

# Curriculum Vitae of Riccardo Faccini

## Part I -- General Information

Full Name	Riccardo Faccini
Date of Birth	
Place of Birth	
Citizenship	Italian
E-mail	riccardo.faccini@roma1.infn.it
Spoken Languages	Italian. English

## Part II -- Education

Type	Year	Institution	Thesis/ marks
University graduation	1994	Univ. Di Roma "La Sapienza"	"Ricerca del Bosone di Higgs @ LEP200" – 110/110 e Lode
PhD	1998	Univ. Di Roma "La Sapienza"	"Measurement of $\sin^2\theta_W$ in hadronic decays of the Z boson with the L3 experiment at LEP"

## Part III -- Appointments

Start	End	Institution	Position
1998	2002	University of California San Diego	Research Assistant
2000	2002	Univ. di Roma "La Sapienza"	Grant Holder
2002	2012	Univ. di Roma "La Sapienza"	Assistant Professor
2012	2017	Univ. di Roma "La Sapienza"	Associate Professor
2017		Univ. di Roma "La Sapienza"	Full Professor

## Part IV Teaching experience

Year	Institution	Lecture/Course
2021-today	Univ. Of Rome "La Sapienza"	Physics for "Infermieristica"
2014-today	Univ. Of Rome "La Sapienza"	Medical Physics
2012-2014	Univ. Of Rome "La Sapienza"	Didactics of Physics – TFA A059
2011-2017	Associazione Insegnamento Fisica	Preparation to the Physics Olympics
2007-2019	Univ. Of Rome "La Sapienza"	Scientific Programming for physicists
1999-2017	Univ. Of Rome "La Sapienza"	Statistics for High Energy Physics Laboratory
2006-2007	Univ. Of Rome "La Sapienza"	Physics for biologists
2002-2007	Univ. Of Rome "La Sapienza"	Thermodynamics (assistant)
2004-2005	Univ. Of Rome "La Sapienza"	Measurements and Statistics (assistant)

2003-2004	Univ. Of Rome “La Sapienza”	Mechanics (assistant)
2002-2003	Univ. Of Rome “La Sapienza”	Electronics Lab (assistant)
2001-2002	Univ. Of Rome “La Sapienza”	Physics for Mathematics (assistant)

*Tutor of >60 first level thesis (dissertazioni), >30 Laurea thesis, 1 specialization in medical physics, >15 PhD thesis*

## Part V -- Society memberships, Awards, Honours, Coordination Roles

YEAR	TITLE
2024-	Deputy Director of the “Teaching and Learning Center” of Univ. di Roma “La Sapienza”
2019-	Dean Faculty of Science, Univ. di Roma “La Sapienza”
2017-19	Deputy Dean Faculty of Science, Univ. di Roma “La Sapienza”
2015-	Director of the Doctorate School in Fisica degli Acceleratori of “La Sapienza” and INFN
2015-	Editor of Scientific Reports (Nature Publishing Group)
2015-	Member of the “Comitato Tecnico Scientifico Prodotti Ricerca” of “La Sapienza” (Organo Collegiale)
2015-	Member of the Executive Board of the Osservatorio Scienza per la Societa’ of the II Municipio di Roma Capitale
2015	Press release from the American SNMMI on the intraoperative beta- probe: <a href="http://www.snmmi.org/NewsPublications/NewsDetail.aspx?ItemNumber=13133">http://www.snmmi.org/NewsPublications/NewsDetail.aspx?ItemNumber=13133</a>
2014	Reviewer of SIR for MIUR
2013-2015	Member of the Research Committee of the Univ. of Rome “La Sapienza” (Organo Collegiale)
2013-	Member of the scientific committee for the “Premio Nazionale Divulgazione Scientifica” of the Associazione Italiana del Libro
2011-3	Member of the committee for the assignment of post-doc grants of INFN-Roma
2011-	President of the Rome “Young Minds Section” of the European Physics Society
2009-14	Responsible for the didactics of the Physics Department of “La Sapienza”
2009	Chissesi Tomassoni Prize from “Fondazione Sapienza”
2008-	Member of the Italian Physics Society
2008-11	Physics convener of the SuperB Collaboration
2005-6	Physics Analysis Coordinator of the BaBar Collaboration
2004-	Reviewer of Phys. Rev. Lett., Phys. Rev. D, and Phys. Lett. B
2002-5	Physics convener the BaBar Collaboration (2 different appointments)
1999-2002	Sin2beta coordinator of the BaBar Collaboration
1991-3	Winner of the “Enrico Persico” Grant of the “Accademia dei Lincei”

## Part VI -- Funding Information [grants as PI-principal investigator or I-investigator]

YEAR	FUNCTION	FUNDING-	GRANT
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		<b>AGENCY/ PROGRAM</b>	<b>VALUE (€)</b>
2023	Co-Pi	PE6 (PNRR)	300,000
2023	Co-Pi	Rome Technopole (PNRR)	150,000
2022	PI	Ateneo/Sapienza	10,000
2019	Co- Proponente	Grandi Attrezzature Sapienza	300,000
2019	PI	Ateneo/Sapienza	35,800
2019	PI	INFN/NEPTUNE	14,000
2018	Resp. Sci.	LIFE-2020 Regione Lazio	105,000
2018	PI	Ateneo/Sapienza	13,500
2017	PI	Ateneo/Sapienza	38,600
2018	PI	INFN/Chir2	20,000
2017	PI	INFN/Chir2	19,500
2016	PI	INFN/Chirone	8,000
2015	PI	INFN/Chirone	21,000
2014	PI	INFN/Chirone	10,000
2012- 2016	PI	IIT/Sapienza	250,000
2012	PI	INFN/PlasmonX	47,000
2012	PI	INFN/SuperB	38,500
2011	PI	INFN/PlasmonX	104,000
2011	PI	INFN/SuperB	31,500
2011	PI	Sapienza/Ateneo	28,600
2010	PI	INFN/PlasmonX	51,000
2010	PI	INFN/SuperB	22,000
2010	PI	Sapienza/Ateneo	15,000
2009	PI	INFN/SuperB	36,500
2009	PI	INFN/BaBar	29,500
2008	PI	INFN/BaBar	279,000
2008	PI	Sapienza/AST	15,000
2007	PI	INFN/BaBar	753,000
2000- 2006	I	INFN/BaBar	unknown
1998- 2002	I	DOE/BaBar	unknown
1994- 1998	I	INFN/L3	unknown

## Part VII Outreach and technological transfer Activities

Year	Activity
2019	Patent 102019000000202, 'Radiofarmaco per utilizzo diagnostico terapeutico in medicina nucleare e medicina radio guidata'
2016-2019	Funder and coordinator of the "LAB2GO" project for the requalification of the high school laboratories ( <a href="http://www.roma1.infn.it/LAB2GO">www.roma1.infn.it/LAB2GO</a> )
2014-2016	Coordinator of the "education" table of the Osservatorio "Scienza per la Societa'" of the Municipio II of Roma Capitale
2014-2018	Member of the organizing committee of the "Incontri di Fisica" of INFN
2014-2015	Organization of a didactical laboratory for the teaching of modern physics in high school
2013-15	Member of the scientific committee for the "Premio Nazionale Divulgazione Scientifica" of the Associazione Italiana del Libro
2014	Research contract between Sapienza, INFN, IIT, Istituto Europeo di Oncologia and Istituto Neurologico C. Besta for the experimentation of beta- probes for the complete removal of brain tumors.
2012	Patent RM2013A000050 (deposited in 2013) "SONDA DI RIVELAZIONE DI RADIAZIONE BETA- PER LA IDENTIFICAZIONE INTRAOPERATORIA DI RESIDUI TUMORALI" → Extended to PCT (deposited in 2014)
2012-today	Ideation, realization and coordination of the first Italian podcast on physics, <a href="http://www.radioscienza.it/fisicast/">http://www.radioscienza.it/fisicast/</a>

## Part VIII -- Research Activities

My activity concentrated in high energy physics and in development of radiation detectors. To shorten the keywords and the descriptions I will use the following nicknames:

MP: medical physics, sector in which I have funded a group (ARPG) that currently comprises 10 permanent staff, 6 temporary staff and each year 2-3 PhD students and ~5 undergraduates. Details in the web site <http://arpg-serv.ing2.uniroma1.it/arpg-site/>.

PLX: PlasmonX experiment on Laser Plasma Acceleration at the INFN National Laboratories in Frascati

CUORE: Cuore experiment on the measurement of the absolute neutrino mass and its Majorana/Dirac nature in the INGN Gran Sasso National Laboratories

SUPERB: Future experiment on precision measurements in flavour physics to be built in the next decade in Torvergata, Rome Italy

BABAR: BaBar experiment on CP violation in B decays at the Stanford Linear Acceleration Center

L3: L3 experiment on electroweak physics and search for new physics at the LEP accelerator of the CERN

YEARS	KEYWORDS	SHORT DESCRIPTION
2020-	MP, WIDMApp	Development of low energy radiation detectors for dosimetry in

today		Molecular Radio Therapy treatments.
2019-2023	MP, NEPTUNE	Project to benchmark and improve MRI with fluorine
2018-2019	MP, Sentiment Analysis	PI of an industrial research project for the application of machine learning to the patient-doctor interactions.
2011-today	MP, intraoperative probes	Development of an intraoperative probe for the detector of tumor residuals. <b>Activity financed by IIT</b> in a joint grant with Sapienza. Partnership with the Istituto Neurologico Carlo Besta, the IEO, the Policlinico Gemelli of Rome, and the Ospedale Pediatrico Bambin Gesù'.
2011-today	MP, Hadron-therapy dosimetry	Measurement of the products of the interactions of ions with the patient during hadrotherapy and development of an innovative detector for dosimetry.
2013	LENR	Verification of a measurement of Low Energy Nuclear Reactions
2009-2012	PLX, Laser Plasma Acceleration, Spectrometer	Development of a spectrometer to measure the spectrum of the electrons generated in the interaction of a ultra-high power laser with plasma (PlasmonX experiment). I am the <b>PI</b> of the group that designed, deployed and tested the electromagnetic spectrometer
2008-2012	SUPERB, electromagnetic calorimeter	<b>PI of the Rome group</b> , involved in the design of the electromagnetic calorimeter of the SuperB experiment (crystal choice, test-beams, electronics and mechanics)
2008-2012	SUPERB, spectroscopy, exotica	<b>Convener of the Spectroscopy and Exotica WG</b> of the SuperB collaboration. I coordinate the activities towards the assessment of the physics reach of SuperB in the study of the heavy quarkonium spectroscopy and of the direct searches of exotic particles.
2007-2013	BABAR, spectroscopy, phenomenology	The large number of exotic charmonium states observed was a hint of the existence of a new kind of matter never observed before: bound states of four quarks or of two quarks and a gluon. The plethora of measurements had to be systematized with a joint experimentalists-theorists work. I have therefore created a collaboration with theory colleagues to review the observations and the interpretations in a consistent way. From this work few individual papers were published, but above all a review. In virtue of this work I was also appointed <b>Section Editor of the BaBar-Belle legacy book</b> that should be published in 2012 and represents the official review of the current generation of B-Factories.
2006-2009	CUORE, database	<b>Responsible for the development and maintenance of the database</b> that stores the hardware and operational information needed for data analysis of the Cuore experiment and active part to the restructuring of the experiment's code.
2008	BABAR, spectroscopy, high energy scan	In the context of my studies on possible exotic spectroscopy, I designed, coordinated, and studied an <b>energy scan of the PEP-II accelerator at the Stanford Linear Accelerator Center</b> , on which BaBar operated. The scan was finalized to the search for exotic bottomonium. This run represents the most accurate such

		scan, twenty times better than the previous existing ones. No exotic state was unfortunately found.
2005-2009	BABAR, Physics Coordinator, CKM	<b>Physics Coordinator of the BaBar Experiment</b> (600+ collaborators) in 2005-2006. During my term the experiment produced in excess of 70 papers, observed for the first time several new quark bound states and refined significant the bounds on the possible physics beyond the Standard Model involving the low energy processes BaBar can study. Following this experience I was the <b>chair</b> of the 2008 edition of the most outstanding workshop on the physics of BaBar, the <b>CKM workshop</b> . In this role I was able to coordinate the activity of 150+ people towards the realization of a <b>Phys. Repts.</b> which is the current reference paper on the topic.
2002-2005	BABAR, semileptonic B decays, recoil physics	I developed an innovative technique for the study of B meson decays in high luminosity B-factories that allows to perform inclusive measurements in large background environments ( <b>Recoil Physics method</b> ). Its first application, designed by me and realized by a group lead by me, was to the measurement of the $b \rightarrow u$ transitions and therefore besides being responsible for the Recoil Physics activities I was appointed <b>convener of the BaBar physics group for the measurement of the sides of the Cabibbo Kobayashi Maskawa (CKM) matrix</b> .
2002-2005	BABAR, gamma	I developed and implemented with a student a novel measurement of the CKM matrix angle gamma based on B decays to non CP-eigenstates. The technique, that required several ancillary measurements, is now well established
1999-2002	BABAR, sin2beta, CP violation, charmonium	The measurement of the CP violating quantity sin2beta was the flagship analysis of the BaBar experiment. Its measurement corresponded to the first observation of violation of the CP parity in B decays and was critical in the assessment of the mechanism that lead from the Big-Bang (when matter and anti-matter were present in equal parts) to the current universe, where anti-matter is highly suppressed. I was first coordinator from the start of the experiment of the working group devoted to the reconstruction of the events needed for such measurement and then I was the first "sin2beta coordinator", i.e. the coordinator of a group of about 100 physicists that performed the first observation of CP violation in B decays.
1999-2000	BABAR, database	I designed and implemented the <b>data format</b> that summarized all the information needed for the analysis of the data, which otherwise, given the extremely high rate of good events, would be gigantic
1998-1999	BABAR, Drift Chamber, Vertexing	My first contribution to the BaBar experiment was in the commissioning of the drift chamber. Next I developed the code for the reconstruction of secondary vertices, a critical ingredient for all the exclusive analyses performed in the experiment, starting from the measurement of sin2beta
1996-	L3, electromagnetic calorimeter, lead and	responsible for the installation and running of an electromagnetic calorimeter made of lead and scintillating

1998	scintillating fibers	fibers filling the gaps in the L3 electromagnetic calorimeter.
1996-1998	L3, $\sin^2\theta_w$ , hadronic Z decays	My PHD thesis was on the development of a novel analysis technique that allowed to measure the electroweak mixing angle $\theta_w$ in hadronic Z decays. This measurement required particular care and ad-hoc techniques because of the relatively poor performances of the tracking system of the experiment.
1994-1998	L3, Higgs Boson	I searched for the Higgs boson (the particle predicted by the Standard Model of particle physics (SM) to be responsible for the masses) decays into bottom quarks. This was the most challenging way of looking for it at LEP because the quarks could not be observed directly but as jets of a large number of hadrons. Reconstructing the jets and achieving the best possible discrimination power, in particular by exploiting the possibility to identify the hadrons containing bottom quarks by their long decay time, was my major contribution to the L3 data analysis. Although the for the Higgs boson did not unveil any signal, a competing experiment claimed the observation of a particle decaying into the same final state I was studying and where I was not observing any deviation from the expectation from the background. After two years of intense cross checks among us and devoted data taking, where I was the contact person on the topic for L3, it was proven that the signal actually did not exist.

## Part VIII -- Summary of Scientific Achievements

Product type	Number	Data Base	Year/Start	End
Papers [international]	823	ISI	1995	2016

Total Citations	20458
Average Citations per Product	24.4
Hirsch (H) index	63
Normalized H index*	3.5

\*H index versus/divided by the academic seniority (time span from Ph.D.)

## Workshops/conferences

YEAR	TITLE
2022	Talk@ Retreat INFN, Assisi
2019	Seminario Univ. Di Berna
2018	Talk@ Retreat INFN, Assisi
2017	TALK@ICTS course, IEO
2016	Talk@ICTR-PHE Geneva
	Talk@INFN2016 LNF
	Talk@Congresso Nazionale di Chirurgia Raggioguidata, Milano
2015	Chair of Rain15 (Radiazione per l'Innovazione)

	Talk@INFIERI Hamburg
	Talk@AINM a Rimini
2014	Talk @ ICTR-Phe Geneva
	Talk @ MEDAMI Alghero
	Talk @ SIRR, Padova
	Talk@ EANM Padova
2014-2017	Program Committee of “Incontri di Fisica” at Laboratori Nazionali di Frascati INFN
2013	Chair of the workshop on “Neutron Production at IRIDE”
	Talk @ AIFM Torino
	Talk @ SINCh Palermo
2012-today	Scientific Committee of INFN school of Statistics (Vietri, Italy)
2012	Scientific Committee of PhiPsi2013 (Rome, Italy)
2011	Scientific Secretary of the CLXXIX “Fermi School” of the SIF on “Laser Plasma Acceleration”
2010	Member of the Scientific Committee of Discrete 2010 (Rome)
2008	Convener of the Heavy Quark Spectroscopy section at ICHEP (Philadelphia)
2008	Chair of the CKM workshop (Rome) and corresponding author of the corresponding Physics Reports.
2003-2010	Member of the Scientific Committee of the CKM workshop (San Diego, Nagoya)
2005	Member of the Local Organizing committee of Beauty 2005 (Perugia)
2005	Convener of the ITP-SLAC joint workshop (Seattle)
2005-today	Member of the Scientific Committee of the Frascati Spring School (Frascati)
2003	Convener of WIN’03 (Lake Geneva – Illinois – USA)
2003	Convener of the III edition of the “Incontro Fisica Alte Energie” (Lecce)

Rome, 26/9/2023

Riccardo Faccini