# ADELE LA RANA

## *Curriculum Vitae*

*Macerata, 27 Febbraio 2025*

## Part I – General Information

**Full name:** Adele La Rana
**Citizenship:** Italian
**Spoken Languages:** Italian, English, French
**Current Position:** Assistant Professor (RtdB) in History and Didactics of Physics at the Department of Education, Cultural Heritage and Tourism of the University of Macerata (Italy)
**National Scientific Qualification: History and Didactics of Physics** (Fis08, II fascia, 2022-2034)

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## Part II – Education

- **2004: University graduation (Laurea) in Physics** (110/110 *cum laude*), University of Naples Federico II. Thesis: "*Metodi adattivi di analisi di segnali per la rivelazione di onde gravitazionali*" ("Adaptive signal processing methods for gravitational wave detection")

- **2007: PhD in Fundamental and Applied Physics** (final mark: Excellent), University of Naples Federico II. Thesis: "*An Optical Readout for the Gravitational Reference Sensor of LISA*"

- **2009: Two-year Master in Science Communication** (30/30 *cum laude*), International School for Advanced Studies in Trieste (SISSA). Thesis: "*Se sapessi dirlo, non avrei bisogno di danzarlo.* La comunicazione della scienza attraverso il dinamismo corporeo" ("*If I could say it I wouldn't have to dance it.* Science communication through body dynamism")

## Part III – Appointments

### IIIA – Academic Appointments

- **2017-2019**: **Research grant in History of Physics** at the *Enrico Fermi Historical Museum of Physics and Study and Research Centre* – Rome, collaborating with Prof. Paolo Rossi of Pisa University

- **2019-2021**: **Assistant Project Scientist** at the Dept. of Physics and Astronomy of the University of California Riverside, as collaborator in history of physics of Prof. **Barry Barish** (Nobel Prize for Physics 2017)

- **2021-2022: Fixed-term Researcher (RtdA) in History and Didactics of Physics** (Fis08) at the Dept. of Computer Science of the University of Verona, collaborating with Prof. Francesca Monti

- **2022-to date: Assistant Professor (RtdB) in History and Didactics of Physics** (Fis08, now PHYS-06/B) at the Dept. of Education, Cultural Heritage and Tourism of the University of Macerata

- **2023-2025: Associated Principal Investigator** in the **PRIN** project "FusEUrope – European cooperation in nuclear fusion research: from history to future policy design", responsible for the Research Unit at the University of Macerata

- **2024-to date:** Teaching assignment at the **University of Camerino** for the course "**Teaching Methodologies for Physics**", within the framework of the "University Paths for Initial Training and Qualification of Teachers for Middle and Upper Secondary Schools - Classes A027 and A020" (**PF60 and PF30**)

- **2024-to date:** Teaching assignment for the course "**Physics applied to cultural heritage**" at the **Specialization School of Historical and Artistic Heritage** at the University of Macerata

- **2023-to date:** Several institutional appointments at the University of Macerata. Member of the Commission "Riesame ciclico LM85bis" (Primary Education Sciences). Member of the Study Plan Commission for LM85bis. Member of the Admission Exam Commission for LM85bis. Member of the Commission for the verification of cultural qualifications and access for the "TFA Sostegno" (Tirocinio Formativo Attivo) for the Kindergarten and Primary Schools. Member of Recruitment committees for the assignment of teaching positions and supplementary teaching assignments. Member of the Commission for the revision of the scientific area curricula for LM85bis

## IIIB – Other Appointments

- **2008:** Temporary position as **Expert for the creation of digital shows/lessons** at the newly built *Planetarium of Caserta*

- **2009: Founding member** of the science communication association *Treehouse. La Scienza racconta.* Outreach activities: **science games** addressed especially to children

- **2009-2010:** Temporary position as **Scientific Editor**, *Zanichelli publishing house* – Bologna

- **2010-2017: Scientific Assistant of Prof. Ugo Amaldi**, *TERA Foundation* – at **CERN, Geneva (2010-2012)** and then hosted by the Dep. of Physics at **Sapienza University, Rome (2012-2017)**.

- **2010-2017: Occasional collaborations** as a science writer and editor of physics books and manuals for the publishing house **Zanichelli**; occasional collaboration as editor for **Adelphi.**

- **2015-2018:** Oral history project about the physicist Edoardo Amaldi and XX Century Physics, collecting video-interviews. Making of the **docufilm *La Scelta. Edoardo Amaldi e la scienza senza confini*** (*The Decision. Edoardo Amaldi and Science without borders*) directed by Enrico Agapito and written by Adele La Rana, financed by **TERA Foundation, Zanichelli publisher, INFN CC3M**.

- **2019-to date:** Member of Organizing Committees of several International Conferences and Workshops in History of Physics.

- **2020-21**: **Project VEROSH** (Virtual ExploRation Of Science History) at the ***Enrico Fermi Research Centre*** (Rome). Project supported by *Regione Lazio*. As a physics historian, I contributed at planning, writing and supervising the historical-scientific contents for a possible new wing of the Museum of via Panisperna.

- **2021-22:** Co-curator with Prof. G. Battimelli and Prof. M. De Maria of the new expanded edition of the book "**Da via Panisperna all'America. I fisici italiani e la Seconda Guerra Mondiale**" (Editori Riuniti, Rome 2022).

- **2021-2024: Proposer and co-guest-editor of the special issue** *Shaping a Multi-Messenger Universe: Historical Perspectives on the Changing Skyscape of Astronomical Observation* for ***Centaurus***, class A journal of the **European Society for the History of Science** (co-guest-editors Dr Luisa Bonolis of Max Planck Institute for the History of Science and Dr Roberto Lalli, Polytechnic of Turin). To be published in early 2025.

- **2021-to date:** Co-authorship with Nobel Laureate Barry Barish of a **scientific biography of Edoardo Amaldi**, under contract with Oxford University Press.

- **2023-2024:** Co-curator with Dr. Luisa Bonolis of the new enriched edition of the book by Ginestra Amaldi and Laura Fermi "**Alchimia del tempo nostro**", under contract with the publisher Castelvecchi (Florence).

## Part IV – Research associations and Scientific Committees/Collaborations

- **2012-2014:** Research associate at the Physics Department of Sapienza University of Rome, within the history of physics group (Prof. Giovanni Battimelli)

- **2015-to date: Research associate of INFN**, in the Virgo group of the Sapienza University of Rome

- **2019-February 2025**: **Elected member of the Executive Board** of the *Italian Society for the History of Physics and Astronomy* (**SISFA**)

- **2021-to date:** Member of the **LIGO-Virgo Collaboration**

- **2021-to date**: Member of the **Editorial Board of the journal *Giornale di Fisica*** of the Italian Physical Society, especially oriented to schoolteachers

- **2021-to-date**: Member of the team **INFN-Kids** (https://web.infn.it/infn-kids/)

- **2022-to date:** Among the founding members of the **National Coordination of Fis08** (**CooFis08**), led by the elected president Prof. Marisa Michelini

- **2023-to date:** Member of the **Research Group on the History and Didactics of Physics**, affiliated with the National Coordination of Fis08

- **2023-to date:** Research associate of the **Enrico Fermi Research Centre** (CREF, Rome)

## Part V – Teaching experience

- **2021: University of Verona**. Primary Education Sciences (*Scienze della Formazione Primaria*). Course: "***Foundations and didactics of physics"*** (100 students; 8 CFU).
- **2021: University of Verona**. **Credit-free course** addressed to students of all faculties and aimed at the development of transversal skills (https://talc.univr.it/it/competenze-trasversali): "*Con i piedi per terra: l'approccio scientifico all'interpretazione della realtà attraverso l'esempio dell'evoluzione del concetto di gravità*" (about 10 students).
- **2022: University of Verona**. Primary Education Sciences (*Scienze della Formazione Primaria*). Course: "***Foundations and didactics of physics"*** (100 students; 8 CFU).
- **2022: University of Verona**. **Credit-free course** addressed to students of all faculties and aimed at the development of transversal skills (https://talc.univr.it/it/competenze-trasversali): "*Con i piedi per terra: l'approccio scientifico all'interpretazione della realtà attraverso l'esempio dell'evoluzione del concetto di gravità*" (about 10 students).
- **2023: University of Macerata**. Primary Education Sciences. Course: "***Didactics of physics"*** (about 300 students; 9 CFU course, including 1 CFU Laboratory with mandatory attendance)
- **2024: University of Macerata**. Primary Education Sciences. Course: "***Didactics of physics"*** (about 300 students; 9 CFU course, including 1 CFU Laboratory with mandatory attendance)
- **2024: University of Macerata**. **Specialization School of Historical and Artistic Heritage**. Course: "***Physics applied to cultural heritage***" (about 15 students; 1 CFU)
- **2024 (May-June)**: **University of Camerino**. *Percorsi Universitari di* ***Formazione Iniziale e Abilitazione dei docenti*** *delle Scuole Secondarie di Primo e Secondo Grado - Classe A027 (****PF30****)*. Course: module 1 of course "***Teaching Methodologies for Physics***" (about 50 students; 1 CFU).

- **2024 (November)**: **University of Camerino**. *Percorsi Universitari di **Formazione Iniziale e Abilitazione dei docenti** delle Scuole Secondarie di Primo e Secondo Grado – Classi A020 e A027 (**PF30 e PF60**)*. Course: module 1 of course "***Teaching Methodologies for Physics***" (1 CFU).
- **2024 (November): University of Macerata**. Primary Education Sciences. Interdisciplinary **laboratory in co-teaching mode**: "Didactics and disciplinary didactics" (1 CFU).

In addition, at the University of Macerata, I have supervised and am actually supervising several **undergraduate theses in Didactics of Physics** for Primary Education Sciences.
At the University of Verona I contributed to the PLS (Piano Lauree Scientifiche) initiatives, collaborating with Prof. Francesca Monti and Prof. Claudia Daffara.

## Part VI – Awards

**2005:** First place at the competition for the **best popular article on General Relativity**, organized by the University of Naples Federico II, for the paper: A. La Rana, *La Teoria della Relatività* [1].
**2019:** Award for the best contribution to the session of History of Physics and Physics Education at the 104° National Congress of Italian Physical Society (2018), for the dissertation*: Il Dizionario Biografico dei Fisici Italiani: lo stato dei lavori* (*The Biographical Dictionary of Italian Physicists: the work progress*) (https://www.sif.it/attivita/congresso/104/comunicazioni)
**2020:** Award of the Italian Physical Society for Science Communication, for the screenplay of the documentary film *La Scelta. Edoardo Amaldi e la scienza senza confini* (https://www.sif.it/attivita/congresso/106/premiati)
**2022**: Award of the Italian Physical Society for History of Physics, shared with Prof. Paolo Rossi, for conceiving and writing the volumes *I Fisici Italiani*, a biographical dictionary of Italian scholars who contributed to the advancement of physics, starting from the Renaissance up to the XX century (https://2022.congresso.sif.it/info/premiati-2022)

## Part VII – Research activities

My research activities have been focused on gravitational wave physics and on history of physics, with forays into the fields of physics education and science communication.

### *Gravitational waves*

During my PhD studies, I carried out a research activity in the framework of the project LISA (Laser Interferometer Space Antenna), at the time a joint ESA-NASA endeavour, aiming at space-based gravitational wave detection (http://www.fedoa.unina.it/1793/1/La_Rana_Fisica_Fondamentale_ed_Applicata.pdf).
My experimental investigations focused on [3, 7, 55]:

1. the development and test of an optical readout system for the gravitational reference sensor of LISA;
2. the characterization of the optical sensor noise at very low frequencies (100 μHz - 100 mHz);
3. the testing of the sensor on the four-mass torsion pendulum facility at the Physics

Department of Trento University.

I participated in the work of the VLT Survey Telescope group in Naples, mounting an optical readout system on the secondary mirror of the telescope, to provide a handy solution for measuring its displacements [2].
During my PhD studies alongside the love for scientific research, a strong interest in a more interdisciplinary understanding of science matured in me, which prompted me to give up the proposal of a post-doc position and to participate in the selection to access the Master in science communication at Sissa in Trieste. From there on, I gradually found my way to history of physics.

## *History of Physics*

I have been carrying on research activities in history of physics along the following main threads.

**History of gravitational wave research**

Taking advantage of my scientific background in the field of gravitational wave detection, in early 2015 I started a detailed study of the *Edoardo Amaldi Archive* to investigate the beginning of gravitational wave research in Italy and the pioneering role played by Amaldi and his colleagues in Rome during the so-called Renaissance of General Relativity (1950s-60s). As a research associate of INFN in the Virgo group of Sapienza University, I started a collaboration with the historians Luisa Bonolis and Roberto Lalli at the Max Planck Institute for the History of Science in Berlin [56, 59, 60]. Since then, I have been working at an accurate investigation of the birth and development of the Virgo collaboration, starting from the construction of the first prototypes of interferometric detectors in Europe in the '70s and focusing on the reasons why Virgo was born as a French-Italian project instead of a European one [24, 30, 35, 37, 57, 58, 64]. I interviewed the main protagonists of those events and started a collaboration with Alain Brillet (co-founder of Virgo experiment with Adalberto Giazotto) and the European Gravitational Observatory (EGO), to help organize Brillet's personal archive at the EGO-Virgo site in Cascina. I promoted the birth of the archival fund of Guido Pizzella in the archives of the Department of Physics of Sapienza University, to preserve the documents of Pizzella, father with Edoardo Amaldi of the Italian research on gravitational waves.

As part of this research activity I supervised a graduation thesis in physics at Sapienza University of Rome, analyzing the history of the alleged detection of gravitational waves from SN1987A:

*L'esplosione di Supernova 1987A: una prospettiva storica sulla ricerca delle onde gravitazionali a Roma*. **Candidate**: Marco Giganti.

**Supervisors**: Prof. Fulvio Ricci and Dr. Adele La Rana. Discussed on July 24, 2019.

The thesis won the **2020 SISFA Award for the best degree thesis in history of physics** (http://www.sisfa.org/notizie-eventi/premio-di-laurea-sisfa-2020-2/).

**History and roots of multimessenger astronomy**

As a member of the Executive board of the Italian Society for the History of Physics and Astronomy (SISFA), in October 2020 I launched the idea of proposing to *Centaurus* - the journal of the European Society for the History of Science (http://eshs.ens.fr/Centaurus.html?lang=en) - a special issue concerning the history of multimessenger astronomy, a still poorly explored research field in history of science. Bearing this purpose in mind, I co-organized with the physics historians Luisa Bonolis and Roberto Lalli (at the time, both from the Max Planck Institute for the History of Science) an international on-line workshop called "Observing, sensing, detecting. Toward a multi-layered picture of the Universe from historical and epistemological perspectives" (February 4-5, 2021). The workshop was promoted by SISFA with the endorsement of Commission C3 History of Astronomy of the International Astronomical Union and of the History of Physics Group of the European Physical Society (http://www.sisfa.org/observing-sensing-detecting/).

The workshop and the final roundtable have seen the participation of some of the world's leading experts in multiwave and multi-messenger astronomy, among which the Nobel Laureates Barry Barish and Reinhard Genzel (video recordings available here: https://www.youtube.com/watch?v=qRuvngxELY0). As a follow-up of the workshop, I coordinated and built with the historian Luisa Bonolis (Max Planck Institute for the History of Science) a proposal of special issue for Centaurus, entitled "Shaping a Multi-Messenger Universe: Historical Perspectives on the Changing Skyscape of Astronomical Observation", which collects several contributions from scholars of different institutions in the world. The proposal has been evaluated by a board of peer-reviewers and accepted. Dr Bonolis, Dr R. Lalli (Polytechnique of Turin) and I are working as guest editors of the special issue, coordinating the peer-reviewing process. We also contribute with two papers and an introduction to the issue, which is planned to be published in the spring of 2025 [52, 53].

**Edoardo Amaldi and his contributions to the XX century physics**

Since 2012, I have been studying Amaldi's documents and papers stored in the *Edoardo Amaldi Archive* at the Physics Department of Sapienza University in Rome, with the purpose of analyzing and putting in a historical perspective the role of Amaldi in science and scientific policy. It is a research of great interest and complexity, since Amaldi's activity and commitment concerned many of the most significant episodes in the development of twentieth century physics and in the evolution of the role of physics in society and in international politics: the dawn of nuclear physics, the transition to Big science, the post-war nuclear policies, the birth of CERN and ESA, just to cite some relevant examples. I collected many unpublished issues and insights in Amaldi's scientific and personal life and a considerable amount of interviews to scientists and relatives all over Italy and at CERN, which constitute a very interesting piece of oral history of XX century physics.

In 2015 I started to collaborate with the film director Enrico Agapito and I gave birth to a video-archive project about Amaldi: I collected over 30 hours of video-interviews with eminent scientists, which are about to be deposited in the *Edoardo Amaldi Archive*. Small parts of these interviews have been included in a docufilm [Doc].

My research project evolved over time, following my investigations and my growth as a physics historian. In autumn 2015, I had the chance to meet Prof. Barry Barish and we agreed to write together a scientific biography of Amaldi. Many things happened since then: the first detection of gravitational waves and Prof. Barish's Nobel Prize in physics in 2017. Between October 2019 and January 2021, I held the position of Assistant Project Scientist at the University of California Riverside, collaborating as historian of physics with Prof. Barish at the scientific biography of Edoardo Amaldi. In early 2021, we submitted a detailed proposal to a few international publishers and signed a contract with Oxford University Press. Our book is expected to be published in 2026.

**History of Italian physicists from XV to XXI century**

I carried on my research activities about the biographies of Italian physicists in two different frameworks: **A.** the editorial project *Dizionario biografico degli Italiani* of the Treccani; **B.** the project *A prosopography of Italian physics* of the Enrico Fermi Centre (Rome).

**A.** Since 2015 I collaborated at the ***Dizionario biografico degli Italiani,*** a biographical dictionary published by **Istituto della Enciclopedia Italiana Treccani** and collecting over 30.000 biographies of distinguished Italians. I have been tracing accurate biographies of five Italian physicists of the XX century, writing the related entries for the dictionary [15, 19, 20, 21, 25]. The research work was carried out in various archives (Central State Archive, University Rectorate Archives, Personal archives), and by consulting the papers and documents in possession of the scientists' families. Besides the investigations aimed at tracing the *curriculum vitae* of each physicist, a careful study of his/her scientific work was necessary to describe his/her research in detail and put it in a historical-scientific perspective.

**B.** In 2017 I won the public competition for a research grant in history of physics, launched by the **Enrico Fermi Centre**, to take part in the project ***A prosopography of Italian physics*** lead by Prof. Paolo Rossi of Pisa University. This project is the first extensive historical research aimed at making a census of all Italian scholars, who contributed to the progress and dissemination of the physical sciences, and at writing the first biographical dictionary of Italian physicists. My research activity was articulated over three main periods of time:

1. from the Renaissance to the Risorgimento (Physicists born until 1770);
2. from the Risorgimento to World War II (Physicists born between 1770 and 1918);
3. from the Second Postwar Period to the dawn of the Third Millennium (Physicists born between 1918 and 1948).

The research was carried out by consulting a considerable quantity of archival documents at the Central State Archive (Rome) and in the Rectorate archives of Italian universities, in addition to a careful inspection of the yearbooks of the Ministry of Education and of several universities, and to a broad search of the registry records of hundreds of Italian municipalities. The investigation concerning time lapse 2 led to identifying about 1000 physicists, among which about 250 secondary

school teachers and about 100 women physicists. A comparison with the *Dizionario biografico degli Italiani* is worthwhile: selecting only the physicists born between 1770 and 1918 in the present index of Treccani's dictionary, 220 names are found, compared to our 1000 names. Furthermore, the 250 biographical data sheets about school teachers represent an unprecedented and very meaningful repertoire. These teachers – among which a not negligible number of women physicists is found – had a relevant role in providing the first generation of Italian students with a shared scientific culture and in addressing brilliant pupils towards scientific studies [26].

Our prosopographic study provides a relevant tool for historians, allowing to follow extensively the evolution in time of the community of Italian physicists (for example their number, their gender, their main scientific interests, etc) and also to trace the scientific genealogies of Italian scholars in the field of physics.

The first two volumes of our biographical dictionary, including in total over one thousand biographies, have been published as supplements of the editorial series *Il Giornale di Fisica* of the Italian Physical Society (SIF) [27, 31, 32, 39]: https://www.sif.it/riviste/sif/gdf/fisici-italiani.

The original research carried out for the prosopographic project provided me a fruitful starting point for further historical studies, especially concerning on one hand the connections between the physics schools of Pisa and Rome in the second half of the nineteenth century, and on the other, the first diffusion of quantum mechanics in Italy [28, 33, 63, 66]. I subsequently developed an interest for the lives and the work of **Laura Fermi and Ginestra Amaldi**, and I recently have been working on the history of "**Alchimia del tempo nostro**", the first Italian book on nuclear physics devoted to laymen, which they published together in 1936 and, in 2nd edition, in 1943 [46,47,48]. From archival documents, I have been tracing also the history of Laura Fermi's "**Atoms in the family. My life with Enrico Fermi**" and have been invited to write the preface of its new Italian edition [49].

**History of European cooperation in nuclear fusion research**

As associated PI at the University of Macerata, I contribute to the PRIN "FusEurope. European cooperation in nuclear fusion research: From history to future policy design" (2023-2025). The project was awarded funding through the PRIN 2022 PNRR call for the SH6 sector (Social Sciences and Humanities – The study of the human past). The universities involved are: Polytechnic of Turin (PI's headquarters), University of Padua, University of Milan, and the University of Macerata. The project aims at a multidisciplinary analysis of the history of techno-scientific cooperation in nuclear fusion energy research for pacific uses in Europe in relation to the process of European political integration, from its early phases at EURATOM in 1957 up to the establishment of ITER in 2007. The multidisciplinary team includes the science historian Roberto Lalli (PI), the historian of international relations Giulia Bentivoglio, the social epistemologist Luca Guzzardi, the network analyst Giorgio Matteoli, the political economist Francesco Nicoli. My contributions mainly concern archival research, oral history interviews and historical analysis.

### *History of Physics and Physics Education*

For several years I have been focusing my efforts in educational activities to explore the possibilities of complementing the basic notions of physics taught to high school students with a historical approach to those concepts [4, 9, 23, Doc, 43]. As a member of the Executive board of SISFA, I am actively promoting initiatives aimed at enhancing the collaboration between researchers in history of physics and in physics education. In 2019 we have established a collaboration with the physics education research group led by Prof. Marisa Michelini at the University of Udine, organizing the first SISFA Workshop devoted to high school teachers and accredited by MIUR (http://www.sisfa.org/workshop-2019/). The purpose was to provide high school teachers with historical-scientific insights and perspectives on special topics in physics and to enrich their cultural background, for a more effective didactic transfer to students. The 2019 SISFA Workshop was held at the Department of Physics of Pisa and dealt with the concept of mass, given the recent redefinition of the International System of Units.

Since 2023, in the framework of the National Coordination of Fis08, we have established a **Research Group on the History and Didactics of Physics**, aimed at constructing a methodological framework for teaching physics that leverages a historical and epistemological approach to the subject.
I am one of three historians of physics involved in the project, in which historians and researchers in didactics of physics are collaborating in close synergy. The research group is now focusing on the specific case of fluid mechanics and is conducting an in-depth study of the works of Galileo, Torricelli, and Pascal.

### *Science Education and Science Communication through body dynamism*

In my experience, the interdisciplinary connections as well as the narrative dimension of science are successful tools to stimulate scientific reasoning. This appears especially true for children, as I could learn starting from my research activity in Science Communication for my Master thesis at SISSA, Trieste (https://iris.sissa.it/retrieve/handle/20.500.11767/5017/2981/1963_6194_La%20Rana.pdf)
I investigated two very different initiatives connecting dance and science:

1. ***Dancing science***, an educational project carried out in British primary schools in the framework of the UK government's programme *Creative Partnerships,* aimed at promoting creative learning (https://en.wikipedia.org/wiki/Creative_Partnerships).
   The project would lend itself to being extended and adapted for experiencing kinesthetic learning of science in Italian primary schools.
2. ***Ferocious beauty: Genome***, a choreography by the US performer Liz Lerman, built on a strong interaction between dancers and researchers in life sciences (https://lizlerman.com/ferocious-beauty-genome/).

## Part VIII – Outreach activities and Educational publishing

My outreach activities started during my PhD, when I wrote a paper on Einstein's theory of gravitation addressed to general public, which was awarded by the University of Naples Federico II [1]. In the following years I've been involved in projects for science education and outreach in **primary schools** (educational science games) and in **secondary schools** (educational science games; art-science competitions for middle and high school pupils; physics manuals; popular science books on physics; outreach talks; a special docufilm about the physicist Edoardo Amaldi).

In all these activities my attention has been focused with increasing commitment on integrating the **history of physics** into the teaching of the field, for a deeper, interdisciplinary and contextualized understanding of scientific concepts, processes and objectives.

Especially in my contributions to textbooks, I aimed at describing the gradual emergence and affirmation of physical concepts - such as *force*, *inertia*, *heat*, *energy* - and showing the processes which led to build increasingly accurate and predictive models of physical phenomena [9, 23].

Since February 2021 I teach in the degree course of *Primary Education Sciences*, which is a precious stimulus for me and encouragement to explore new strategies for transmitting scientific contents and scientific attitudes and approaches.

### *Scientific Games*

With Davide Coero Borga, Filippo Fiori and Fabio Meliciani (all three trained in philosophy of science), Andrea Gentile (neuroscience) and Enrico Poli (computer engineer), who were attending with me the Master in Science Communication in Trieste, in 2009 we founded the association *Treehouse. La Scienza racconta*.

We invented and developed the colorful science games ***Scartacarbone*** (involving giant playing cards inspired by the Energy Problem and especially devoted to children) and ***Braeintstein*** (inspired by Einstein's life, its historical and cultural context, the theories of relativity). Both are team games, animated by a presenter and by music, with an accurate direction, in the form of a TV show.

We presented the games at several science festivals, including: *EuroScience Open Forum* (2010), in Turin (our location: Piazza Castello); *I mondi di Galileo* (2009), in Venice on the occasion of the International Year of Astronomy (our location: Peggy Guggenheim Museum); *Festival dell'Energia* (2009), in Lecce (our location: Piazza Duomo); *Festival delle Scienze* (2009) in Rome, at the Auditorium "Parco della Musica". On all these occasions dozens of **primary and secondary school students** participated in our games, together with their families or with their teachers. The copyright of *Braeinstein* has been purchased by the **Italian Space Agency**.

### *Educational Publishing*

I have carried out my activities concerning educational publishing in the following four different frameworks.

**Science editor at Zanichelli publishing house**, Bologna (2009-2010). I worked as an editor for science textbooks addressed to high schools [5], in particular *L'Amaldi 2.0* [6] and the related website with the multimedia content. While I was employeed by Zanichelli, I met Prof. Ugo Amaldi,

who proposed to me a contract to work with him in TERA Foundation (CERN, Geneva), as a science writer.

**Science writer at TERA Foundation** (2010-2017). I collaborated with Prof. Ugo Amaldi as a science writer, scientific editor, editorial coordinator and iconographic researcher in many editorial activities. Together we worked on the writing of three books and a paper [8, 11, 12, 14].

**Appointments as author and editor for Zanichelli publishing house**

My first appointment as an author concerned writing a few in-depth contributions in *Idee per insegnare* (2009), a special manual devoted to teachers of mathematics [4].

Since then I have contributed as an author and editor to several physics textbooks for high schools, belonging to the series *Amaldi*, which are the most popular physics manuals in Italian lyceums (about 40% of Italian high school students learn the basics of physics on the *Amaldi*) [9, 10, 23].

**Appointment for Adelphi publishing firm**

Editor of the second Italian edition of *The Universal Computer: The Road from Leibniz to Turing* by Martin Davis and translator of new contributions to the second American edition. The book was published on the centenary of Alan Turing's birth (Adelphi, 2012) [13].

## *Documentary Film*

The docufilm *La Scelta. Edoardo Amaldi e la scienza senza confine* (92 min), which I co-authored with the film director Enrico Agapito [Doc] is especially devoted to high school students and is accessible to teachers and pupils on the Zanichelli website, where it has received wide and enthusiastic approval.

I took care of the project already at an early stage, looking for possible financiers and sponsors and finally obtaining the necessary funds and patronage. I also contributed to the English translation of the docufilm - *The Decision. Edoardo Amaldi and Science without borders* - which is available with English subtitles [Doc].

Since its **first showing** in December **2018**, I presented the docufilm in about 30 occasions in Italian and international contexts, including CERN (Geneva), ETH (Zurich), European Gravitational Observatory (online event during the Covid-19 quarantine) and several scientific festivals and conferences, including the 2020 Conference of the European Society for History of Science and the 2023 Science Festival in Genova.

## *Outreach Seminars in Schools, Theatres, Museums.*

Since 2014, I have been giving over fifty invited outreach talks in high schools, scientific museums, theatres and science festivals all around Italy (some are listed at the end of this CV). Main arguments: History of XX Century Physics, General Relativity and Gravitational wave research.

I participated in the national project *La scienza a scuola* by Zanichelli and in other initiatives sponsored by the publishing house, which involved notorious experts from various fields of science to meet and speak to Italian high schools students all over Italy.

### *Outreach activities in the team of INFN-Kids*

Since October 2021 I am a member of the team INFN-Kids, a special group of the Italian National Institute for Nuclear Physics promoting several scientific outreach initiatives dedicated to children of primary and middles schools (https://web.infn.it/infn-kids/) [34]. As a physics historian, I contribute texts about the story of scientists' lives and discoveries, published on the webpages of INFN-Kids.

### *Interviews on TV and Radio*

**2020:** Interviewee in the episode "Enrico Fermi -Emilio Segrè" of the TV miniseries *Nobel Minds*, devoted to the Italian Nobel Laureates. The miniseries was aired on the TV channel RAI Storia as part of Paolo Mieli's program Italiani (https://www.raiplay.it/video/2020/06/Italiani-Nobel-Minds-p1-Enrico-Fermi---Emilio-Segre-09835866-b492-44f5-b73b-3aae94e12ec6.html).
**2021:** Interviewee in the episode "Errore" of the TV program "Storie della scienza", presented by Telmo Pievani and Silvia Bencivelli on the channel RAI Scuola (https://www.raiscuola.rai.it/scienze/articoli/2021/11/Storie-della-Scienza-Errore-a71030e0-e6f4-4709-97f9-135913a21412.html).
**2022:** Interviewee in the Swiss radio program "Il giardino di Albert", for the episode dedicated to Edoardo Amaldi (https://www.rsi.ch/g/15218071)
**2023 (19 September):** Interviewee on the Swiss radio program "Millevoci" for the episode "The Atomic Age, from nuclear bombs to fusion like in a star", broadcast on Rete Uno of the Swiss Italian Radio (https://www.rsi.ch/rete-uno/programmi/intrattenimento/millevoci/L%E2%80%99era-atomica-dalle-bombe-nucleari-alla-fusione-come-in-una-stella--1865518.html)
**2024-2025**: Interviewee in the three-episode documentary series "Nel Regno dei fatti – Storia di Enrico Fermi", broadcast by Focus TV (https://mediasetinfinity.mediaset.it-/documentari/nelregnodeifatti-storiadienricofermi_SE000000002359 ).

### *Art-Science Projects*

For my multidisciplinary interests connecting science, humanities, dance and theatre and for my studies on Edoardo Amaldi and in the field of gravitational waves, I have been involved in three different art-science projects:

- *Adotta scienza e arte nella tua classe* (*Adopt science and art in your class*), a competition for **middle schools and high schools** organized by *Esplica. Laboratorio per la divulgazione culturale e scientifica nell'era digitale.* I chaired the jury for the years 2013 and 2014. The initiative is under the scientific patronage of the *Associazione per l'Insegnamento della Fisica* and was rewarded by **SIF** in the section of **Didactics and History of Physics** in 2012 and 2014. *http://www.esplica.it/adotta/adotta-e7*
- *Amaldi l'Italiano*. A theatrical monologue by Giusy Cafari Panico and Corrado Calda, for which I have been the **historical-scientific supervisor** (2018). **I was invited** to give a **historical-scientific talk** at ***Genoa Science Festival 2019*** to introduce the show.

- *Surfing Einstein* (documentary film). A dance-science project inspired by the first detection of gravitational waves. I contributed as a **scientific advisor, interviewee and dancer**.
  The idea was born in spring 2018 from a private seminar I gave for the choreographer Meritxell Campos Olivé and the science communicator Margherita Cappelletto (CNR). I contributed to promote the project inside the Virgo community and many researchers were involved. Directed by M. Campos Olivé, coordinated by M. Cappelletto, supported by the **European Gravitational Observatory**, the film was screened at *InScience Film Festival* in Nijmegen and at MAFIZ WIP, Festival de Málaga, where it deserved the REC Special Prize (https://www.tempoideal.com/).

## Part IX – Complete List of Publications

1. A. La Rana, La Teoria della Relatività, in "Come alla Corte di Federico II. Ovvero parlando e riparlando di scienza", I quaderni di Coinor, University of Naples Federico II (2006), pp. 257-61. ISBN 88-7893-005-9

2. P. Schipani, L. Ferragina, L. Marty, A. Grado, L. Di Fiore, R. De Rosa, A. La Rana, A. Buratta, *Parallel robots in a ground-based telescope active optics system: theory and experiments*, "Proc. of SPIE", Vol. 6715, Optomechatronic Actuators and Manipulation III (2007), pp. 671503-1/671503-9. DOI: 10.1117/12.754172

3. A. Cavalleri, G. Ciani, R. De Rosa, L. Di Fiore, R. Dolesi, F. Garufi, M. Hueller, D. Nicolodi, A. La Rana, L. Milano, D. Tombolato, S. Vitale, P.J. Wass, W. J. Weber, *Ground testing, with a four mass torsion pendulum facility, of an optical-read-out for the LISA gravitational reference sensor*, Journal of Physics: Conference Series, Vol. 154 (2009), Art. N°012012. DOI: 10.1088/1742-6596/154/1/012012

4. A. La Rana, *Saggi in storia della scienza*, in M. Bergamini, A. Trifone, G. Barozzi, *Idee per insegnare*, Zanichelli (2009). ISBN: 9788808131515

5. A. La Rana, *Introduzione ai concetti di base della fisica*, in E. Lupia Palmieri, M. Parotto *Osservare e capire la Terra*, Zanichelli (2010). ISBN: 9788808332400

6. U. Amaldi & E. Joli, G. Melegari (collaborators), *L'Amaldi 2. 0 multimediale. Edizione blu*, A. La Rana, S. Merialdo (eds), Zanichelli (2010). ISBN: 978-88-08-31523-8

7. R. De Rosa, L. Di Fiore, F. Garufi, A. Grado, A. La Rana, L. Milano, *An optical readout system for the drag free control of the LISA spacecraft*, Astroparticle Physics, Volume 34, Issue 6, ELSEVIER (2011), pp. 394-400. DOI: 10.1016/j.astropartphys.2010.10.014

8. U. Amaldi & A. La Rana, E. Joli, G. Melegari (collaborators), *La fisica del Caos*, Zanichelli (2011). ISBN: 978-8808127174. http://online.scuola.zanichelli.it/lafisicadiamaldi/lafisicadelcaos/

9. A. La Rana, *Dodici brevi testi di storia della fisica*. Issues in the high school manual U. Amaldi, *Le Traiettorie della Fisica. Da Galileo a Heisenberg, 1° edition*, 3 Volumes, Zanichelli (2012): 1) Le montagne della luna; 2) Un pianeta attorno a un altro sole; 3) Aristotele: perché un corpo si muove; 4) Galileo: perché un corpo si ferma; 5) Brown: le molecole d'acqua; 6) Binnig e Rohrer: gli atomi; 7) Un mondo predicibile; 8) Un mondo impredicibile; 9) I raggi cosmici; 10) Il neutrino; 11) Le onde elettromagnetiche; 12) L'espansione dell'universo.
ISBN: I) 978-8808127211; II) 978-8808140999; III) 978-8808241009

10. A. La Rana, *Paragrafi sulle frontiere della fisica*, in U. Amaldi & E. Joli, G. Melegari (eds), *L'Amaldi per i licei scientifici. Campo magnetico, induzione e onde elettromagnetiche. Relatività e quanti*, Zanichelli (2012). ISBN: 8808136450

11. U. Amaldi, A. La Rana, *I fisici e l'anima* (*The physicists and the soul*), in *L'anima e la mente*, V. Andreoli, F. Buzzi (eds), San Paolo Editions (2012). ISBN: 978-8821572821

12. U. Amaldi, A. La Rana (collaborator), *Sempre più veloci*, Zanichelli (2012). The book won the **First National Award for Popular Science** organized in 2013 by the Italian Book Association and by the National Research Council (CNR). https://it.wikipedia.org/wiki/Sempre_pi%C3%B9_veloci
ISBN: 978-8808063311

13. M. Davis, *Il calcolatore universale. Da Leibniz a Turing*, 2° Edition. Italian translation by G. Rigamonti, with 2° edition new parts translated by A. La Rana, Adelphi (2012). ISBN: 8845927415

14. U. Amaldi, A. La Rana (collaborator), *Particle Accelerators: From Big Bang Physics to Hadron Therapy*, translated by Geoff Hall, Springer-Verlag (2015). English edition of *Sempre più veloci*, with new contents for international readers. ISBN: 978-3-319-08869-3

15. A. La Rana, *Oreste Piccioni*, in *Dizionario Biografico degli Italiani*, Treccani, Vol. 83 (2015) (http://www.treccani.it/enciclopedia/oreste-piccioni_(Dizionario-Biografico)/).
ISBN: 978-8812000326

16. A. La Rana, *In ricordo di Giorgio Salvini*, MATEpristem, Bocconi University (2015) (http://matematica.unibocconi.it/articoli/ricordo-di-giorgio-salvini).

17. A. La Rana, *Che cosa sono le onde gravitazionali?*, Zanichelli, March 2016. Online publication: http://aulascienze.scuola.zanichelli.it/come-te-lo-spiego/2016/03/02/che-cosa-sono-__le-onde-gravitazionali/ .

18. A. La Rana, *Onde di cooperazione*, in the Geopolitical Review *Eastwest*, n° 67, page 88, Europeye srl Rome, September-October 2016. EAN: 9778009062008-60067
https://eastwest.eu/it/onde-di-cooperazione/

19. A. La Rana, *Franco Rasetti*, in *Dizionario Biografico degli Italiani*, Treccani, Vol. 86 (2016). ISBN: 978-8812000326

20. A. La Rana, *Tullio Regge,* in *Dizionario Biografico degli Italiani*, Treccani, Vol. 86 (2016). ISBN: 978-8812000326

21. A. La Rana, *Antonio Rostagni,* in *Dizionario Biografico degli Italiani*, Treccani, Vol. 88 (2016). ISBN: 978-8812000326

22. A. La Rana, *Da ente matematico a grandezza misurabile: il lungo cammino per captare le onde gravitazionali*, Giornale di Astronomia, Vol. 42 n° 4, Fabrizio Serra editore, 2016. ISSN: 0390-1106

23. U. Amaldi & A. La Rana, G. Melegari, E. Cerboneschi, E. Joli (collaborators), *Le traiettorie della fisica, 2° edition*, 3 Volumes, Zanichelli (2016-2017). ISBN: 1) 978-8808321138; 2) 978-8808919922; 3) 978-8808325358
Original contributions by A. La Rana:
    I. Editorial project of the new historical-scientific and interdisciplinary contents;
    II. All chapter-openings (37), consisting of verses by poets specially chosen and commented on the basis of the contemporary scientific ideas they were inspired by (the first 12 openings concern verses from Dante Alighieri's *Divina Commedia*) (with Alessandra P. Macinante);
    III. Full page panels (12) called "Il fisico racconta", which present and comment on examples of scientific literature and passages nicely written by notorious scientists;
    IV. New paragraphs (over 25) about history of physics.
    V. Double-page contributions (3) called "Il cammino della fisica", about history of physics.

24. A. Brillet, A. La Rana, *Les ondes gravitationnelles: une histoire Cosmos-polite*, in *The Conversation*, February 2018. Carlton (Victoria, Australia): Conversation Media Group. ISSN: 2201-5639.
https://theconversation.com/les-ondes-gravitationnelles-une-histoire-cosmos-polite-89343

25. A. La Rana, *Vanna Tongiorgi*, in *Dizionario Biografico degli Italiani*, Treccani, Vol. 96 (2019). ISBN: 978-8812000326

26. A. La Rana, *Italian physicists of all times: a biographical dictionary in preparation*, in *Il Nuovo Cimento* 42 C (2019) 239. DOI: 10.1393/ncc/i2019-19239-x

27. A. La Rana, P. Rossi, *I Fisici Italiani 2: dal Risorgimento alla Seconda Guerra Mondiale. A-C*, Supplemento *Giornale di Fisica* della Società Italiana di Fisica, Vol. 60, Bologna (2019). ISSN: 0017-0283. DOI: 10.1393/gdf/i2019-10338-0

28. G. Battimelli, A. La Rana, P. Rossi, *Masters and students in Italian Physics between the 19th and 20th centuries: the Felici-Bartoli-Stracciati-Corbino case*, European Physical Journal H, 45: 107-121 (2020). Available full-text view-only version: https://rdcu.be/b56NO. DOI: 10.1140/epjh/e2020-10016-y

29. A. La Rana, *Italiani Nobel Minds: la nuova miniserie di RAI Storia comincia in via Panisperna*, SIF *Prima Pagina* (https://www.primapagina.sif.it/article/1151/italiani-nobel-minds-la-nuova-miniserie-di-rai-storia-comincia-i) (30 July 2020)

30. A. La Rana, *Virgo and the emergence of the international gravitational wave community*, in *The Renaissance of General Relativity in context*, Blum A., Lalli R., Renn J. (eds.), Series *Einstein Studies*, Howard D., Kormos-Buchwald D. L. (eds), Vol. 16. Birkhäuser Boston (2020). DOI: https://link.springer.com/chapter/10.1007/978-3-030-50754-1_10.

31. A. La Rana, P. Rossi, *I Fisici Italiani 1: dal Rinascimento al Risorgimento. A-Z*, Supplemento *Giornale di Fisica* della Società Italiana di Fisica, Vol. 61, Bologna (2020). DOI: 10.1393/gdf/i2020-10376-5

32. A. La Rana, P. Rossi, *I Fisici Italiani 2: dal Risorgimento alla Seconda Guerra Mondiale. D-L*, Supplemento *Giornale di Fisica* della Società Italiana di Fisica, Vol. 61, Bologna (2020). DOI: 10.1393/gdf/i2020-10377-4

33. A. La Rana, P. Rossi, *The blossoming of quantum mechanics in Italy: the roots, the context and the first spreading in Italian universities (1900-1947)*, European Physical Journal H (2020), Vol. 45, Issue 4-5. Available full-text view-only version: https://rdcu.be/cydxA. DOI: 10.1140/epjh/e2020-10044-0

34. A. La Rana, *Stimolare la curiosità scientifica nei bambini. Le iniziative di INFN Kids*, RicercAzione Vol. 13, Issue 2 (December 2021). ISSN: 2036-5330

35. A. La Rana, *EUROGRAV 1986–1989: the first attempts for a European Interferometric Gravitational Wave Observatory*, European Physical Journal H (2022), Vol. 47, Issue 3. Available full-text view-only version: https://rdcu.be/cINke. DOI: 10.1140/epjh/s13129-022-00036-x

36. A. La Rana, *Scienza e politica al CERN, in tempo di Guerra*, Le Scienze (26 April 2022)

37. A. La Rana, *Un osservatorio europeo di onde gravitazionali: dai tentativi del passato alle prospettive del future*, SIF *Prima Pagina* (https://www.primapagina.sif.it/article/1497/un-osservatorio-europeo-per-l-astronomia-a-onde-gravitazionali) (2 May 2022)

38. E. Amaldi, *Da via Panisperna all'America: I fisici italiani e la Seconda guerra mondiale*, G. Battimelli, M. De Maria, A. La Rana (eds), 2nd expanded edition, Editori Riuniti, Rome (May 2022). ISBN: 9788835982098

39. A. La Rana, P. Rossi, *I Fisici Italiani 2: dal Risorgimento alla Seconda Guerra Mondiale. M-Z*, supplement of the editorial series *Giornale di Fisica* della Società Italiana di Fisica, Vol. 62, Bologna (2023). DOI: 10.1393/gdf/i2023-10506-7

40. F. Acernese et al. (Virgo Collaboration), *Frequency-Dependent Squeezed Vacuum Source for the Advanced Virgo Gravitational-Wave Detector*, Physical Review Letters 131 (2023) 4, 041403. DOI: 10.1103/PhysRevLett.131.041403.

41. R. Abbott et al. (Kagra, Virgo and LIGO Scientific Collaborations), *Open Data from the Third Observing Run of LIGO, Virgo, KAGRA, and GEO*, Astrophysical Journal Supplement Series, Volume 267, Number 2 (2023). DOI: 10.3847/1538-4365/acdc9f

42. F. Acernese et al. (Virgo Collaboration), *Advanced Virgo Plus: Future Perspectives*, Journal of Physics Conference Series, 2429 (2023) 1, 012040. DOI: 10.1088/1742-6596/2429/1/012040

43. A. La Rana, *Gravitational Waves: An Historical Perspective*, in M. Streit-Bianchi, M. Michelini, W. Bonivento, M. Tuveri (eds), *New Challenges and Opportunities in Physics Education.* Book Series: *Challenges in Physics Education*. Cham (Switzerland): Springer Nature (2023). DOI: 10.1007/978-3-031-37387-9_8.

44. A. La Rana, *Dividere l'indivisibile*, Asimmetrie, issue "Materia", year 19 vol. 36 (April 2024). ISSN: 1827-1383.

45. A. G. Abac et al. (Kagra, Virgo and LIGO Scientific Collaborations), *Observation of Gravitational Waves from the Coalescence of a 2.5–4.5 $M_\odot$ Compact Object and a Neutron Star*, Astrophysical Journal Letters, 970:L34 (2024). DOI: 10.3847/2041-8213/ad5beb.

46. A. La Rana, *The Newer Alchemy at via Panisperna. An early account of Nuclear Physics by Ginestra Amaldi and Laura Fermi,* Physics in Perspective. **Submitted** in August 2024.

47. G. Amaldi, L. Fermi, *Alchimia del tempo nostro*, L. Bonolis, A. La Rana (eds), 3rd edition. With a preface by U. Amaldi, an historical introduction by A. La Rana and an afterword by L. Bonolis. Rome (Italy): Castelvecchi (November 2024). ISBN: 9791256140312.

48. A. La Rana, *Two biographical notes: Ginestra Amaldi and Laura Fermi*, in G. Amaldi, L. Fermi, *Alchimia del tempo nostro*, L. Bonolis, A. La Rana (eds), 3rd edition. Rome (Italy): Castelvecchi (November 2024).

49. A. La Rana, Preface of the book by L. Fermi, *Atomi in famiglia. La mia vita con Enrico Fermi*, new Italian edition. Rome (Italy): Castelvecchi (November 2024). ISBN: 125614245X.

50. A. G. Abac et al. (Kagra, Virgo and LIGO Scientific Collaborations), *Ultralight vector dark matter search using data from the KAGRA O3GK run*, Physical Review D, Vol. 110, Issue 4 (2024). DOI: 10.1103/PhysRevD.110.042001.

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52. R. Lalli, L. Bonolis, A. La Rana, *Multi-messenger from above: the international movement to establish a new field in astronomy*, Centaurus. **Submitted** in December 2024.

53. L. Bonolis, R. Lalli, A. La Rana, H*ow Supernovae led the way to Multi-messenger Astronomy*, Centaurus. **Submitted** in November 2024.

54. B. Barish, A. La Rana, *The little kid. Edoardo Amaldi: from Apprentice of Enrico Fermi to Architect of European Science*. Oxford University Press. **In preparation** (2025).

### *Conference Proceedings*

55. F. Acernese, R. De Rosa, L. Di Fiore, F. Garufi, A. La Rana, L. Milano, *Some Progress in the Development of an Optical Readout System for the LISA Gravitational Reference Sensor*, "Proceedings of the 6th International LISA Symposium" (2006), pp. 339. DOI: 10.1063/1.2405065

56. A. La Rana, L. Bonolis, *The beginning of Edoardo Amaldi's interest in gravitation experiments and in gravitational wave research*, in *Atti del XXXV Convegno annuale della SISFA (Arezzo, September 16-19, 2015)*, Esposito S. (ed.). Pavia: Pavia University Press, 2016. DOI: 10.23739/9788869520433/c23

57. A. La Rana, L. Milano, *The early history of gravitational wave detection in Italy: from the first resonant bars to the beginning of the Virgo collaboration*, in *Atti del XXXVI Convegno annuale della SISFA (Napoli, October 4-7, 2016)*, Esposito S. (ed.). Pavia: Pavia University Press, 2017. DOI: 10.23739/9788869520709/c17

58. M. Bassan, A. La Rana, *Gravitational interferometers in Italy 1976: a first timid attempt. And a missed opportunity*, in *Atti del XXXVI Convegno annuale della SISFA (Napoli, October 4-7, 2016),* Esposito S. (ed.). Pavia: Pavia University Press, 2017. DOI: 10.23739/9788869520709/c14

59. L. Bonolis, A. La Rana, R. Lalli, *The Renaissance of General Relativity in Rome: Main Actors, Research Programs and Institutional Structures*, in *Proceedings of the 14th Marcel Grossmann Meeting On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories. Rome 12-18 July 2015*, ed. Massimo Bianchi, Robert T. Jantzen, Remo Ruffini, World Scientific, Singapore, 2018. DOI: 10.1142/9789813226609_0433

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61. A. La Rana, *L'inarrestabile propagazione della gravità: le onde gravitazionali, dall'ipotesi alla misura*, in *La Relatività Generale a cento anni dalla sua formulazione*, Merola L. (ed.). Naples: Giannini Editore, 2018. ISBN: 978-88-7431-923-7

62. A. La Rana, *Ritratto di un antifascista: il matematico Giulio Bisconcini*, in *Atti del XXXVIII Convegno annuale della SISFA (Messina, October 3-6, 2018),* Esposito S., Fregonese L., Mantovani R. (eds). Pavia: Pavia University Press, September 2020. DOI: 10.48244/9788869520594/c11

63. A. La Rana, P. Rossi, *La diffusione della meccanica quantistica in Italia (1900-1940)*, in *Il valore della fisica. Enrico Persico nella cultura italiana del Novecento*, Barone V. C., Battimelli G. (eds), Quaderno n. 37 (2020) dell'Accademia delle Scienze di Torino, Torino 2020. ISBN: 978-88-99471-32-3

64. A. La Rana, *Una prospettiva storica sulla terza generazione di rivelatori di onde gravitazionali: i primi tentativi per una collaborazione Europea (1986-1989)*, in *Atti del XXXIX Convegno annuale della SISFA (Pisa, September 9-12, 2019)*, La Rana A., Rossi P. (eds). Pisa: Pisa University Press, October 2020. DOI: 10.12871/978883339402227

65. A. La Rana, P. Rossi (eds), *Atti del XXXIX Convegno annuale della SISFA (Pisa, September 9-12, 2019)*. Pisa: Pisa University Press, October 2020. ISBN: 9788833394022

66. Rossi P., La Rana A., *The diffusion of quantum theory and quantum mechanics in Italy (1900-1947)*, in *Atti del XL Convegno annuale della SISFA (Online, September 8-10, 2020)*, Bevilacqua F., Gambaro I. (eds). Pisa: Pisa University Press, 2021. DOI: 10.12871/978883339517313

67. A. La Rana, *Edoardo Amaldi, scienziato europeo e promotore di pace*, in *Io, dove e quando?*, Colombi E., Pavesi M. (eds), Piano Lauree Scientifiche dell'Università di Parma. Parma: Edizionigraphital, 2023. ISBN: 979-12-811630-8-9

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## Part X – DOCUMENTARY FILMS

*La scelta. Edoardo Amaldi e la scienza senza confini* (92 min, Italian language, 2018). Director: E. Agapito. Screenplay and Interviews: A. La Rana.
Available for private viewing here:
https://collezioni.scuola.zanichelli.it/browsebytheme/section-fisica/la-scelta-edoardo-amaldi-e-la-scienza-senza-confini

*The Decision. Edoardo Amaldi and Science without Borders* (92 min, English subtitles, 2020). Director: E. Agapito. Screenplay and Interviews: A. La Rana.

*Ginestra, la ragazza di via Panisperna* (60 min, Italian language, 2025). Director: A. Scillitani. Film subject by M. Focaccia, A. La Rana and A. Scillitani. Scientific consulting: M. Focaccia and A. La Rana.

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## Part XI – Invited seminars and invited talks at conferences

- *Whispers from the Cosmos: short insights into Gravitational Waves.* **CERN**, Geneva – **Invited seminar**, 20 December 2011.
- *Ettore Pancini: un'avventura scientifica e umana*. Ceremony for the dedication of the Physics Department of **Naples** to the physicist Ettore Pancini - **Invited seminar**, 16 December 2015.
- *Looking for Coincidences: the Early International Collaborations for Gravitational Wave Detection*. Institute for Mathematics, Johannes Gutenberg University, **Mainz** – **Invited seminar**, 16 November 2016.
- *L'inarrestabile propagazione della gravità: le onde gravitazionali, dall'ipotesi alla misura*. Accademia Pontaniana, **Naples** – **Invited seminar**, 9 December 2016.
- *The Birth of Gravitational Wave Research in Italy: Insights into a Scientific Frontier Adventure.* SISSA, **Trieste** – **Invited seminar**, 28 February 2017.

- *Le origini della ricerca delle onde gravitazionali in Italia*. Sapienza University of **Rome**, among the "Seminars on the History of the Faculty"- **Invited seminar**, 24 January 2018.
- *A historical perspective on the 3rd generation GW detectors: the early attempts for a joint European effort (1986-1989).* Technische Universitaet, **Berlin** - **Invited seminar**, 27 January 2020.
- *The Origins of Gravitational Wave Research in Italy*. Conference "*A Century of General Relativity*", organized by the Max Planck Institute for the History of Science, Berlin - **Invited talk**, Dec. 2015.
- *Looking for Coincidences: the Birth of Gravitational Wave Detection in Italy and the Beginning of the First International Detector Networks.* Conference of SIGRAV, Cefalù – **Invited talk**, Sept. 2016.
- *Looking for Coincidences: the Birth of Gravitational Wave Detection in Italy and the Beginning of the First International Detector Networks.* Conference of European Society for the History of Science, Prague - *Symposium Enduring Ideas, New Alliances: Social and Epistemic Factors in the Renaissance of General Relativity* – **Invited talk**, September 2016.
- *The Early History of GW Detection in Italy: from the First Resonant Bars to the Beginning of the Virgo Collaboration.* Congress of Italian Society for the History of Science, Naples - **Invited talk,** October 2016.
- *The Early History of GW Detection in Italy*. Conference of the Italian Physical Society, Trento – **Invited talk**, September 2017.
- *A Historical perspective on the 3rd generation GW Detectors: the early attempts for a joint European effort (1986-1990)*. GEMMA Physics Workshop (Gravitational-waves, ElectroMagnetic and dark MAtter), Lecce – **Invited talk**, June 2018**.**
- *A historical perspective on the 3rd generation GW detectors: the early attempts for a joint European effort (1986-1989).* Conference of the Italian Physical Society at Gran Sasso Science Institute, L'Aquila – **Invited talk**, September 2019.
- *Tra atomi e spazio-tempo: la fisica del '900.* In the framework of the initiative "Gravitas. Nuovi dialoghi sui massimi sistemi", promoted by INFN Division of Cagliari and dedicated to high school students. Online – **Invited seminar**, December 2021.
- *Fisica nucleare e raggi cosmici: le origini della sezione di Roma dell'INFN.* Opening speech for the celebration of the 70th anniversary of INFN Division of Rome 1 (https://70.infn.it/evento/70-anni-dalla-fondazione-della-sezione-infn-di-roma/), Rome - **Invited talk**, April 14, 2022.
- *Los muchacos de via Panisperna. Un breve recorrido histórico-científico en la Roma de los años Treinta.* Ciclo "Mes de la Ciencia y la Tecnología. Encuentros Chile-Italia", initiative of UTEM and the Italian Embassy in Chile "Italia Energia Creatìva" (https://www.youtube.com/watch?v=mEn8aOiAnv8). Online – **Invited seminar**, May 2022.
- *EUROGRAV 1986–1989: the first attempts for a European Interferometric Gravitational Wave Observatory.* 16th International Symposium "Frontiers of Fundamental Physics" (FFP16). Online – **Invited talk**, May 2022.
- *Le onde gravitazionali come messaggeri cosmologici: storia di una ricerca alle origini.* Conference "Storia della cosmologia. Visioni dell'universo da Galileo ai giorni nostri" at the University of Urbino Carlo Bo, Urbino – **Invited talk**, May 2022.

- *Nuclear encounters: Italian and German physicists during WWII,* Conference of the Italian Physical Society, *Milano* - **Invited talk**, September 2022.
- *Fisica, storia e cultura scientifica.* 39° National Congress of the Italian Society for the History of Physics and Astronomy Padova - **Invited contribution** to Roundtable on the links between **History and Didactics of Physics**, September 2022.
- *Presentation of the docufilm "*La Scelta. Edoardo Amaldi e la scienza senza confini". Centro Ricerche Enrico Fermi, Rome - **Invited talk**, December 2022.
- *Presentation of the docufilm "*La Scelta. Edoardo Amaldi e la scienza senza confini". University of Parma, Event "Io, dove e quando? Scientists and civic engagement" addressed to high school students and organized in the framework of the Piano Lauree Scientifiche - **Invited talk**, January 2023.
- *I ragazzi di via Panisperna: storie divergenti al cuore della materia*. IIS Tropea, in the framework of the initiatives "Un tuffo nel sapere: colloqui in rete" promoted by the INFN and dedicated to high school students - **Invited talk**, May 2023.
- *Messaggi dal cosmo profondo: cosa raccontano le onde gravitazionali*. Festival *BergamoScienza* (https://www.youtube.com/watch?v=f5TjTYv38Mo). **Invited talk**, in memory of the theoretical physicist and physics historian Erasmo Recami. The talk has been selected for broadcast on *TV Corriere*. October 2023.
- *Presentation of the docufilm "*La Scelta. Edoardo Amaldi e la scienza senza confini". Genova Science festival – **Roundtable discussion**, November 2023.
- *Shedding light on a rising star: an oral history survey on the history of nuclear fusion research in Europe.* 110° Conference of the Italian Physical Society, Bologna - **Invited Talk**, September 2024.
- *The discovery of the antihyperon $\bar{\Sigma}^+$: a Roman story at the particle zoo.* Symposium: the Rise of Particle Physics, Sapienza University of Rome – **Invited Talk**, September 2024.
- *Alchimia del tempo nostro. Le ragazze di via Panisperna raccontano la fisica nucleare.* Giornata Internazionale delle Donne nella Scienza, Laboratori Nazionali di Frascati – **Invited Talk**, February 2025.

**Macerata, February 27th 2025**