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PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando 2022 PNRR  
Prot. P20223BAFW

**PART A**

*1. Line of intervention*

Main line/Linea Principale

*2. Research project title*

FusEUrope - European cooperation in nuclear fusion research: from history to future policy design

*3. Duration of the project (months)*

24 months

*4. Strategic emerging Topics - 5. Related Cluster*

Strategic emerging topic: SUSTAINABILITY AND PROTECTION OF NATURAL RESOURCES

Cluster: Climate, Energy and Mobility

Sub Cluster:

4.Efficient and sustainable use of energy, accessible and safe for all is ensured thanks to a clean energy system and a just transition. .

*6. Main ERC field*

SH - Social Sciences and Humanities

*7. Other ERC field*

## 8. ERC subfields

1. SH6\_15 History of science, medicine and technologies
2. SH6\_11 Global history, transnational history, comparative history, entangled histories
3. SH2\_5 International relations, global and transnational governance

## 9. Keywords

n°	Testo inglese
1.	nuclear fusion
2.	European integration
3.	techno-scientific cooperation
4.	science diplomacy
5.	historical network analysis
6.	experimental public opinion research

## 10. Principal Investigator

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## Declarations

I declare that I have not participated as PI in PRIN 2022 call (n. 104 02/02/2022)

I declare that I have participated as associated PI in PRIN 2022 call (n. 104 02/02/2022)

Current funding and applications submitted



## Age limits derogation

The principal investigator and or the substitute are over 40 at the time of the publication of the call. They do not intend to benefit from the derogations to the age limits for the amount allocated to under 40 PI;

### 11. List of research units (RU)

n°	Associated Investigator	Qualification	University/ Research Institution	Registered office (address)	e-mail address
1.	LALLI Roberto	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Politecnico di TORINO	Corso Duca degli Abruzzi, 24 - TORINO (TO)	roberto.lalli@polito.it
2.	BENTIVOGLIO Giulia	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Università degli Studi di PADOVA	Via 8 Febbraio, 2 - PADOVA (PD)	giulia.bentivoglio@unipd.it
3.	LA RANA Adele	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Università degli Studi di MACERATA	Piaggia dell'Universita', 11 - MACERATA (MC)	adele.larana@unimc.it
4.	GUZZARDI Luca	Professore Associato (L. 240/10)	Università degli Studi di MILANO	Via Festa del Perdono, 7 - MILANO (MI)	LUCA.GUZZARDI@UNIMI.IT

### 12 - Substitute Principal Investigator (PI)\* (To be identified among one of the associated PIs participating in the project).

<b>BENTIVOGLIO</b> (Surname)	<b>GIULIA</b> (Name)
<b>Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)</b> (Qualification)	
<b>07/01/1980</b> (Date of birth)	<b>BNTGLI80A47E098P</b> (Personal identification code)
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### 13. Brief description of the proposal

FusEurope is 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 (International Thermonuclear Experimental Reactor) in 2007. The results of the historical & epistemological analyses will be used to frame a multi-national survey in five EU countries on the public acceptability of controlled thermonuclear

research, which will identify policy recommendations the EU level.

Nuclear fusion is considered a future viable solution for a sustainable provision of large amounts of energy with relatively minor environmental impact, and historians have claimed nuclear fusion research to be central in the European integration process. Yet, the history of European cooperation on fusion research has been rarely addressed by professional historians. Its long-term history is terra incognita and no attempt has been made to connect the history of science to the history of international relations. Also, nuclear fusion not only faces the hurdle of developing a technology considered "always 20 years away", but it must also overcome a strong "double bias" against large infrastructure projects & nuclear energy. Win over public support represents the largest non-technical challenge in fusion energy development, and therefore identifying the conditions under which public acceptability is achieved is critical, yet severely under-studied.

We plan to address these shortcomings by pursuing six research objectives:

RO1 Create historical maps of international cooperation in nuclear fusion energy research and identify key actors, groups, and techno-scientific objects using quantitative tools based on network theory as well as qualitative methods based on close reading and oral history;

RO2 Elucidate the role of fusion energy research in the foreign policy of major European states;

RO3 Identify key moments of negotiations and understand the interplay of techno-scientific and political agendas in their resolutions;

RO4 Determine the basic options that the actors involved in the nuclear fusion research had available for designing social environments capable of promoting their techno-scientific aims;

RO5 Analyze the causal impact on public opinion of alternative fusion cooperation designs derived by RO1-4 through a survey experiment;

RO6 Produce policy recommendations based on the results of RO5.

Once completed, the project will fill a knowledge gap in the historiography of science and of European integration. The results of the survey will inform EU policy-making and communication strategies on fusion energy, successfully translating historical analysis into actionable policy recommendations.

#### 14. Total cost of the research project identified by items

Associated Investigator	item A.1	item A.2	item B	item C	item D	item E	item F	Total
LALLI Roberto	19.375	93.000	0	51.000	16.856	0	10.800	<b>191.031</b>
BENTIVOGLIO Giulia	13.950	0	0	2.000	2.093	0	27.000	<b>45.043</b>
LA RANA Adele	13.950	0	0	2.000	2.093	0	12.000	<b>30.043</b>
GUZZARDI Luca	24.000	0	0	0	3.600	0	6.200	<b>33.800</b>
<b>Total</b>	<b>71.275</b>	<b>93.000</b>	<b>0</b>	<b>55.000</b>	<b>24.642</b>	<b>0</b>	<b>56.000</b>	<b>299.917</b>

N.B. The Item D and TOTAL columns will be filled in automatically

- item A.1: enhancement of months/person of permanent and temporary employees
- item A.2: cost of contracts of non-employees, specifically to recruit
- item B: cost of equipment and tools
- item C: cost of consulting and other services
- item D: overhead
- item E: materials cost
- item F: other costs

## PART B

### B.1

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## 1. State of the art

Major EU projects investigate the status of European science diplomacy with the goal of proposing articulated and unified agendas. In them, history assumes a fundamental role by providing unique empirical perspectives (especially <https://www.insscide.eu/>). A few historiographical frameworks have been recently put forward to investigate science diplomacy exercises from a transnational perspective (e.g., Turchetti et al. 2020; Adamson and Lalli 2021), but attempts to issue policy recommendations for the EU based on historical studies are so far rather weak (<https://www.insscide.eu/IMG/pdf/d9.7.pdf>).

This shortcoming depends on the fact that relatively few historical studies have explored in detail the role of science and technology in the process of European integration, while this role is described as central by scholars and policymakers alike (Krige 2003; Moedas 2016). We have partial historical analyses of European institutions and European scientific policies (e.g., Hermann et al. 1987-90; Guzzetti 1995), but the role of techno-scientific cooperation in European integration was discussed especially with a focus on the impact of U.S. foreign policies (Skogmar 2004; Krige 2016). Only recently, historians started addressing the question of how the historical process of political integration and techno-scientific cooperation shaped each other (Kohlrausch and Trischler 2014; Patel and Kaiser 2018; Lalli 2021; Mobach and Felt 2022), within the broadening of new perspectives in the historiography of European integration (Patel 2019).

As underlined by Krige (2003, p.898), the history of European cooperation on nuclear fusion is one of the main fields of techno-scientific cooperation “at the heart of the process of European economic and political integration.” However, while nuclear-related topics in national and international contexts have been the focus of numerous studies and projects (see, e.g., <https://www.honest2020.eu/> and Paoloni 1992 for the Italian case), historical analysis of nuclear fusion energy research at the European level is still at its infancy. Most of the historiography on fusion focuses on national (Bromberg 1982; Dean 2013, Bonolis 2022) or specific case studies (Åberg 2021; McCray 2010). Limited access to archives on nuclear fusion contributes to the challenges faced in scholarly reconstructions. Various writings authored by experts and protagonists provide a detailed and educational narrative, but they frequently adopt a rhetorical tone (Wilson 1981; Palumbo 1987; Fowler 1997; Rebut 1999). In the broader context of technology as an element of foreign policy (Krige 2016; Guzzetti and Krige 1997), only in recent times some studies (Bini and Londero 2017) have stressed how the history of nuclear energy should be written by adopting an international perspective, and Curli (2022) has recently shed light on the initial phases of the history of European cooperation on fusion energy in relation to the history of European integration. Still, we miss a comprehensive long-term historical analysis that discusses the interaction of techno-scientific, political and epistemological aspects. Furthermore, there has been no attempt to use this analysis to put forward a survey aimed at policy recommendation.

In FusEUrope, the results of the historical-epistemological analysis will inform a survey on the acceptance of fusion power. While a large body of research already investigates public preferences for nuclear energy in general, research on public attitudes toward controlled nuclear fusion is scarce. Despite the importance of public acceptance of nuclear energy – well understood by international bodies such as the European Commission - only two studies exist using survey methods exploring the acceptance of fusion energy. Jones et al. (2019) use a small sample in Germany and in UK (less than 1000 respondents in total) over a panel of four surveys to assess opinions towards fusion in general, and towards depleted uranium as a fuel storage option in particular. Turcanu et al. (2020) run an even smaller survey among a very small group of 375 Belgian adults, showing that one’s opinion on nuclear fission technology influences opinion towards nuclear fusion, and suggesting that a key element in public preferences is the cost of developing the technology. While interesting, these studies face severe theoretical and empirical limitations. In particular, their sample size is too small and unbalanced, greatly limiting the validity of the study; and the design is purely observational, preventing us from conducting any causal inference on the determinants of public opinion towards nuclear fusion. To address these shortcomings, we use historical policy research to inform survey design following Vandenbroucke et al. (2018), De Vries (2020) and Beetsma et al. (2021) in which one of the team members of the proposed PRIN project has contributed.

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## 2. Detailed description of the project: methodologies, objectives, and results that the project aims to achieve; indicate deliverables and milestones outlining the project coherence as to the strategic themes, indicating clear and innovative objectives, setting out the project sector relevance and its positioning with reference to the state of art, describing the role and contribution of each research unit

A recent breakthrough in fusion research at the UK-based Joint European Torus (JET) laboratory has revamped hopes that civil use of fusion energy can be a viable strategy for energy sustainability (Gibney 2022). The major project for pursuing this agenda is the International Thermonuclear Experimental Reactor (ITER), under construction in France. Nuclear fusion is considered ‘cleaner’ since its radioactive wastes have much shorter time-life compared to fission wastes, which drastically reduces one of the most problematic environmental issues of fission reactors. Moreover, its efficiency is potentially incomparably larger than fission reactors due to the quantity of energy liberated in the fusion process. Yet, the techno-scientific challenges to achieve & sustain fusion are enormous and no country hopes to solve them alone. ITER is one of the most expensive scientific enterprises ever built, based on the cooperation of 35 countries, many of which in otherwise political, commercial & technological competition, including Russia, China, the US & EU countries. The high stakes at play in nuclear fusion research raise urgent questions about how techno-scientific and political agendas have been interacting in shaping international cooperation on nuclear fusion research for pacific uses in Europe, about the historical

role of techno-scientific cooperation in the process of European integration, and about how historical analyses of scientific cooperation can guide the design of future policies.

We address these issues by exploring the historical transformations in European cooperation on fusion research in relation to changing political contexts from the first cooperation put forward at CERN & EURATOM in the 1950s up to the establishment of ITER in 2007. We will apply a multidisciplinary approach to analyze the relationships between three elements: a) techno-scientific decision-making, b) epistemological constraints of international cooperation, c) changing political relations between countries and the role of techno-scientific cooperation in their foreign policies. The historical-epistemological analysis will then inform the design of a survey instrument to test the public acceptability of fusion technologies in five EU countries.

Our research objectives are:

RO1 Create historical maps of international cooperation in nuclear fusion energy research and identify key actors, groups, & techno-scientific objects;

RO2 Elucidate the role of nuclear fusion energy research in the foreign policy of major European states;

RO3 Identify key moments of negotiations, and understand the interplay of techno-scientific & political agendas in their resolutions;

RO4 Determine the basic options that the actors involved had available for designing social environments capable of promoting their techno-scientific aims;

RO5 Analyze the causal impact on public opinion of alternative fusion cooperation designs derived by RO1-4 through a survey experiment;

RO6 Issue policy recommendations based on the results of RO5.

RO1 will be pursued by two Research Units (RUs) at the Polytechnic of Turin (PI Roberto Lalli) and at the University of Macerata (Ass. PI Adele La Rana).

RO2 will be pursued by the RU at the University of Padua (Ass. PI Giulia Bentivoglio)

RO3 will be pursued by RUs at the University of Macerata, the University of Padua, and the Polytechnic of Turin.

RO4 will be pursued at the University of Milan (Ass. PI Luca Guzzardi)

RO5 and RO6 will be pursued at the Polytechnic of Turin (with key contribution of research team member Francesco Nicoli)

These ROs will be pursued through 5 different Working Packages (WPs), each situated in one specific RU.

WP1 – The socio-epistemic networks of nuclear fusion research in Europe, c.1950-2007 (Polytechnic Univ. of Turin)

In European countries, early scientific research that would flow into controlled fusion research strongly depended on the political conditions in the immediate post-World War II period. Different streams of research, also in apparently unconnected domains—e.g., astrophysical plasma—provided both expertise and knowledge essential for producing advances in controlled thermonuclear research. Understanding the relations and flows of persons, technologies and knowledge between different fields and different nations is essential to clarify in what specific ways fusion research became progressively international in the European context.

WP1 will investigate these flows and relations using methodological advances in the application of network theory to historical research, especially with tools developed by the PI and others for the analysis of socio-epistemic networks of scientific cooperation, namely, complex multi-layer networks composed of various entities: social, material and cognitive (Lalli et al. 2019, 2020).

WP1 will achieve three milestones:

WP1a) The dynamics of cooperation networks (RO1). After retrieving information available in reports, published literature and archival documents (see archives in WP2), the RU will produce a temporal social network analysis of cooperation on topics related to fusion research. The project will focus both on national networks in major (Western) European countries—UK, West Germany (later Germany), France, Italy—and the European cooperation, starting with the 'CERN Study group on fusion' and the EURATOM in 1957 until the establishment of ITER in 2007.

WP1b) The socio-epistemic network analysis (RO1). The RU will identify key elements of the techno-scientific dimensions applying machine learning techniques for retrieving the changes of knowledge associated to the individuals in the social networks identified in WP1a. We will compare this network-based knowledge-space to the actual techno-scientific decisions made at the institutional level of European cooperation determining the relations between social networks and institutional decisions as well as the centrality of specific nodes in these processes.

WP1c) Understanding the impact of politics on socio-epistemic networks (RO3). Using results from WP3 (see below), we will explore the impact of specific changes in international relations on the topology of the networks, both at the social and socio-epistemic levels. This analysis allows to visualize the impact of changing foreign policies on techno-scientific cooperation.

Deliverable WP1-A: A methodological paper in a class-A journal in the history of science devoted to quantitative analyses (preferred journal *Scientometrics*).

Deliverable WP1-B: Historical results will be published in one article in a class-A international journal in the history of science.

Deliverable WP1-C: An interactive website with network visualizations of the different layers.

WP2 - The interplay of techno-scientific agendas and political constraints in scientists' decision-making on fusion research in Europe (Univ. of Macerata)

Adele

WP2 will carry out research based on close reading approaches of published and unpublished literature, and on oral history interviews with selected scientists involved in decision-making processes. The published literature relates to the outcomes of scientific research on nuclear fusion (scientific papers, surveys and reviews) as well as scientists' recollections, notes and essays. The unpublished literature includes declassified folders about scientists, scientific groups, commissions and organizations (see archives below).

The research unit will pursue the following milestones:

WP2a) Identifying the main phases of the European fusion program (RO1/RO3). A general survey will be produced starting from the early work of the 'group de liaison' established in 1957 under the leadership of Italian physicist Donato Palumbo up to the establishment of ITER in 2007. The survey will help identify the different stages of the development of fusion research in Europe through its main scientific targets, technological hurdles and possible solutions within the international context.

WP2b) Analyzing techno-scientific arguments in critical decision-making phases (RO3). The RU will focus on critical phases of the European fusion program, as identified by the interviewees (historical actors' category) and cross-correlated to archival documents. Preliminary analyses suggest at least three decision-making processes to be analyzed in detail: First, the definition of the final parameters for the JET machine and the competition for the hosting country, eventually won by UK. We will focus on the role and arguments of scientists in relation to the political context. We will analyze the evaluation process which led to the choice of the Soviet tokamak instead of the American stellarator as well as the scientific debate about electromagnetic confinement versus inertial confinement. Second, the process which led the countries cooperating in EURATOM to join forces with USSR (later Russia), USA, Japan and China in the ITER project, on the changing landscape of the international relations up to the hard-fought decision of building ITER in France, adopting the strategy of enlarging the negotiating field (the so-called "broader approach"), from the perspective of the scientists involved in the decision-making process. Third, the role of nuclear fission agendas on the policy of controlled nuclear fusion research.

WP2c) Tracking the constraints in the transfer of techno-scientific knowledge (RO3). WP2c will investigate various constraints in the transfer of techno-scientific knowledge between different countries, including the influence of possible military applications on discussions and decisions of European scientists engaged in fusion research in France, FRG (later Germany), Italy, and UK.

Archives for WP1/WP2:

While most documentation is still classified, many archival sources are available: Archives of E. Amaldi, C. Salvetti and E. Persico, Sapienza University; Archives of the CNEN; Italian Fusion Unity Archives in the National labs of Frascati; Publication Office of the EU, including sources about JET; files about the fusion programs including 2007 ITER documents, Historical Archives of the EU (Florence); CERN Archives; French Commissariat à l'Énergie Atomique Archives; Archives of the Max Planck Society; History of Fusion, Churchill Archives Centre, UK; Records of the United Kingdom Atomic Energy Authority and its predecessors, National Archives, UK.

Deliverables:

WP2-A: Article in a class-A international journal in the history of science.

WP2-B: Annotated edition of the (authorized) transcripts of the oral interviews either as a book or as a special issue of a class-A journal in the history of physics, depending on length, coverage and consistency.

WP3: Cooperation and competition on the path to fusion energy (Univ. of Padua)

WP3 will provide an analysis of the cross-national tensions in Europe regarding the cooperation on nuclear fusion energy. Since no nuclear program has ever had a distinctly national character and every country pursuing a nuclear policy has been deeply influenced by the international context, there is a specific international dimension that has to be taken into consideration when discussing the dissemination of nuclear knowledge (scientific, civilian and military), as well as the implementation of nuclear policies.

The most widely used narratives on scientific collaboration and science diplomacy focus mainly, if not solely, on cooperation between countries and its positive transformative power over international relations. However, as recently shown (Ruffini 2020), this approach overlooks the confrontational elements, not taking into account unilateral quests for advantages that are part of national strategies and of utmost importance in this narrative.

Work of this RU will be structured in three milestones:

WP3a) Identifying turning points and moments of conflict (RO2). Different types of conflicts will be analyzed in the long history of fusion from the mid-1950s to 2007: disagreements within the European or supranational framework; intra-European competition between and among states or between national policies and European programs; international contrasts with non-European actors, in particular the USA and USSR (later Russia) in the wider context of the Cold War and post-Cold War international order.

WP3b) Analysing the national-international nexus (RO2). If the close link between scientific cooperation and foreign policy is undeniable, European scientific collaboration also aims both to further the interests of the nation-state and to contribute to the European integration process. There has to be a careful balance between these potentially conflicting objectives. European programs can also provide an opportunity for maintaining a strong, albeit reduced, national presence by "Europeanizing" all or part of the national effort. Moreover, over the years many European governments tended to opt for the realization of specific national aims and further dissolution of remaining multilateral bonds. WP3b aims at identifying the links between national policies and foreign policy decisions in fusion research. To this extent, the RU investigates four main European actors: United Kingdom, France, German Federal Republic (later Germany) and Italy.

WP3c) Examining conflict management (RO3). An analysis of how the conflicts were managed and solved will be of paramount importance not only from a historical perspective, but would also provide fundamental tools and strategies in dealing with most contemporary crises. In this milestone, in addition to national archives, the Historical Archives of the European Union will offer the primary sources for understanding the complexity and effectiveness of crisis management at the Community/EU level.

This RU will use different levels of analysis: bilateral and multilateral relations, the European integration process, and the wider context of the European role in the international scenario. The fusion story may therefore provide an additional thread in the narratives of European integration, which are presently undergoing yet another rewriting process as they become ever more complicated.

As for the primary sources, the research for this unit will be conducted mostly in: Italy (Archivio della Presidenza della Repubblica in Rome, Archivio Andreotti at the Istituto Sturzo in Rome, Historical Archives of the European Union in Florence); UK (The National Archives in London); France (Centre des Archives diplomatiques de La Courneuve in Paris and Nantes, Archives de la présidence de la République in Paris); Germany (German Federal Archives or Bundesarchiv in Koblenz). There is no total availability for the period under consideration (1957-2007), due to the different national access policies to diplomatic documents; nonetheless, the British National Archives have adopted a 20-year rule, hopefully declassifying material up to 2004 during the time of this project.

Deliverables

WP3-A/B: two scientific papers in class-A international journals in the History of European Integration and European contemporary history.

After the end of the project, research undertaken in WP3 will be the groundwork for a monograph on cross-national tensions in Europe during the Cold War and beyond to be submitted to an international publisher.



**WP4 Social-epistemological issues in the development of fusion energy in Europe (Univ. of Milan)**

WP4 will apply a social-epistemological approach to the case of scientific cooperation in Europe on nuclear fusion research, keeping in mind that this was envisaged, since its very beginnings in the 1950s, as a highly cooperative enterprise involving many countries with potentially diverging political interests and objectives. Much research has been devoted to produce taxonomies of scientific collaboration (e.g., Katz and Martin 1997; Thagard 2006) and identify its epistemic conditions and effects (e.g., Muldoon 2017; Wray 2017). WP4 relies especially on conceptual tools developed in the study of interdisciplinary collaborations (Andersen and Wagenknecht 2013; MacLeod and Nersessian 2016), particularly when applied to massive, international cooperative environments (Marcoci and Nguyen 2020). It will profit from expertise on large international collaborations acquired within the interdepartmental project “Reassessing Scientific Collaboration”, funded by the Univ. of Milan and coordinated by Luca Guzzardi. WP4 intends to clarify the basic options that the actors involved at the different stages of nuclear fusion research—as identified in WP1 and WP2—had available for designing a social environment capable of promoting their epistemic goals. WP4 will also compare the epistemically possible social structures with those actually realized, which both reflect the cooperative and competitive tendencies characterizing the joint effort of nuclear fusion research, as analyzed in WP3.

To this end, we will follow a three-milestone path:

WP4a) From social networks to collaborative structures (RO4). This milestone aims to provide an image of the distinguishing features of cooperative work in nuclear fusion research. We will base our analysis on the phases of the European fusion program (WP2a) and the socio-epistemic networks (WP1a and b), and describe how knowledge shared by actors within the relevant networks has been turned into science cooperation. We will use the case study of the nuclear fusion research to outline an image of what are the distinguishing features of research collaboration faced with social networks, and advance theoretical tools to take them as separate but interconnected concepts, both of them being essential to the analysis of complex, multi-agent epistemic environments.

Deliverable WP4-A: a theoretical article on the distinctive features and the relationship between social networks and scientific cooperation in a class-A journal in the philosophy of science.

WP4b) Exploring the team-goal formation and epistemic constraint nexus (RO4). This milestone aims to establish an image of the teamwork in nuclear fusion research as an effect of the interplay of three distinct factors: 1) how epistemic goals shape teamwork in nuclear fusion research; 2) how teams negotiate and re-define epistemic goals; 3) how epistemic constraints help shape social structures.

Extrapolating case studies from the results of WP2 (particularly regarding the scientific targets, the technological hurdles & the possible solutions envisaged within the nuclear fusion research effort) and utilizing/updating taxonomies of scientific collaboration (esp. Thagard 2006), we will explore the main epistemic factors that guide team formation in nuclear fusion research.

Deliverable WP4-B: a historical-epistemological paper exploring goal-team formation and negotiation process depending on the epistemic constraints at play, in an international class-A journal in the history and philosophy of science.

WP4c) Mapping the unrealized (RO1). This milestone aims to compare the social structures allowed by the interplay between goal formation-negotiation and epistemic constraints with actual cooperative projects, which are strongly dependent on socio-economic conditions, political conveniences, and international relations.

Using results from WP3, we intend to produce a “counterfactual map” of the unrealized goals (with their expected benefits) and try to guess under which conditions they are feasible and arguably achievable. This might provide, at a normative level, a basis for discussing potential policies that consider how to implement conditions at which feasible goals with high potential benefits could be achieved.

Deliverable WP4-C: an interactive map of the unrealized goals of the nuclear fusion research to be published on the Project Website

**WP5 Which nuclear fusion? Experimental assessment of the causal Effects of policy design on public acceptance of nuclear fusion energy (Polytechnic Univ. of Turin)**

WP5 will address the shortcomings discussed in the state of the art on the public acceptability of fusion technologies in EU countries (RO5). While acceptability of traditional nuclear fission technologies is well understood, little is known about nuclear fusion research & commercial deployment. It remains unclear how much fusion suffers from anti-nuclear fission biases, to what extent ‘not in my backyard’ (NIMBY) attitudes play a role, how memory of past disasters or technical details affect support, what is the role of costs, &

whether the national/supranational nature of the governance, research & commercialization efforts affect support. Given the potential that fusion technologies have to counter climate change & foster European energy independence in a historical moment where traditional energy suppliers are no longer reliable, it is key to understand drivers of public support or opposition.

WP5 builds on the results of WP1-4 to identify key elements of tension as well as design choices to be made in international fusion research, development & deployment. It then enriches these insights with input coming from literature on public opinion on large energy and infrastructure projects. We will conduct a large-N, fully representative survey in 5 European countries, using a multifactorial conjoint experiment to test how the various options in nuclear policy design affects support on nuclear fusion, considering how energy matters might become politicized in the context of the energy crisis (Zeitlin and Nicoli, 2019). Conjoint experiments, through the random assignment of policy characteristics to fictional but realistic alternative policy packages, allow us to identify these causal effects, & benchmark those against other competing technologies, like new generation fission technologies, renewables or fossil fuels. In doing so, we link the key features of policy design identified by historical and epistemological research with public policy and public opinion, hence drawing public policy recommendations that will be discussed in cross-national policy fora.

Work of this RU will be structured in four milestones:

WP5a) Identification of key policy features & preparation of research design (RO5). We first analyze-jointly with all Associated PIs-results from the historical & epistemological investigations, & complement them with a literature review to identify the key parameters to be tested in a survey experiment. The RU designs the survey experiment and identifies the countries of interest as well as the sample quota.

**Deliverable WP5-A: a joint theoretical paper linking the issue of acceptability of fusion technologies to historical-epistemological insights & the broader literature on infrastructure acceptability.**

Adele

WP5b) Survey design & testing (RO5). After the identification of the panel provider, the survey instrument is designed through a team-wise iterative process. The survey is implemented in a test environment by the survey company, translated in all languages of interest, & tested in these languages by the team & colleagues. A pre-registration documenting the team's research design, hypotheses & analysis plan is recorded in a dedicated online repository like Open Science Framework

WP5c) Experimental fieldwork (RO5). The survey company carries out the fieldwork for the experimental survey.

Deliverable WP5-B: experimental dataset, which will be made open access & free to use after an embargo period, providing essential information for policymakers & researchers.

WP5d) Scientific analysis (RO5). Next, the team analyzes the impact of individual as well as aggregate non-experimental characteristics (such as income, education, or GDP) on preferences for alternative fusion energy cooperation schemes.

Deliverable WP5-C: a scientific paper on the causal analysis of the impact of fusion-cooperation policy design on public support; the target journal is Energy Policy (IF 7)

Deliverable WP5-D: heterogeneous treatment effect paper. The policy features modeled in the experiment are interacted with individual characteristics (education, income, & fears of technology) to explore how individual factors impact different parts of policy design. The preferred target is the Journal of European Public Policy (IF 7)

WP5e) Policy Recommendations and outreach (RO6): the team draws on the results of the survey & of the previous analyses to provide policy recommendations in the form of a policy brief, & present them to appropriate policy audiences.

Deliverable WP5-E: policy paper drawing policy recommendations for European and national policymakers on the grounds of our empirical results.

Joint milestone: International workshop (Univ. of Padua)

An international workshop will be organized at the University of Padua on the historical role of European cooperation on fusion research in the process of European integration.

Deliverable D16: an edited volume in a major international publishing house (target Palgrave) based on the international workshop.

*3. Detailed description of the project team and planning; indicating the research team components – PI and associated PIs - and their relative expertise/track record, gender equality of the composition, the interrelation and coherence of the team components. RUs- and the feasibility of the project, thus outlining the congruity between objectives, timing and costs*

The RU at the Polytechnic Univ. of Turin is led by Prof. R. Lalli, this project's PI, who has acquired extensive experience in research and group management, as PI or co-PI in five international projects. From 2014 to 2020 he was main coordinator of an international research project on the post-World War II history of general relativity funded by the Max Planck Institute for the History of Science. He is also the proponent and co-PI of an international project on the global history of the International Union of Pure and Applied Physics to be concluded in 2023 with an edited volume under contract with Oxford University Press. The PI's international profile in high-level cooperation teams is further shown by his participation as senior team member in the ERC AdG project 'NeWorld@a-Negotiating World Research Data: A science diplomacy study'. Lalli is the author of a 2017 monograph which was positively reviewed in major history of science journals. His track record includes the co-editorship of two special issues in international class-A journals in the history of science, as well as one co-edited volume in the prestigious series Einstein Studies (Birkhäuser). He has published 33 historical research articles, eight of them in class-A journals in the history of science & five in major scientific journals (including 3 papers in Nature journals). He co-organized 18 international workshops, conferences or seminars, and presented his research at about 55 international and national conferences/workshops, 31 times by invitation, including a plenary lecture at the III International Conference on the History of Physics (2018). His recent work with considerable international impact concerns the history of international scientific cooperation and science diplomacy as well as historical network research, key fields in the proposed project. From 2021, he has the ASN Habilitation as full professor in both 11/C2 (History and philosophy of science) and 02/D1-Fis/08 (History and didactics of physics).

Francesco Nicoli will be responsible of WP5 at the RU of the Polytechnic Univ. of Turin. Nicoli's PhD thesis won the European Political Economy Thesis Prize. Since defending his PhD in 2017, prof. Nicoli has published 19 A-class journal articles, half of which using survey experiments to explore policy preferences, key expertise in the proposed project; his Scholar citation count is over 650. He is the winner & PI of the FEB Starting Grant (250.000 EUR) on experimentally exploring the future of the EU, & co-PI in 4 more multi-country experimental survey projects. Two of his recent co-authored papers have been awarded the best paper prize of the European Consortium of Political Research. He is co-editor of three special issues in major journals and one edited volume, and has co-organized more than 10 conferences or workshops.

The inter-disciplinary team at the Polytechnic Univ. of Turin will be completed by a contract researcher who will be hired to carry on research on WP1, WP5 and WP6, together with the PI and Prof. Nicoli.

The RU at the Univ. of Macerata is composed of Ass. PI Adele La Rana, in charge of WP2. Prof. La Rana has a PhD in physics and strong connections with the physics community, features that constitute the backbone of her activity as a historian. Research associate of the National Institute for Nuclear Physics (INFN), she has been working mainly on the history of 20th century physics, developing extensive experience in archival research and oral history interviews. She has given seminal contributions in investigating European attempts to create a network of gravitational wave detectors. Her paper EUROGRAV 1986-1989 (<https://rdcu.be/cINke>) has rapidly become a reference for the LIGO and Virgo community. As a research fellow of the Fermi Research Center, she co-authored the first biographical dictionary of Italian physicists from the Renaissance to World War II (<https://www.sif.it/riviste/sif/gdf/fisici-italiani>), which won the 2022 History of physics award of the Italian Physical Society. Together with Nobel Laureate Barry Barish, she is co-authoring a scientific biography of E. Amaldi to be published by Oxford University Press in 2024. This research activity addresses many of the most significant issues in the history of 20th century physics and its role in society and international politics, including issues related to nuclear physics and policies as well as European scientific cooperation. She is co-editor of the expanded new edition of the book by E. Amaldi, *Da via Panisperna all'America: I fisici italiani e la seconda guerra mondiale*.

The RU at the Univ. of Padua is composed of Ass. PI Giulia Bentivoglio, in charge of WP3. She is known for her works on British, Italian and American foreign policies in the 20th century. Her research interests lay in the fields of Cold War History, History of European Integration, History of technical-scientific multilateral diplomacy and Transatlantic studies. Her research covers a period ranging from the 1920s with studies on post-WWI Italy and on the Bolshevik threat to the British Empire, to the 1990s, which are the focus of her last project on Italy's transition. For this project, she was financed with a 15000€ competitive grant by the University of Padua. Her most recent monograph (2018) on Italy's and Britain's crises in the 1970s-1980s was reviewed on *Diplomacy & Statecraft* as "a timely reflection on a relationship that has been vital in recent European history and provides a useful precedent for today's challenges". Since 2004, she has been invited to present her work in many international conferences across Europe. She has participated in several national and international research projects (including the 2020 Project "Inter-European Circulation of Knowledge during the Cold War" of the Spanish Science, Innovation and University Ministry; the Project of Relevant National Interest PRIN 2009 "Italy in the International context (1968-1981): crises, transformations, stabilization"; "Cold War and Society - Eastern and Western perspectives", financed by the European Union, Institut für Zeitgeschichte, University of Vienna). She has also been a participant to the project for the Publication of Italian Diplomatic Documents of the Ministry of Foreign Affairs. She has an extensive

experience of archival research in Italy, United Kingdom, France and the United States (thanks to the 2012 Gerald Ford Foundation grant received) that will be pivotal for pursuing this project.

The RU at the Univ. of Milan is composed of Ass. PI Luca Guzzardi, in charge of WP4. Guzzardi's track record demonstrates a profile of an independent, original researcher capable of joining together apparently distant areas of investigation and interests. He is particularly known for his works on Ernst Mach and Ruggiero Boscovich. As a DAAD Alumnus, after his post-doc scholarship (2003-04) the DAAD awarded him two times with research grants (2008, 2018) in its re-invitation program, allowing him to conclude a monograph on Boscovich's "theory of natural philosophy". This has been published in the leading History of Science series Science Networks. Historical Studies (Birkhäuser) and reviewed in the Zentralblatt MATH and in Mathematical Reviews as "an example of a remarkable piece of history and philosophy of science". Prof. Guzzardi has been invited several times to give talks in many European countries and Israel. The study of Boscovich's activity as an astronomer, particularly his contribution to the calculation of Uranus orbit in 1781-82, led him to elaborate the concept of "shared discovery" and to develop the epistemological underpinnings of scientific collaboration. This also requested him to widen his field of view including 20th century physical sciences. In 2019 he successfully applied for a competitive grant (€ 15.000) of the Univ. of Milan. The interdepartmental project he coordinated (partner: Dept. of Physics) was titled "Reassessing Scientific Collaboration" and ended up in 2021 with an interdisciplinary workshop bringing together philosophers, historians of science, physicists, astronomers, and biologists. Results of this project have been presented at national and international workshops and conferences and are in the review process for being submitted within 2022.

The 4-member team composed of the PI and the three Ass. PIs shows a perfect balance between female and male scholars. The team composition aims at complementarity of research expertise so to carry on this multidisciplinary project:

Lalli is an expert in the history of contemporary physics, historical network research and history of science diplomacy, who will carry on a quantitative analysis of techno-scientific cooperation on fusion research in Europe using tools he himself has developed and applied.

La Rana is an expert in the history of contemporary physics, oral history, and European scientific cooperation, who will focus on techno-scientific aspects providing the scientists' perspective on the evolution of European collaborations on nuclear fusion research.

Bentivoglio is an expert in the history of international relations, who will investigate the history of fusion research from the perspective of inter-state relations elucidating the political/diplomatic dimensions of the negotiations.

Guzzardi is a philosopher of science with expertise in the social epistemology of international multidisciplinary large-scale cooperation who will analyze the epistemological constraints from descriptive and normative perspectives.

Nicoli, team member at the Polytechnic Univ. of Turin, is a political economist with expertise in large-N multi-national survey experiments & the political process of EU integration, and experiences in employing historical analyses in the designing phase of these surveys.

Research at the four RUs is designed to be complementary at various levels, both methodologically and topically. In most cases the research will run in parallel, but there are specific interactions in which milestones in one WP are relevant to carry on research pursued in other RUs. In addition, all digital files, including digital archival materials, will be shared through a freely available document manager software by the entire team in all RUs.

In more detail, the project's plan is:

#### Months 1-6

WP1, WP2, and WP3 will run in parallel since the beginning of the project.

The first four months will be employed for the acquisition of data (through archival research, oral history interviews, or automatic data retrieval from published literature, depending on the methodology employed). Early work in WP2 will be devoted to oral interviews of scientists who had key roles in decision-making phases about controlled thermonuclear fusion research in Europe, including P.-H. Rebut (head of the design team for JET), U. Finzi (third director of the Fusion program, Commission of the European Communities), L. Enriques (second chair of the JET working group in the 1970s), A.M. Bradshaw (past spokesperson of the German nuclear fusion program), R. Toschi (head of the nuclear fusion laboratory in Frascati and leader of the Next European Torus (NET) team in the 1980s).

The next two months will be dedicated to the analyses of acquired historical data to achieve the first milestone of each WP: WP1a, WP2a and WP3a, which will then be compared to test the robustness of the findings.

#### Months 6-12

Partial results and advances of WP1, WP2 and WP3 will be made available immediately through the document management software. WP4 will start at the end of month 6 after the completion of WP1a, WP2a & WP3a, as these results will be employed to pursue the analysis based on social epistemology. While all Ass. PIs will dedicate about the same number of working hours to the project, Prof. Guzzardi will work more intensively as his WP starts 6 months later. By the end of the second 6-month period we will have completed WP1b, WP2b, WP3b, WP4a.

#### Months 13-14

The milestones already achieved in WP1, WP2, WP3 & WP4 will be employed for WP5a, namely the process of designing the survey of public acceptability based on the historical and socio-epistemological analysis. This will be pursued by the entire team in all RUs. This activity will end with the submission of the concept paper (deliverable WP5-A). In parallel, research at each RU will continue.

#### Months 15-24

An international workshop will be held at the University of Padua to share and discuss the results in a larger framework of historians and scientists.

After WP5a, the next steps of WP5 will be pursued independently by Prof. Nicoli except for the policy recommendations and outreach (WP5d) that will occur in the last 6 months of the project.

As for the other WPs, results from inter-state political analysis (WP3a and b) will be used to complete WP1c—namely the impact of political relations on the socio-epistemic networks—by month 16. We plan to achieve all the remaining milestones of WP2-4 by month 18. After month 18, the individual RUs will focus on the writing of the deliverables of each WP. The publication of the volume related to the workshop will involve the editors Profs. Bentivoglio, Lalli & La Rana.

The time commitment of all Ass. PIs will be about 30% of their overall workload (900 hrs. or 7.2 months/person) but only about 15% will be reported in the A.1 expenses, because WPs1-4 align with the Ass. PIs' main research activities.

Prof. Nicoli will dedicate 175 hrs. (1.4 months/person) starting from month 12, in line with his previous experience with similar methodologies. The researcher hired at the Polytechnic Univ. of Turin will work full time on the project (24 months/person). Beyond the costs on the personnel (item A.1 and A.2), funds will cover travels for archival research, participation to workshop/conferences and the organization of the international workshop (item F) as well as the digitization of archival records (5000€ in item C). The other major expense will be for the experimental multi-national survey WP5c by a survey company (50000 € in item C) around month 15.

Given the expertise of the team involved and the time dedicated by the Ass. PIs, we expect the project to be feasible. Preliminary explorations showed the relevant materials to be available in the archival collections, and preliminary contacts with individuals selected for oral history interviews have been made. The documents at the basis of the extraction of data from published literature for the network analysis have been already located. The method for the socio-epistemic network analysis as well as the methodology for the large-number multi-national survey has been applied successfully to other cases.

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#### *4. Detailed description of the Project impact, as such; indicating knowledge improvements, technological innovation and/or industrial applications, scientific community reinforcement, level of research internationalization, dissemination and exploitation of the results*

The project is designed to have an impact on various disciplinary domains, but also at the social and political levels.

By achieving RO1-4, FusEUrope will have given an important contribution to address a massive lack of knowledge in the historiography of science and the historiography of international relations in the contemporary period. The project aims to fill a lack of knowledge concerning the history of fusion research in Europe both in terms of the big-picture narrative and in terms of detailing specific key moments and negotiations. These results will contribute to the history of science and technology, addressing various shortcoming in our current knowledge of the history of fusion research in general; on the history of European integration, with the understanding of the role of fusion research in political processes, and, more broadly, on the history of science diplomacy with a multi-disciplinary historical analysis of a major case study in international techno-scientific cooperation.

With RO4, the project will have provided a major empirical case of how knowledge acquisition and transmission may be promoted or

threatened by the social environment in which it emerges and develops. This will also have normative significance, as the study of fundamental structures of collaborative approaches in nuclear fusion energy research is expected to give evidence-based insights both for developing appropriate social structures to promote desired techno-scientific results and, in turn, for designing the adoption of appropriate scientific policies under given social circumstances and demands. In this sense, our research may positively orient discussions in important topics related to nuclear fusion energy research that we do not directly or explicitly address in our project, such as the exploitation of scientific results for military purposes, political relations and social pressures related to the environmental impact of the fusion research.

This impact will be obtained through:

- the Project Website, displaying a release of the main scientific results (linked articles), interactive maps including network visualizations, and experimental datasets;
- the organization and promotion of the international interdisciplinary workshop;
- scholarly publications (academic papers across all WPs, the edited volume based on the workshop, the annotated edition of oral interviews in WP2);
- the participation to a number of international and national conferences and workshops in the involved academic fields (such as History of Science Society- HSS, European Society for the History of Science-ESHS, Society for the History of Technology-SHOT, Tensions of Europe, Italian Society for the History of Science-SISS, Italian Society of for the Study of Contemporary History, European Philosophy of Science Association, Italian Society for Logic and Philosophy of Science, as well as in events organized by the historical Commission on Science, Technology and Diplomacy, to which the PI was a officer in 2019-2021).

By completing RO5, we will have developed a full causal analysis of the effect that different policy design alternatives have on public support or opposition for large infrastructural programmes in general, and fusion energy in particular. To our knowledge, this would constitute the first dataset ever studying experimentally how public support for such projects is causally associated with policy design. This will provide essential information which will be then exploited to fulfill RO6. As discussed below, such experimental surveys have had a direct impact on international policy-making.

With RO6, we aim to have an impact on current policy-making at the EU level akin previous successful conjoint experiments, which were presented in dedicated policy seminars and had a verified impact on the design of essential EU policies. Conjoint experiments designed by Nicoli and his team have routinely been used by policymakers to inform policy design. For instance, the 2018 Study on European Unemployment Benefits Schemes (Vandenbroucke et al. 2018) was cited in the Commission working programme in 2019 and constituted the foundation for Von Der Leyen 'SURE' policy package in 2020. Similarly, the early-2020 work on medicines procurement (Beetsma et al. 2021) was indicated by Frank Vandenbroucke, deputy prime minister of Belgium, as a key piece of evidence in support of joint procurement of vaccines to respond to COVID, while related 2020 experimental studies informed the design of the Resilience and Recovery Facility (RRF) (Beetsma et al. 2021; Bremer et al. 2023).

Similarly to such previous cases, we plan to begin our outreach and policy impact efforts by establishing early on a collaboration and partnership with ITER and EUROfusion, and then present the results in a series of dedicated policy seminars in think tanks in European capitals. Preliminary contact with ITER and Eurofusion, as well as CEPS or BRUEGEL (Brussels), Jacques Delors Institute (Paris), Bertelsmann Stiftung (Berlin) and Istituto Affari Internazionali (Rome) will be taken immediately after the PRIN award to secure venue for the presentation of the policy paper that concludes the project.

Overcoming the double public opposition against large infrastructural projects and against nuclear energy represents the two largest non-technical challenge in fusion energy deployment. By identifying the impact that certain design decisions have on policy preferences, we will be able to provide essential information to governments & international agencies to act responsively to the public opinion & tailor future fusion energy cooperation strategies, hence maximizing public acceptability, minimizing political risk, and fully exploiting the potential of fusion energy for the green transition.

The entire set of ROs is aimed, on the one hand, at producing a robust long-term analysis of a major example of science diplomacy in the process of European integration, and, on the other, at highlighting a methodology to employ historical studies to produce policy recommendations on suitable choices in the science diplomacy domain, which is a desideratum still lacking a major successful result (as discussed in the state of the art). The project is designed to make a case for the integration of historical and epistemological studies in the analysis and recommendation of current policies, especially in devising science diplomacy strategies. As mentioned in the state of the art, various projects at the EU level have tried to explore this sort of integration, most especially InsSciDE - Inventing a Shared Science Diplomacy for Europe (<https://www.insscide.eu>), which now, together with sister projects, form the collaborative initiative EU Science Diplomacy Alliance (<https://www.science-diplomacy.eu/>). We will present the methodology and results to all arenas related to the EU Science Diplomacy Alliance.

Being a transnational study of international cooperation, the project is planned to have an international impact, but also to address

the Italian community of scholars and policymakers. The topic lends itself to international cooperation and research will be pursued internationally, with archives located in different countries. The results are of relevance at the European level both for the scholarly and policy-making communities. In addition, the methodology of WP1 will profit from the cooperation with the international network of scholars and projects around the project Modelling Socio-Epistemic Networks (ModelSEN <https://modelsen.mpiwg-berlin.mpg.de/de/>) pursued at the Max Planck Institute for the History of Science and funded by the Germany Ministry of Education, in which the PI worked before moving to Italy in August 2022. In case of the extension of the ModelSEN project, the proposed PRIN project will become a partner group of ModelSEN. Otherwise, it will be part of the international network of digital humanities projects presently connected within the ModelSEN framework. The project will also benefit from the international cooperation network related to the PI, which includes the Inter-Union (IUPAP and DHST/IUHPS) Commission on the History and Philosophy of Physics in which the PI is Vice-President (<https://www.iuchpp.org/>), the DHST/IUHPS Historical Commission on Science, Technology and Diplomacy (<https://sciencediplomacyhistory.org/>), and two Max Planck Institutes: the Max Planck Institute for the History of Science (in which the PI is a Visiting Scholar until 2026 (<https://www.mpiwg-berlin.mpg.de/>)) and the recently established Max Planck Institute for Geoanthropology (<https://www.mpg.de/9347805/geoanthropology>), whose founding director, Prof. Jürgen Renn, is a long-term cooperation partner of the PI.

The international workshop to be held at the Univ. of Padua in month 15 of the schedule will both help promote the project in the international scholarly community and also increase the international cooperation related to the research outputs. A relevant task of the workshop will be bringing together historians and scientists, and fostering a dialogue between different research communities, on the ground of the shared interest towards controlled thermonuclear fusion. The workshop will aim at putting in connection different perspectives and expertise and at promoting a deeper awareness of the issues at stake within the research communities, also laying the foundations for possible joint initiatives. The choice of Padua as location of the workshop has a special value, because the city hosts very relevant experimental activities contributing to ITER and to the EU Fusion Programme (Laboratory Neutral Beam Test Facility of Consortium RFX). The Legnaro National Laboratories of the Istituto Nazionale di Fisica Nucleare (INFN), close to Padua, are the place where the RFQ (Radio-frequency quadrupole) accelerator has been built within the project called International Fusion Materials Irradiation Facility (IFMIF/EVEDA), aimed at material-testing technologies for ITER, and later installed in Rokkasho site (Japan), following the already mentioned 'broader approach'. A visit to the laboratories can be planned within the workshop, so to have a closer look at the material culture of experimental plasma physics and of controlled thermonuclear fusion research. All publications and policy recommendations are planned to be published in international journals with international publishing houses mostly in the Open Access format.

##### 5. Financial aspects: costs of each research unit

n°		Funds of the Ministry of University and Research (euro)
1.	LALLI Roberto	191.031
2.	BENTIVOGLIO Giulia	45.043
3.	LA RANA Adele	30.043
4.	GUZZARDI Luca	33.800
		<b>299.917</b>

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## 7. Time schedule of the research activities (GANTT CHART)

Scadenze da rispettare

### Milestone 1 WP1a - Visualizing the dynamics of cooperation networks in fusion research in Europe

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Preparing digital infrastructure	LALLI R	X											
Data retrieval and archival research	LALLI R	X	X										
Social network analysis	LALLI R			X									
Visualization social networks in the website	LALLI R			X									

### Milestone 2 WP1b - The socio-epistemic network analysis

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Data retrieval and archival research	LALLI R				X	X							
Analysis of socio-epistemic networks	LALLI R					X	X						
Visualization in the website	LALLI R						X						

## Milestone 3 WP1c - Understanding the impact of politics on socio-epistemic networks

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Acquire results from milestones WP3a and b	LALLI R							X					
Analysis of political impact on socio-epistemic networks	LALLI R							X	X				
Complete website (deliverable WP1-C)	LALLI R GUZZARDI L									X	X	X	X
Write deliverable WP1-A	LALLI R									X	X		
Write deliverable WP1-C	LALLI R											X	X

## Milestone 4 WP2a - Identifying the main phases of the European fusion program

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Oral history interviews	LA RANA A	X	/	/									
Archival research	LA RANA A	X	X	/									
Historical analysis	LA RANA A		X	X	/								

## Milestone 5 WP2b - Analyzing techno-scientific arguments in critical decision-making phases

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Archival research and oral history interviews	LA RANA A				X	X							

Historical Analysis	LA RANA A							X	X						
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**Milestone 6 WP2c - Tracking the constraints in the transfer of techno-scientific knowledge**

ACTIVITY	ASSIGNED TO	I year						II year							
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6		
Archival research and oral history interviews	LA RANA A							X	X						
Historical Analysis	LA RANA A								X	X					
Preparation annotated edition oral history interviews (deliverable WP2-B)	LA RANA A										X	X	X	X	
Writing deliverable WP2-A	LA RANA A													X	X

*Milestone 7 WP3a - Identifying turning points and moments of conflict*

ACTIVITY	ASSIGNED TO	I year						II year							
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6		
Archival research	BENTIVOGLIO G	X	X												
Historical analysis	BENTIVOGLIO G		X	X											

*Milestone 8 WP3b - Analysing the national-international nexus*

ACTIVITY	ASSIGNED TO	I year						II year							
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6		
Archival research	BENTIVOGLIO G				X	X									
Historical															

analysis	BENTIVOGLIO G						X	X						
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## Milestone 9 WP3c - Examining conflict management

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Archival research	BENTIVOGLIO G							X	X				
Historical analysis	BENTIVOGLIO G								X	X			
Write deliverables WP3-A and WP3-B	BENTIVOGLIO G										X	X	X

## Milestone 10 WP4a - From social networks to collaborative structures

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Acquisition and comparison results WP1a, WP2a, WP3a	LALLI R BENTIVOGLIO G LA RANA A GUZZARDI L				X								
Social epistemological analysis	GUZZARDI L				X	X							
Write deliverable WP4-A	GUZZARDI L						X						

## Milestone 11 WP4b - Exploring the team-goal formation and epistemic constraint nexus

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Literary review	GUZZARDI L							X					
Social epistemological													

analysis	GUZZARDI L							X	X				
Write deliverable WP4-B	GUZZARDI L									X			

## Milestone 12 WP4c - Mapping the unrealized

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Social epistemological analysis	GUZZARDI L										X	X	
Produce interactive map on the website (deliverable WP4-C)	LALLI R GUZZARDI L											X	X

## Milestone 13 WP5a - Identification of key policy features &amp; preparation of research design

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Joint analysis of results WP1a,b; WP2a,b; WP3a,b and WP4a	LALLI R BENTIVOGLIO G LA RANA A GUZZARDI L							X					
Identification key parameters for survey design	LALLI R							X					
Writing joint paper Deliverable WP5-A	LALLI R BENTIVOGLIO G LA RANA A GUZZARDI L							X					
Identification countries of interest and sampe quota for survey	LALLI R							X					
Literature review	LALLI R							X					

## Milestone 14 WP5b - Survey design and testing

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Identification panel provider	LALLI R							X					
Testing all versions implemented by the survey company	LALLI R								X				
Record documents about the process in online repository	LALLI R								X				

## Milestone 15 WP5c - Experimental fieldwork

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Fieldwork for the experimental survey by the survey company	LALLI R										X		
Publication dataset	LALLI R										X		

## Milestone 16 WP5d - Scientific analysis of experimental survey

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Analysis of the results of the survey	LALLI R										X		
Write deliverable WP5-C and WP5-D	LALLI R											X	

## Milestone 17 WP5e - Policy Recommendations and outreach

ACTIVITY	ASSIGNED TO	I year						II year					
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
Preparation policy paper (deliverable WP5-E)	LALLI R										X	X	

Presentation in appropriate policy audiences	LALLI R											X	X	X
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## Milestone 18 WP6 - International workshop

ACTIVITY	ASSIGNED TO	I year						II year						
		BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	
Organization international workshop	BENTIVOGLIO G	X	X	X	X	X	X	X						
International workshop	LALLI R BENTIVOGLIO G LA RANA A GUZZARDI L								X					
Write edited volume collecting papers presented at the workshop (deliverable D16)	LALLI R BENTIVOGLIO G LA RANA A										X	X	X	X

## 8. Time schedule of the expenses

Scadenza spese

n°	Research Units	Expenses	I year						II year					
			BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6	BIM. 1	BIM. 2	BIM. 3	BIM. 4	BIM. 5	BIM. 6
1.	LALLI Roberto	item A1	X	X	X	X	X	X	X	X	X	X	X	X
2.	LALLI Roberto	item A2	X	X	X	X	X	X	X	X	X	X	X	X
3.	LALLI Roberto	item B												
4.	LALLI Roberto	item C							X	X				
5.	LALLI Roberto	item D												
6.	LALLI Roberto	item E												
7.	LALLI Roberto	item F	X	X		X	X		X	X				
8.	BENTIVOGLIO Giulia	item A1	X	X	X	X	X	X	X	X	X	X	X	X
9.	BENTIVOGLIO Giulia	item A2												
10.	BENTIVOGLIO	item B												

	Giulia													
11.	BENTIVOGLIO Giulia	item C	X	X		X			X					
12.	BENTIVOGLIO Giulia	item D												
13.	BENTIVOGLIO Giulia	item E												
14.	BENTIVOGLIO Giulia	item F	X	X		X	X		X	X				
15.	GUZZARDI Luca	item A1				X	X	X	X	X	X	X	X	X
16.	GUZZARDI Luca	item A2												
17.	GUZZARDI Luca	item B												
18.	GUZZARDI Luca	item C												
19.	GUZZARDI Luca	item D												
20.	GUZZARDI Luca	item E												
21.	GUZZARDI Luca	item F						X			X	X	X	
22.	LA RANA Adele	item A1	X 	X	X	X	X	X	X	X	X	X	X	X
23.	LA RANA Adele	item A2												
24.	LA RANA Adele	item B												
25.	LA RANA Adele	item C	X	X		X			X					
26.	LA RANA Adele	item D						X						
27.	LA RANA Adele	item E												
28.	LA RANA Adele	item F	X	X		X	X		X	X		X	X	

Anno 1

Anno 2

## B.2

## 1. Scientific Curriculum of the Principal Investigator

- Researcher unique  
identifier: ORCID Id

0000-0002-5854-3484

- URL for web site:

[https://www.dimeas.polito.it/personale/scheda/\(nominativo\)/roberto.lalli](https://www.dimeas.polito.it/personale/scheda/(nominativo)/roberto.lalli)Academic age (years from  
the beginning of scientific  
activity, i.e. years from first  
publication or from the  
beginning of PhD or Medical  
Specialisation School)

12



Previous positions	<p>2013-22, Research Scholar, Max Planck Institute for the History of Science, Germany</p> <p>2011-2013 Postdoctoral Fellow in the History of Modern Physical Sciences, Program on Science, Technology, and Society, MIT, USA,</p>
Prizes and awards	<p>2020 Visiting fellowship, Department of Philosophy, University of Milan (6,000€)</p> <p>2018 SPIN 2018 Grant, 1st in Final Ranking, Ca' Foscari, Venezia, (119,000€) - declined</p> <p>2017 Visiting fellowship from the Van Leer Jerusalem Institute, Israel (7,160\$)</p> <p>2013 Maurice A. Biot award, California Institute of Technology Archives, USA (2,000\$)</p> <p>2010-2016 Three grants-in-aid from the Center for History of Physics, American Institute of Physics, USA (total of 7,500\$)</p>
Visiting academic positions	<p>2022- Visiting Scholar, Max Planck Institute for the History of Science, Germany</p> <p>2020 Visiting fellow, Department of Philosophy, University of Milan</p> <p>2018-2021 Research Scholar, Berlin Center for Machine Learning, Germany</p> <p>2017- Visiting Scholar, Research Program on the History of the Max Planck Society, Germany</p> <p>2017-2022 Visiting Lecturer, Technische Universität Berlin</p> <p>2017 Visiting fellowship at the Van Leer Jerusalem Institute, Israel</p>
Teaching activities and PhD supervision	<p>Co-supervisor, Carrington Kinyanjui, PhD student at the University of Manchester, within the ERC AdG project NeWorld@a - Negotiating World Research Data: A science diplomacy study, from 2022</p> <p>Co-supervisor, Andrea Battocchio, PhD candidate in the History of Science, University of Bari, Italy. Title: Il nucleare in Italia dal "caso Ippolito" alla crisi petrolifera, 1963-1973, from 2021</p> <p>2022-23 Course, History of Science and Technology, 6 ECTS, 60 hours, BA Engineering, Polytechnic of Turin</p> <p>2021-22 Course, Histories and historiographies of the relativity revolution (in English), 5 ECTS, 28 hours, BA and MA students in the History of Science Program , Technische Universität Berlin</p> <p>2020-21 Course, History of Science (in English), 6 ECTS, 36 hours, MA students in philosophy, University of Turin</p> <p>2017-20 One Course per year (in English), 5 ECTS, 28 hours, 28 hours, BA and MA students in the History of Science Program , Technische Universität Berlin</p>
Other work experience (e.g. consultancy if any)	nessuna
- Administrative role and position responsibility	<p>2022 - Member of the Council of the joint degree course in Sustainable design for the food system. Polytechnic of Turin and University of Parma.</p> <p>2022 - Member of Theseus, Inter-departmental center on technology, society, humanity, Polytechnic of Turin.</p> <p>2020-21 Member of the Council of the degree course in philosophy, University of Turin.</p>
- Scientific organisations/Coordination of academic activities	<p>2020-22 Scientific committee member, biennial conferences of the European Society for the History of Science,</p> <p>2021 Co-organizer, workshop, "Observing, sensing, detecting: Toward a multi-layered picture of the Universe from historical and epistemological perspectives," online, 4-5 Feb,</p> <p>2020 Co-organizer, symposium, "The changing relation between visual representations and theoretical frameworks: visual tools in the history of physics and astronomy," 9th ESHS conference, online, 31 Aug-3 Sep,</p> <p>2019-2020 Co-organizer, seminar series, "Science, Technology, and Diplomacy during the Cold War and Beyond," MPIWG, Berlin</p> <p>2019-2022 Member of scientific and organizing Committee, Annual congresses Italian Society for the History of Physics and Astronomy"</p> <p>2019 Co-organizer, workshop, "Diplomats in science diplomacy: Promoting scientific and technological collaboration in international relations," Copenhagen, 19-20 July</p> <p>2018 Co-organizer, session, "Institutionalizing scientific internationalism? Diplomacy at work in the physical sciences during the Cold War and beyond." History of Science Society Meeting, Seattle, 1-4 Nov,</p> <p>2016 Co-organizer, workshop, "Opening New Windows on the Cosmos: Astrophysics and Astronomy in the History of the Max Planck Society," Berlin, 6-8 Sep,</p> <p>2016 Co-organizer, symposium, "Enduring Ideas, New Alliances: Social and Epistemic Factors in</p>

the post-war Renaissance of General Relativity” 7th Congress of the ESHS, Prague, 22-24 Sep,  
 2015 Co-organizer, conference, “A Century of General Relativity: A Centenary Conference on the  
 History of General Relativity” Berlin, 2-5 Dec,  
 2015 Co-organizer, session “Back with a Flourish: Social and epistemic factors in the postwar  
 Renaissance of General Relativity,” History of Science Society Meeting, San Francisco, 19-22  
 Nov,  
 2013 Co-organizer, Harvard-MIT-Princeton Workshop on the History of the Physical Sciences,  
 Harvard University, 20 Apr.

Editorial activity	<p>2022- Senior Editorial Board member, Oxford Research Encyclopedia of Physics (Oxford University Press)</p> <p>2021- Editorial board member, Il Giornale di Fisica and Quaderni di Storia della Fisica (Italian Physical Society, SIF)</p> <p>2020- Advisory board member, GRG Golden Oldies Series, General Relativity and Gravitation</p> <p>2019- Editorial board member, Human and Social Sciences Communications (formerly Palgrave Communications)</p> <p>2012- Referee for (selection): Oxford University Press; Chicago University Press; American Journal of Physics; Centaurus; Cold War History; European Journal of Physics; European Physical Journal H; Historical Studies in the Natural Sciences; Notes and Records: the Royal Society Journal of the History of Science; Nuncius; Science and Education; Studies in the History and Philosophy of Modern Physics (~ 8 reviews per year in the last four years)</p>
Membership of scientific societies	<p>2021- Vice-President, Inter-Union (IUPAP and DHST/IUHPS) Commission on the History and Philosophy of Physics</p> <p>2019-2021 Member (invited), DHST/IUHPS Commission on Science, Technology and Diplomacy of the Division of History of Science and Technology</p> <p>2019- Member executive board (elected), Italian Society for the History of Physics and Astronomy (SISFA)</p> <p>2018- Committee Member (invited), Group for the History of Physics, European Physical Society</p> <p>2018- Member scientific board, PR-officer (elected) and Secretary, European Society for the History of Science</p> <p>2016–2020 Member (invited), Physical Sciences Forum of the History of Science Society</p> <p>2014- Member of the European Physical Society</p> <p>2010- Member of the Italian Society for the History of Science</p> <p>2010- Member of the European Society for the History of Science</p> <p>2010- Member of the History of Science Society</p> <p>2008- Member of the Italian Physical Society</p> <p>2008- Member of the Italian Society for the History of Physics and Astronomy</p>

## Funding (current and past)

Anno	Project title	Person months	Funding organisation
2022	NEWORLDatA Negotiating World Research Data: A science diplomacy study	20	ERC
2022	One hundred years of IUPAP	3	International Union of Pure and Applied Physics
2021	Socio-Epistemic Networks: Modelling Historical Knowledge Processes	16	Federal Ministry of Education and Research, Germany
2018	Berlin Center for Machine Learning: Pathways to exoplanet Research	26	Federal Ministry of Education and Research, Germany
2015	The Renaissance of General Relativity in the post-WWII period	34	Max Planck Institute for the History of Science, Germany

2014	Changing Contexts and Practices of Basic Science during the Twentieth Century	4	Max Planck Institute for the History of Science, Germany
2013	History of Physics and Chemistry Seen through the Nobel Prizes: Complexity, Reduction, and Emergence	9	Lindau Nobel Laureates Meetings Foundation, Germany
2011	The other side of the relativistic revolution: A comparative history of anti-relativity. Case studies in USA and France	24	Massachusetts Institute of Technology, USA

Significant career breaks	2 months of paternal leave in 2020
- H-Index (in Scopus):	6
- Total number of publications in peer-reviewed journals	17
- Total IF	n.a
- n. and total IF of publications where the candidate is first author or equivalent (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a
- N. and total IF of the publications where the candidate is last or corresponding author (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a.

## 2. Scientific Curriculum of the associated PIs

### 1. BENTIVOGLIO Giulia

- Researcher unique identifier: ORCID Id	0000-0001-6499-9317
- URL for web site:	<a href="https://didattica.unipd.it/off/docente/D78C8E825734F77EE86AE4B36A882C5F">https://didattica.unipd.it/off/docente/D78C8E825734F77EE86AE4B36A882C5F</a>
Academic age (years from the beginning of scientific activity, i.e. years from first publication or from the beginning of PhD or	16

Medical Specialisation School)	
Previous positions	<ul style="list-style-type: none"> <li>- Junior Assistant Professor of History of International Relations, Department of Political Sciences, Law and International Studies, University of Padua (9/2019-6/2021)</li> <li>- Post-Doc, Department of Political Sciences, Law and International Studies, University of Padua (6/2017-5/2018; 5/2016-4/2017; 4/2015-3/2016; 10/2012-10/2013)</li> <li>- Post-Doc, Department of Political Sciences, University of Trieste (1/2012-10/2012)</li> </ul>
Prizes and awards	<ul style="list-style-type: none"> <li>- 2012 Gerald Ford Foundation grant</li> </ul>
Visiting academic positions	<ul style="list-style-type: none"> <li>- 2016 Visiting fellow, Universität Mannheim. Teaching the module "Italy's foreign policy during the Cold War" within the MA programme "Between détente and tension: Cold War culture in Italy and Germany, 1960s to 1980s".</li> <li>- 2013 Visiting fellow, London School of Economics and Political Sciences, IDEAS centre, London.</li> </ul>
Teaching activities and PhD supervision	<ul style="list-style-type: none"> <li>- 2020-today History of international relations (65 h, in English), BA programme in Political Sciences, International Relations, Human Rights, University of Padua</li> <li>- 2019 History of international relations (27 h, in English), supplementary course to the courses in History of international relations (A-L and M-Z), BA programme in Political Sciences, International Relations, Human Rights, University of Padua</li> <li>- 2014 Module (20 h) on British foreign policy after 1945 within the course in History of international relations, BA programme in Political Sciences, International Relations, Human Rights, University of Padua</li> <li>- 2013-2014 Module (20 h) on History of European Integration, Course for the preparation for the Ministry of Foreign Affairs diplomatic career, Research Institute on Negotiation, Gorizia.</li> <li>- 2022 PhD referee, PhD programme in Political Studies, University of Rome La Sapienza</li> </ul>
Other work experience (e.g. consultancy if any)	<ul style="list-style-type: none"> <li>- 2002 Internship at the Ministry of Foreign Affairs, Rome, Directorate for Political and Multilateral Affairs and Human Rights, NATO Office</li> </ul>
- Administrative role and position responsibility	<ul style="list-style-type: none"> <li>- Rector's delegate for traineeships of the BA Programme in Political Sciences, International Relations, Human Rights, University of Padua</li> <li>- Member of the Accreditation and Assessment Team, BA Programme in Political Sciences, International Relations, Human Rights, University of Padua</li> <li>- Responsibility for the cycle of workshops "How to write a dissertation" for undergraduate students, Department of Political Sciences, Law and International Studies, University of Padua</li> </ul>
- Scientific organisations/Coordination of academic activities	<ul style="list-style-type: none"> <li>- 2022 Organizer of the international workshop "The Italian Revolution? Images and Perceptions of Italy's Transition", Padua</li> <li>- 2022 Co-organizer of the international conference "Italy's foreign policy between history and historiography", Padua</li> <li>- 2021 Member of the scientific committee of the workshop "The other side of the coin: Western images and analyses of GDR's crisis and collapse", Padua</li> <li>- 2019 Co-organizer of the conference "1989: the end of an international order", Padua</li> <li>- 2018 Member of the scientific committee of the conference "Lina Merlin: anti-fascist, socialist, senator (1920-1960)", Padua.</li> <li>- 2018 Co-organizer of the conference "Air and Space Heritage Italy", Padua</li> <li>- 2017 Member of the scientific committee of "Ex-post Europe. Experts and politics on Science and Technology in Europe: a problem of democratic legitimacy and international reliability?", Padua</li> <li>- 2015 Co-organizer of the workshop "Not only diplomacy. Experts and technicians in science and technology in Italian foreign policy", Padua.</li> <li>- 2015 Co-organizer of the 4th National Conference, SISI - Italian Society of International History Padua.</li> <li>- 2013 Co-organizer of the 2nd National Conference, SISI - Italian Society of International History, Gorizia</li> </ul>
Editorial activity	<ul style="list-style-type: none"> <li>- Since 2015 Member of the editorial board, Class A journal «Ventunesimo Secolo»</li> <li>- Since 2020 Member of the editorial board, Class A journal «Annali della Fondazione Ugo La Malfa»</li> <li>- Book proposal referee for Palgrave Macmillan</li> <li>- Referee for the Nuova Rivista Storica, Institutita, Diacronie</li> </ul>
	<ul style="list-style-type: none"> <li>- Member of SISI -Italian Society of International History</li> <li>- Member of Europe RICHIE - Réseau international de jeunes chercheurs en histoire de</li> </ul>

Membership of scientific societies	l'intégration européenne. - Member of SISSCO - Italian Society for the Study of Contemporary History - Member of TSA - Transatlantic Studies Association			
	<b>Anno</b>	<b>Project title</b>	<b>Person months</b>	<b>Funding organisation</b>
Funding (current and past)	2020	PI of the Inter-Departmental Project "The Italian Revolution: Images and Perceptions of Italy's Transition (1989-1994)" (15.000 €)	5+5	University of Padua
Significant career breaks	None			
- H-Index (in Scopus):	n.a.			
- Total number of publications in peer-reviewed journals	4			
- Total IF	n.a.			
- n. and total IF of publications where the candidate is first author or equivalent (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a.			
- N. and total IF of the publications where the candidate is last or corresponding author (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a.			

## 2. LA RANA Adele

- Researcher unique identifier: ORCID Id	0000-0001-8755-9322
- URL for web site:	<a href="https://docenti.unimc.it/adele.larana">https://docenti.unimc.it/adele.larana</a>
Academic age (years from the beginning of scientific activity, i.e. years from first publication or from the beginning of PhD or Medical Specialisation School)	18

Previous positions	<ul style="list-style-type: none"> <li>- 2021-2022: Research Position (RtdA) in History of Physics and Physics Education (Fis08) at the University of Verona</li> <li>- 2019-2021: Assistant Project Scientist at the University of California Riverside, as collaborator in history of physics of Prof. Barry Barish (Nobel Prize in Physics 2017)</li> <li>- 2017-2019: Research fellow in History of Physics at the Enrico Fermi Historical Museum of Physics and Study and Research Centre - Rome</li> <li>-2012-2017: Scientific Assistant of Prof. Ugo Amaldi, TERA Foundation – Rome and Research associate at the Physics Department of Sapienza University of Rome</li> <li>-2010-2012: Scientific Assistant of Prof. Ugo Amaldi, TERA Foundation – CERN, Geneva</li> </ul>
Prizes and awards	<ul style="list-style-type: none"> <li>- 2020: Award of the Italian Physical Society for Science Communication, for the screenplay of the documentary film “The Decision. Edoardo Amaldi and Science without borders” (<a href="https://www.sif.it/attivita/congresso/106/premiati">https://www.sif.it/attivita/congresso/106/premiati</a>)</li> <li>- 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”, the first biographical dictionary of Italian scholars who contributed to the advancement of physics, starting from the Renaissance up to the XX century (<a href="https://2022.congresso.sif.it/info/premiati-2022">https://2022.congresso.sif.it/info/premiati-2022</a>)</li> </ul>
Visiting academic positions	<p>As RtdB at the University of Macerata, I teach Didactics of physics at Primary Education Sciences students, as I did as RtdA in Verona. In Verona I also proposed and held for two times a credit-free course on the history of the concept of gravity, called “Con i piedi per terra: l’approccio scientifico all’interpretazione della realtà attraverso l’esempio dell’evoluzione del concetto di gravità” (“Down to earth: the scientific approach to the interpretation of reality through the example of the evolution of the concept of gravity”), addressed to students of all faculties and aimed at the development of transversal skills (<a href="https://talc.univr.it/it/competenze-trasversali">https://talc.univr.it/it/competenze-trasversali</a>).</p> <p>As research associate at the Physics Dep. of Sapienza University, I supervised a degree thesis in history of physics, which won the 2020 SISFA Award (<a href="http://www.sisfa.org/notizie-eventi/premio-di-laurea-sisfa-2020-2/">http://www.sisfa.org/notizie-eventi/premio-di-laurea-sisfa-2020-2/</a>).</p>
Teaching activities and PhD supervision	<ul style="list-style-type: none"> <li>- 2009-2010: Scientific Editor, Zanichelli publishing house – Bologna</li> <li>- 2015-to date: I collaborate as an author at the Dizionario biografico degli Italiani, a biographical dictionary published by Istituto della Enciclopedia Italiana Treccani. I have been tracing biographies of several Italian physicists of the XX century.</li> <li>- 2015-2019: Historical-scientific consultant, interviewer and author of the screenplay of the docufilm “The Decision. Edoardo Amaldi and science without borders” (92 min), directed by Enrico Agapito and supported by Zanichelli publishing house, TERA Foundation, INFN (Italian National Institute for Nuclear Physics) and the Physics Department of Sapienza University in Rome, with the patronage of the Italian Space Agency and of the Italian Society for the History of Physics and Astronomy.</li> <li>- 2019: Collaboration as advisor and interviewee with the documentary-director of RAI Storia Ketì Riccardi, for the episode “Enrico Fermi Emilio Segrè” of the miniseries Nobel Minds, devoted to the Italian Nobel Laureates. The TV miniseries was aired on the TV channel RAI Storia as part of Paolo Mieli’s program Italiani.</li> <li>- 2020-21: Consultant of the Enrico Fermi Historical Museum of Physics and Study and Research Centre (Rome), collaborating at the project VEROSH (Virtual ExploRation Of Science History), supported by Regione Lazio.</li> <li>- 2021-to date: I am an active member of the team INFN-Kids (<a href="https://web.infn.it/infn-kids/">https://web.infn.it/infn-kids/</a>), a special group of INFN promoting several scientific outreach initiatives dedicated to children of primary and middle schools (<a href="https://web.infn.it/infnkids/">https://web.infn.it/infnkids/</a>).</li> <li>- 2022: As a historian of physics and biographer of Edoardo Amaldi, I played the role of consultant and interviewee of the Swiss radio program “Il giardino di Albert”, for the episode dedicated to Edoardo Amaldi. It is possible to listen to the episode here: <a href="https://www.rsi.ch/g/15218071">https://www.rsi.ch/g/15218071</a>.</li> </ul>
- Administrative role and position responsibility	<ul style="list-style-type: none"> <li>- 2021-2022: member of the Council of the master's degree course in Primary education sciences at the University of Verona</li> <li>- 2022-to date: member of the Council of the master's degree course in Primary education sciences at the University of Macerata</li> <li>- 2015-to date: Research associate of INFN – Section of Sapienza University of Rome</li> <li>- 2021-to date: Member of the LIGO-Virgo Collaboration</li> </ul>

- Scientific organisations/Coordination of academic activities	<p>- 2019: Co-organizer of the XXXIX Congress of Italian Society for History of Physics and Astronomy (Pisa, 9- 12 September), gathering more than 100 historians of physics and astronomy from Italy and from abroad.</p> <p>- 2020: Organizer and chairperson of a special panel discussion about Edoardo Amaldi, at the 9th Conference of the European Society for the History of Science (Bologna, 31 August-3 September), following the screening of the docufilm The Decision. Edoardo Amaldi and Science without borders. Invited speakers: Ugo Amaldi, John Krige, Luciano Maiani</p> <p>- 2020: Organizer and chairperson of the panel discussion about Laura Bassi (1711-1778) and women in physics, at the XL Congress of SISFA (7-11 September) (<a href="http://www.sisfa.org/convegni/congress-2020/">http://www.sisfa.org/convegni/congress-2020/</a>)</p> <p>- 2021: Co-organizer with Luisa Bonolis and Roberto Lalli of the international on-line workshop "Observing, sensing, detecting. Toward a multi-layered picture of the Universe from historical and epistemological perspectives" (February 4-5, 2021), promoted by SISFA with the endorsements of Commission C3 History of Astronomy of the International Astronomical Union and of the History of Physics Group of the European Physical Society (<a href="http://www.sisfa.org/observing-sensing-detecting/">http://www.sisfa.org/observing-sensing-detecting/</a>). The workshop and the final roundtable have seen the participation of some of the world's leading experts in multi-wave and multi-messenger astronomy, among which the Nobel Laureates Barry Barish and Reinhard Genzel.</p> <p>- 2021: Co-President of the Section "Physics Education and History of Physics" in the Annual National Congress of the Italian Physical Society (13-17 September 2021, online)</p>								
Editorial activity	<p>-2022: Co-editor of the second expanded edition of the book E. Amaldi, "Da via Panisperna all'America: I fisici italiani e la Seconda guerra mondiale", G. Battimelli, M. De Maria, A. La Rana (eds).</p> <p>- 2022-to date: Guest editor of a special issue of Centaurus, the journal of the European Society for the History of Science, together with the historians Dr. Luisa Bonolis and Dr. Juan Andres Leon. The special issue is titled "Shaping a Multi-Messenger Universe: Historical Perspectives on the Changing Skyscape of Astronomical Observation" and collects 10 contributions from scholars of different institutions in the world. To be published in 2023.</p> <p>- 2021-to date: Member of the Editorial Board of the review <i>Giornale di Fisica</i> promoted by the Italian Physical Society.</p> <p>- 2019-2020: I have been co-editor with Prof. Paolo Rossi (University of Pisa), of the Proceedings of the XXXIX Conference of the Italian Society for the History of Physics and Astronomy (Pisa, 9-12 September 2019)(<a href="https://www.torrossa.com/en/resources/an/4706617">https://www.torrossa.com/en/resources/an/4706617</a>).</p> <p>- 2017-to date: I am co-authoring with Paolo Rossi of Pisa University the first biographical dictionary of Italian physicists from the Renaissance to World War II (<a href="https://www.sif.it/riviste/sif/gdf/fisici-italiani">https://www.sif.it/riviste/sif/gdf/fisici-italiani</a>), which is being published as issues of the editorial series "Il Giornale di Fisica" of the Italian Physical Society.</p> <p>- 2015-2017: I have been editor in lead for a few 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).</p> <p>- 2012: 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).</p>								
Membership of scientific societies	<p>Since 2019, I am a member of the Executive Board of the Italian Society for the History of Physics and Astronomy (<a href="http://www.sisfa.org/">http://www.sisfa.org/</a>), at my second term. I am also member of the Italian Physical Society and of the European Society for the History of Science.</p>								
Funding (current and past)	<table border="1"> <thead> <tr> <th>Anno</th> <th>Project title</th> <th>Person months</th> <th>Funding organisation</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Anno	Project title	Person months	Funding organisation				
Anno	Project title	Person months	Funding organisation						
Significant career breaks									
- H-Index (in Scopus):	3								

- Total number of publications in peer-reviewed journals	10
- Total IF	
- n. and total IF of publications where the candidate is first author or equivalent (for the disciplines where the position in the list of authors correspond to the role in the work presented)	
- N. and total IF of the publications where the candidate is last or corresponding author (for the disciplines where the position in the list of authors correspond to the role in the work presented)	

### 3. GUZZARDI Luca

- Researcher unique identifier: ORCID Id	0000-0003-0622-4569
- URL for web site:	<a href="https://sites.unimi.it/guzzardi/">https://sites.unimi.it/guzzardi/</a>
Academic age (years from the beginning of scientific activity, i.e. years from first publication or from the beginning of PhD or Medical Specialisation School)	22
Previous positions	<ul style="list-style-type: none"> <li>- 2019-2021 Senior Assistant Professor of Logic and Philosophy of Science, University of Milan, Department of Philosophy.</li> <li>- 2015-2018 Junior Assistant Professor of Logic and Philosophy of Science, University of Milan, Department of Philosophy.</li> <li>- 2012-2014 Post-Doc in History of Science (Department of Physics, University of Pavia) &amp; Associate Researcher of INAF (Istituto Nazionale di Astrofisica), Brera Observatory Milan.</li> <li>- 2007-2012 Scientific Collaborator and editor of Edizione Nazionale delle Opere e della Corrispondenza Ruggiero G. Boscovich. Co-editor of the Web Edition (Biblioteca Digitale).</li> <li>- 2005-2006 Research contract – INAF-Osservatorio Astronomico di Brera. Project: The correspondence of Ruggiero G. Boscovich (funded by Fondazione CARIPL0). Head of the project: Dr. Elio Antonello.</li> <li>- 2003-2004 DAAD Post-Doc, Universität der Bundeswehr München / Forschungsinstitut des Deutschen Museum München. (Advisor: Prof. Dr. Ivo Schneider.)</li> </ul>
Prizes and awards	<ul style="list-style-type: none"> <li>- Oct.-Dec. 2018: DAAD Re-invitation Programme for Former Scholarship Holders, 2018 — Berlin-Brandenburg Academy of Sciences and Humanities. Host: Prof. Dr. Eberhard Knobloch.</li> <li>- 2017: Individual funding grant for basic activity in research (FFABR).</li> <li>- May-July 2008 DAAD Re-invitation Programme for Former Scholarship Holders – Ludwig Maximilian Universität / Forschungsinstitut des Deutschen Museums</li> </ul>



München. Host: Prof. Dr. Ivo Schneider.  
- 2003-2004: DAAD Research Scholarship.

Visiting academic positions	<ul style="list-style-type: none"> <li>- 2018 January-February and Oct.-Dec.: Berlin-Brandenburgische Akademie der Wissenschaften, Berlin (Leibniz-Edition Arbeitsstelle).</li> <li>- 2016 September: Centro Interuniversitário de História das Ciências e da Tecnologia, Universidade de Lisboa.</li> <li>- 2014 February-May: Max-Planck-Institut für Wissenschaftsgeschichte, Berlin (group "Modern Geometry and the Concept of Space", chair Vincenzo de Risi).</li> <li>- May-July 2008: Ludwig Maximilian Universität / Forschungsinstitut des Deutschen Museums München. Host: Prof. Dr. Ivo Schneider.</li> </ul>
Teaching activities and PhD supervision	<ul style="list-style-type: none"> <li>- B.A. level: since 2015-16, teaching of the regular course (60h) of Philosophy of Science for the B.A. in Philosophy at the University of Milan (with one-year interruption, 2020-21, when I taught the 60h course of "Introduction to scientific reasoning", B.A. in Philosophy)</li> <li>- M.A. level: Since 2016-17, teaching of the regular course (48h) of History and Philosophy of the Sciences (M.A. in Biodiversity and Evolutionary Biology) at the University of Milan</li> <li>- Post-graduate level: Since 2016-17, teaching of courses in the philosophy of science for several post-graduate medical schools (University of Milan); 2023, "Philosophy of Collaboration" (PhD course for the PhD School in Philosophy and Human Sciences, University of Milan), 10h course; 2023, "Philosophy of Science" (2nd level M.A. in Science Popularization, University of Siena), 4h course.</li> <li>o PhD supervisions: Eugenio Petrovich (2015-2018), Melania Mariconda (2022- )</li> </ul>
Other work experience (e.g. consultancy if any)	copy editor and translator (English/German to Italian; occasionally)
- Administrative role and position responsibility	<ul style="list-style-type: none"> <li>- Supervisor of ca. twenty thesis per year (including both Bachelor and M.A.)</li> <li>- Quality Assurance officer of the B.A. Program in Philosophy</li> <li>- Member of the Didactic Committee of the B.A. Program in Philosophy</li> <li>- Study Plan Tutor of the B.A. Program in Philosophy</li> <li>- 2022: Member of the Selection Committee for the PhD Program in Philosophy and Human Sciences</li> </ul>
- Scientific organisations/Coordination of academic activities	<ul style="list-style-type: none"> <li>- Since 2016 Organizer of the "Seminar of Historical Epistemology", University of Milan</li> <li>- 2018 Member of the Advisory Committee of the 38th National Congress of the Italian Society for the History of Physics and Astronomy 2018, Messina.</li> <li>- 2021-2024 Member of the Steering Committee of ADit, the Italian Association of DAAD Alumni</li> <li>- Sept 2022 Organizer of the panel "Science Policies and Scientific Collaboration" at the 10th Conference of the European Society for the History of Science</li> <li>- Member of the International Committee for the Centennial of the Birth of Paul K. Feyerabend</li> </ul>
Editorial activity	- 2006-2012 Member of the editorial staff of the "National Edition" of the Works and Correspondence of R.G. Boscovich
Membership of scientific societies	<ul style="list-style-type: none"> <li>- Member of the European Society of Philosophy of Science</li> <li>- Member of the European Society for the History of Science</li> <li>- Member of the History of Science Society</li> <li>- Member of the Italian Society of Philosophy of Science</li> <li>- Member of the Italian Society for History of Science</li> <li>- Member of the Italian Society for History of Physics and Astronomy</li> </ul>

	Anno	Project title	Person months	Funding organisation
Funding (current and past)	2020	Reassessing Scientific Collaboration	NA	University of Milan (Project SEED)
		Archivi storici		Regione Lombardia, INAF

	2011	astronomici lombardi	NA	(Istituto Nazionale di Astrofisica)
Significant career breaks	nessuno			
- H-Index (in Scopus):	n.a.			
- Total number of publications in peer-reviewed journals	17			
- Total IF	n.a.			
- n. and total IF of publications where the candidate is first author or equivalent (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a.			
- N. and total IF of the publications where the candidate is last or corresponding author (for the disciplines where the position in the list of authors correspond to the role in the work presented)	n.a.			

### 3. Main Principal Investigator's scientific publications (Max. 20)

1. Lalli, R, Navarro, J (2022). 100 Years of the International Union for Pure and Applied Physics. NATURE REVIEWS PHYSICS, vol. 4, p. 568-569, ISSN: 2522-5820, doi: 10.1038/s42254-022-00503-w - **Articolo in rivista**
2. ADAMSON M, LALLI R (2021). Global Perspectives on Science Diplomacy: Exploring the diplomacy-knowledge nexus in contemporary histories of science. CENTAURUS, vol. 63, p. 1-16, ISSN: 0008-8994, doi: 10.1111/1600-0498.12369 - **Articolo in rivista**
3. LALLI R (2021). Crafting Europe from CERN to Dubna: Physics as diplomacy in the foundation of the European Physical Society. CENTAURUS, vol. 63, p. 103-131, ISSN: 0008-8994, doi: 10.1111/1600-0498.12304 - **Articolo in rivista**
4. Lalli R, Howey R, Wintergrün D (2020). The dynamics of collaboration networks and the history of general relativity, 1925-1970. SCIENTOMETRICS, vol. 122, p. 1129-1170, ISSN: 0138-9130, doi: 10.1007/s11192-019-03327-1 - **Articolo in rivista**
5. TURCHETTI S, LALLI R (2020). Envisioning a "science diplomacy 2.0": on data, global challenges, and multi-layered networks. HUMANITIES AND SOCIAL SCIENCES COMMUNICATIONS, vol. 7, 144, ISSN: 2662-9992, doi: https://doi.org/10.1057/s41599-020-00636-2 - **Articolo in rivista**
6. Lalli R (2019). A brief history of physics reviews. NATURE REVIEWS PHYSICS, vol. 1, p. 12-14, ISSN: 2522-5820, doi: 10.1038/s42254-018-0008-0 - **Articolo in rivista**
7. Blum A, Lalli R, Renn J (2018). Gravitational Waves and the Long Relativity Revolution. NATURE ASTRONOMY, vol. 2, p. 534-543, ISSN: 2397-3366, doi: 10.1038/s41550-018-0472-6 - **Articolo in rivista**
8. LALLI R (2016). 'Dirty work', but someone has to do it: Howard P. Robertson and the refereeing practices of Physical Review in the 1930s. NOTES AND RECORDS OF THE ROYAL SOCIETY OF LONDON, vol. 70, p. 151-174, ISSN: 0035-9149, doi: 10.1098/rsnr.2015.0022 - **Articolo in rivista**

9. Blum A, Lalli R, Renn J (2015). The Reinvention of General Relativity: A Historiographical Framework for Assessing One Hundred Years of Curved Space-time. *ISIS*, vol. 106, p. 598-620, ISSN: 0021-1753 - **Articolo in rivista**

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10. LALLI R (2014). A NEW SCIENTIFIC JOURNAL TAKES THE SCENE: THE BIRTH OF REVIEWS OF MODERN PHYSICS. *ANNALEN DER PHYSIK*, vol. 526, ISSN: 0003-3804 - **Articolo in rivista**

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11. LALLI R (2013). Anti-Relativity in Action: The Scientific Activity of Herbert E. Ives between 1937 and 1953. *HISTORICAL STUDIES IN THE NATURAL SCIENCES*, vol. 43, p. 41-104, ISSN: 1939-1811 - **Articolo in rivista**

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12. LALLI R (2012). The Reception of Miller's Ether-Drift Experiments in the USA: The History of a Controversy in Relativity Revolution. *ANNALS OF SCIENCE*, vol. 69, p. 153-214, ISSN: 0003-3790, doi: 10.1080/00033790.2011.637473 - **Articolo in rivista**

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13. LALLI R (2020). The multiple lives of the general relativity community, 1955-1974. In: (a cura di): Forstner, C. and Walker, M. , *Biographies in the History of Physics: Actors, Institutions, and Objects*. p. 179-202, ISBN: 978-3-030-48508-5, doi: 10.1007/978-3-030-48509-2\_11 - **Contributo in volume (Capitolo o Saggio)**

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14. LALLI R, HOWEY R, WINTERGRUEN D (2020). The Socio-Epistemic Networks of General Relativity, 1925-1970. In: (a cura di): BLUM A, LALLI R, RENN J,, *The Renaissance of General Relativity in Context*. p. 15-84, ISBN: 978-3-030-50753-4 - **Contributo in volume (Capitolo o Saggio)**

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15. Lalli R (2018). Hunting for the luminiferous ether: The revival of the Michelson-Morley experiment in the 1920s. In: (a cura di): Navarro J, *Ether and Modernity: The Recalcitrance of an Antagonizing Object in the Early Twentieth Century*. p. 155-178, OXFORD:Oxford University Press, ISBN: 9780198797258 - **Contributo in volume (Capitolo o Saggio)**

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16. Lalli R (2015). 'The Renaissance of Physics': Karl K. Darrow (1891-1982) and the Dissemination of Quantum Theory at the Bell Telephone Laboratories. In: *A bridge between conceptual frameworks: sciences, society and technology studies*. p. 249-273, springler, ISBN: 978-94-017-9645-3, doi: 10.1007/978-94-017-9645-3\_14 - **Contributo in volume (Capitolo o Saggio)**

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17. ADAMSON M, LALLI R (a cura di) (2021). *Global Perspectives on Science Diplomacy*. *CENTAURUS*, vol. 63, p. 1-170, Wiley, ISSN: 0008-8994 - **Curatela**

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18. BLUM A, LALLI R, RENN J (a cura di) (2020). *The Renaissance of General Relativity in Context*. USA:Birkhäuser, ISBN: 978-3-030-50753-4, doi: 10.1007/978-3-030-50754-1 - **Curatela**

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19. Blum A, Giulini D, Lalli R, Renn J (a cura di) (2017). *The Renaissance of Einstein's Theory of Gravitation*. *THE EUROPEAN PHYSICAL JOURNAL. H*, vol. 42, p. 95-393, ISSN: 2102-6459 - **Curatela**

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20. Lalli R (2017). *Building the General Relativity and Gravitation Community During the Cold War* . *SPRINGERBRIEFS IN HISTORY OF SCIENCE AND TECHNOLOGY*, ISBN: 978-3-319-54653-7, ISSN: 2211-4572 - **Monografia o trattato scientifico**

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#### 4. Main scientific publications of the associated PIs (Max. 20, for each associated PI)

##### 1. BENTIVOGLIO Giulia

1. Giulia Bentivoglio (2018). Venti di crisi tra Roma e Londra? Il conflitto delle Falkland/Malvinas e le relazioni anglo-italiane. *ANNALI DELLA FONDAZIONE UGO LA MALFA*, vol. XXXII, p. 199-218, ISSN: 1826-8854 - **Articolo in rivista**
2. Giulia Bentivoglio (2017). Alla ricerca della modernità. Regno Unito e Italia tra divario tecnologico e integrazione europea, 1966-1972. *VENTUNESIMO SECOLO*, vol. 40, p. 101-122, ISSN: 1594-3755, doi: 10.3280/XXI2017-040007 - **Articolo in rivista**
3. Giulia Bentivoglio (2016). The tentative alliance? Britain, Italy and participation in the European Monetary System. *JOURNAL OF EUROPEAN INTEGRATION HISTORY*, p. 85-106, ISSN: 0947-9511, doi:

<https://doi.org/10.5771/0947-9511-2016-1-85> - **Articolo in rivista**

4. Giulia Bentivoglio, Kiril Iliev, Viktor Marsai, Manuel Müller, Péter András Tóth (2010). Europe between the Superpowers: Third Actor or Satellite?. ZEITGESCHICHTE, vol. 37, p. 337-362, ISSN: 0256-5250 - **Articolo in rivista**
5. Giulia Bentivoglio (2022). Great Expectations. Craxi e l'Italia visti da Londra, 1976-1987. In: (a cura di): Varsori Antonio; Acquaviva Gennaro, Craxi e il ruolo dell'Italia nel sistema internazionale. p. 27-49, Bologna: Società editrice il Mulino spa, ISBN: 9788815382511 - **Contributo in volume (Capitolo o Saggio)**
6. Bentivoglio, Giulia (2020). The Empire Under Attack: Anglo-Soviet Relations and Bolshevik Infiltration in India in the Early 1920s. In: (a cura di): Valentine Lomellini, The Rise of Bolshevism and its Impact on the Interwar International Order. p. 93-111, London-New York: Palgrave Macmillan, ISBN: 978-3-030-35528-9, doi: 10.1007/978-3-030-35529-6\_6 - **Contributo in volume (Capitolo o Saggio)**
7. Giulia Bentivoglio (2020). Italy through British Eyes, 1919-1920. In: (a cura di): Antonio Varsori Benedetto Zaccaria, Italy in the New International Order, 1917-1922. p. 41-57, London-New York: Palgrave Macmillan, ISBN: 978-3-030-50093-1, doi: 10.1007/978-3-030-50093-1\_3 - **Contributo in volume (Capitolo o Saggio)**
8. Giulia Bentivoglio (2020). Le relazioni anglo-italiane nelle prime fasi dell'integrazione europea (1950-1979). In: (a cura di): Leonida Tedoldi Giovanni Zucchelli, L'Italia nelle istituzioni europee. Storia, politica, integrazione. p. 53-68, Carocci, ISBN: 978-88-290-0106-4 - **Contributo in volume (Capitolo o Saggio)**
9. Giulia Bentivoglio (2018). Losing an empire, finding a (European) role': la Gran Bretagna e la scelta europea. In: (a cura di): Georg Meyr, Da impero a grande potenza. Alcuni temi di politica estera britannica nel Novecento. p. 141-163, RIMINI: Panozzo Editore, ISBN: 978-88-7472-380-5 - **Contributo in volume (Capitolo o Saggio)**
10. Giulia Bentivoglio (2017). Una democrazia alla prova? Il 1978 italiano visto da Londra. In: (a cura di): Giulia Bentivoglio Antonio Varsori, Realtà e immagine della politica estera italiana. Dal centro-sinistra al pentapartito. p. 121-142, MILANO: FrancoAngeli, ISBN: 978-88-917-6274-0 - **Contributo in volume (Capitolo o Saggio)**
11. Giulia Bentivoglio (2017). Violenza endemica o eterodiretta? Il terrorismo italiano degli anni Settanta e Ottanta visto da Londra. In: (a cura di): Valentine Lomellini, Il mondo della Guerra fredda e l'Italia degli anni di piombo. Una regia internazionale per il terrorismo?. p. 205-224, MILANO: MONDADORI EDUCATION, ISBN: 978-88-00-74795-0 - **Contributo in volume (Capitolo o Saggio)**
12. Giulia Bentivoglio (2016). Redefining immigration through citizenship? Britain and the case of the 1981 Nationality Act. In: (a cura di): Elena Calandri Simone Paoli Antonio Varsori, Peoples and Borders. Seventy Years of Migration in Europe, from Europe, to Europe (1945-2015). p. 183-201, Nomos, ISBN: 978-3-8487-3452-8 - **Contributo in volume (Capitolo o Saggio)**
13. Giulia Bentivoglio (2015). "Our sole commitment is to negotiate; no more, no less": the Conservative Party and Britain's entry into the EEC. In: (a cura di): Lucia Bonfreschi Giovanni Orsina Antonio Varsori, European parties and the European integration process, 1945-1992. p. 195-211, BRUSSELS: PIE Peter Lang, ISBN: 978-2-87574-279-7 - **Contributo in volume (Capitolo o Saggio)**
14. Giulia Bentivoglio (2009). Britain, the EEC and the special relationship during the Heath government. In: (a cura di): Michele Affinito Guida Migani Christian Wenkel, Les deux Europes - The Two Europes. p. 281-293, P.I.E. Peter Lang, ISBN: 978-90-5201-481-4 - **Contributo in volume (Capitolo o Saggio)**
15. Giulia Bentivoglio, Antonio Varsori (a cura di) (2017). Realtà e immagine della politica estera italiana. Dal centro-sinistra al pentapartito. STORIA INTERNAZIONALE DELL'ETÀ CONTEMPORANEA, p. 1-251, MILANO: FrancoAngeli, ISBN: 978-88-917-6274-0 - **Curatela**
16. Bentivoglio Giulia (2018). The two sick men of Europe? Britain and Italy between crisis and renaissance (1976-1983). EUROCLIO. ETUDES ET DOCUMENTS, vol. 104, Brussels: P.I.E. Peter Lang, ISBN: 978-2-8076-0720-0, ISSN: 0944-2294, doi: 10.3726/b13687 - **Monografia o trattato scientifico**
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  10. La Rana A, Rossi P (2019). I Fisici Italiani 2: dal Risorgimento alla Seconda Guerra Mondiale. A-C. doi: 10.1393/gdf/i2019-10338-0 - **Monografia o trattato scientifico**
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  13. La Rana A, Rossi P (2020). I Fisici Italiani 2: dal Risorgimento alla Seconda Guerra Mondiale. D-L. doi: 10.1393/gdf/i2020-10377-4 - **Monografia o trattato scientifico**
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6. L. Guzzardi (2013). Robert Musil, i numeri reali e la matematica. *INTERSEZIONI*, vol. 33, p. 395-410, ISSN: 0393-2451, doi: 10.1404/75059 - **Articolo in rivista**
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16. L. Guzzardi, F. Bevilacqua (2016). Opere precedenti la Theoria. 6: Opere scientifiche. Opere di Fisica. Filosofia naturale. Milano:Edizione Nazionale delle Opere e della Corrispondenza di R.G. Boscovich, ISBN: 9788896700198 - **Edizione critica di testi/di scavo**
17. L. Guzzardi (2012). Edizione nazionale delle opere e della corrispondenza di Ruggiero Giuseppe Boscovich, 13.2: Les Éclipses : poème en six chants. Roma:Edizione nazionale delle opere e della corrispondenza di Ruggiero Giuseppe Boscovich, ISBN: 9788896700105 - **Edizione critica di testi/di scavo**
18. Guzzardi L (a cura di) (2005). Scienza tra Storia e Critica. MONZA:Polimetrica, ISBN: 8876990100 - **Edizione critica di testi/di scavo**
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20. GUZZARDI L (2010). Lo sguardo muto delle cose. Oggettività e scienza nell'età della crisi. MILANO:Raffaello Cortina, ISBN: 9788860303257 - **Monografia o trattato scientifico**

5. Main staff involved (max 10 professors/researchers for each research unit, in addition to the PI or associated PIs), highlighting the expected time commitment

#### List of the Research Units

#### Unit 1 - LALLI Roberto

#### Personnel of the research unit

n°	Surname Name	Qualification	University/ Research Institution	e-mail address	Months/person expected
1.	LALLI Roberto	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Politecnico di TORINO	roberto.lalli@polito.it	7,2
2.	NICOLI Francesco	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Politecnico di TORINO	francesco.nicoli@polito.it	1,4

## Unit 2 - BENTIVOGLIO Giulia

## Personnel of the research unit

n°	Surname Name	Qualification	University/ Research Institution	e-mail address	Months/person expected
1.	BENTIVOGLIO Giulia	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Università degli Studi di PADOVA	giulia.bentivoglio@unipd.it	7,2

## Unit 3 - LA RANA Adele

## Personnel of the research unit

n°	Surname Name	Qualification	University/ Research Institution	e-mail address	Months/person expected
1.	LA RANA Adele	Ricercatore a t.d. - t.pieno (art. 24 c.3-b L. 240/10)	Università degli Studi di MACERATA	adele.larana@unimc.it	7,2

## Unit 4 - GUZZARDI Luca

## Personnel of the research unit

n°	Surname Name	Qualification	University/ Research Institution	e-mail address	Months/person expected
1.	GUZZARDI Luca	Professore Associato (L. 240/10)	Università degli Studi di MILANO	LUCA.GUZZARDI@UNIMI.IT	7,2

## 6. Information on the new contracts for personnel to be specifically recruited

n°	Associated or principal investigator	Number of expected research contracts	Number of expected PhD scholarships	Overall expected time commitment (months)
1.	LALLI Roberto	1	0	24
2.	BENTIVOGLIO Giulia	0	0	0
3.	LA RANA Adele	0	0	0
4.	GUZZARDI Luca	0	0	0
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>24</b>

7. PI "Do No Significant Harm (DNSH)" declaration, in compliance with article n. 17, EU Regulation 852/2020. (upload PDF)

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