisi statica del software. Al termine del corso i partecipanti dovranno essere in grado di eseguire una scansione con SonarLint, comprendendo i risultati e le metriche, nonché configurare e usare JUnit. Il corso è indirizzato a sviluppatori di software di sistema, di web services, di applicazioni desktop e web.

durata: 10 ore

verifica finale: non prevista

11. CORSO DI FORMAZIONE MANAGERIALE

argomento: Il corso è rivolto ai Responsabili dei servizi e degli uffici di AC. Proprio per i cambiamenti in essere all'interno di AC e per le sfide che l'Ente sta perseguendo, è fondamentale che tutta la struttura di management e middle management possa condividere linguaggi, metodi, chiavi di lettura e quant'altro e assumere un'ottica di miglioramento continuo.

durata: 13 ore (dal 11/04/2022 al 13/04/2022)

verifica finale: non prevista

12. JIRA SOFTWARE PER LO SVILUPPO AGILE

argomento: Configurazione e utilizzo di Jira Software/Core (data center) per lo sviluppatore di un progetto software, con focus sull'approccio Agile.

durata: 20 ore (dal 17/10/2022 al 21/10/2022)

verifica finale: non prevista

DOCENZA CORSI DI FORMAZIONE

- **2007** - INDICO - Guida all'utilizzo dell'agenda INFN (I e II edizione)
- **2009** - I corso su Indico e gestione ospiti (WEB TOOL)
- **2009** - IV corso su Indico e gestione ospiti
- **2010** - GODIVA: il nuovo sistema di Gestione Ospiti, Dipendenti, Visitatori ed Associati - Prima edizione per le segreterie
- **2010** - GODIVA: il nuovo sistema di Gestione Ospiti, Dipendenti, Visitatori ed Associati - Seconda edizione per le segreterie
- **2010** - INDICO e Gestione Ospiti
- **2011** - GODiVA (Gestione Ospiti, Dipendenti, Visitatori ed Associati) per le segreterie
- **2012** - Utilizzo e gestione del software INDICO
- **2016** - Supporto INFN-AAI: Liv. 2
- **2017** - Supporto INFN-AAI: Liv. 1
- **2017** - Supporto INFN-AAI: Liv. 2
- **2022** - Aggiornamenti Normativi in materia di Personale I

TALK IN CONFERENZE

- **27/02/2014** – Workshop CCR @LNGS - I Servizi Nazionali nell'INFN – Godiva Web
- **25/05/2015** – Workshop CCR @LNF - Il Sistema Informativo e l'infrastruttura di autenticazione e autorizzazione dell'INFN

NOTE TECNICHE

INFN-23-22/DSI (DOI: 10.15161/oar.it/77018)

A time tracking system for EU-funded INFN projects

INFN-23-21/DSI (DOI: 10.15161/oar.it/77020)

Il sistema gestionale dei progetti di ricerca INFN

INFN-23-17-DSI (DOI: 10.15161/oar.it/76987)

Un motore di Workflow per applicazioni web

INFN-23-11-DSI (DOI: 10.15161/oar.it/76981)

Sistema Gestionale dei Prodotti della Ricerca: CDR e WBS di Progetto

INFN-23-05-DSI (DOI: 10.15161/oar.it/76957)

Ripresa dati dal nuovo sistema stipendiale Zucchetti verso l'Identity Management della Direzione Sistemi Informativi

INFN-23-03-DSI (DOI: 10.15161/oar.it/76925)

Il portale web degli acquisti INFN

INFN-14-01/CCR

Integrazione Single Sign-On su JasperServer per INFN-AAI

BASELIB

Libreria per Team interno di Sviluppo della Direzione Sistemi Informativi

Frascati, 23/05/2024