



APRE

Agenzia per la Promozione
della Ricerca Europea

"HORIZON EUROPE: European Research Council (ERC)".

MARCO FERRARO – ERC, MSCA AND EURATOM PROGRAMMES NATIONAL CONTACT POINT IN HORIZON EUROPE

24/07/2023



24 LUGLIO (10.00 – 11.45)

AGENDA	Sessione 1 ERC – European Research Council
10:00 – 10:30	European Research Council Introduzione agli schemi di finanziamento <ul style="list-style-type: none">• Struttura e novità del nuovo programma dedicato all'Excellence Science.• Gli schemi Starting, Consolidator e Advanced Grant: i cambiamenti del Programma di lavoro 2024
10:30 – 11:30	European Research Council Elementi di progettazione <ul style="list-style-type: none">• Quali caratteristiche deve avere un CV ERC• Come e cosa scrivere nelle sezioni CV, funding ID e Track record• Come scrivere un progetto ERC
11:30 – 11:45	Q&A

Docente:

- Marco Ferraro

ECOREI
ECOSISTEMA RICERCA E INNOVAZIONE

EVENTI M.O.R.

APRE
Agenzia per la Promozione della Ricerca Europea

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ERC OBJECTIVES

- ↗ to provide attractive, long-term funding to support excellent investigators and their research teams to pursue *ground-breaking, ambitious research*.
- ↗ Scientific excellence is the sole criterion
- ↗ Applications can be made in any field of research
- ↗ Fund research activities that will be directed towards fundamental advances at and beyond the 'frontier' of knowledge



Applications can be made in any field of research

- ❏ The ERC's frontier research grants operate on a '**bottom-up**' basis without predetermined priorities.
- ❏ In particular, it encourages proposals of a multi- or interdisciplinary nature which cross the boundaries between different fields of research, pioneering proposals addressing new and emerging fields of research or proposals introducing unconventional, innovative approaches and scientific inventions.

Independent researchers

- ▣ Independent researchers of **any age** and **career stage** can apply for attractive long-term funding
- ▣ The ERC awards funding to excellent investigators looking to **set up or consolidate** their own independent research team or programme, as well as to already **established research leaders**.
- ▣ Principal Investigators from **anywhere in the world** can apply for an ERC grant:
 - ERC grants are open to researchers of any nationality who may reside in any country in the world at the time of the application





Why to apply for ERC grant?

ERC offers independence, recognition & visibility to:

- work on a research topic of own choice
- gain financial autonomy for five years
- negotiate the best conditions of work with the host institution
- attract excellent team members and collaborators from anywhere in the world
- move with the grant to any place in Europe if desired (“portability of grants”)
- win additional funding



Host Institution

- Applications for an ERC grant must be submitted by a single Principal Investigator (PI) in conjunction with and on behalf of their Host Institution.
- Grants are awarded to the Host Institution with the explicit commitment that this institution offers appropriate conditions for the Principal Investigator independently to direct the research and manage its funding for the duration of the project.
- Any type of legal entity (public or private research organisation including universities, research centres, etc...) can host the PI and his/her team. Legally the host institution must be based in one of the EU Member States, or one of the associated countries.
- The PI does not necessarily need to be working at the host institution at the time when the proposal is submitted. However, a mutual agreement and the host institution's commitment on how the relationship will be established are necessary, should the proposal be successful.





Team

- ↗ ERC grants support projects carried out by an individual researcher who can employ researchers of any nationality as team members. It is also possible to have one or more team members located in a non-European country.**



FUNDING SCHEMES AND ELIGIBILITY RULES

Grant	Objectives and Principal Investigator	Maximum amount and duration of the grant	Type of Funding
Starting Grant	<p>Support for excellent Principal Investigators at the career stage at which they are starting their own independent research team or programme.</p> <p>Principal Investigators must demonstrate the ground-breaking nature, ambition, and feasibility of their research proposal.</p> <p>A Starting Grant Principal Investigator should have already shown evidence of the potential for research independence, for example by having produced at least one important publication as main author or without the participation of their PhD supervisor.</p>	<p>Up to EUR 1 500 000 for a period of 5 years.</p> <p>Additional funding up to EUR 1 000 000.</p>	Actual Cost



FUNDING SCHEMES AND ELIGIBILITY RULES

Consolidator Grant	<p>Support for excellent Principal Investigators at the career stage at which they may still be consolidating their own independent research team or programme.</p> <p>Principal Investigators must demonstrate the ground-breaking nature, ambition, and feasibility of their research proposal.</p> <p>A Consolidator Grant Principal Investigator should have already shown evidence of research independence.</p>	<p>Up to EUR 2 000 000 for a period of 5 years. Additional funding up to EUR 1 000 000.</p>	Actual Cost
Advanced Grant	<p>Support for excellent Principal Investigators at the career stage at which they are already established research leaders with a recognised track record of research achievements.</p> <p>Principal Investigators must demonstrate the ground-breaking nature, ambition, and feasibility of their research proposal.</p> <p>An ERC Advanced Grant Principal Investigator is expected to be an active researcher and to have a track record of significant research achievements.</p>	<p>Up to EUR 2 500 000 for a period of 5 years. Additional funding up to EUR 1 000 000.</p>	Lump Sum



Synergy Grant

Support for a small group of two to four Principal Investigators to jointly address ambitious research problems that could not be addressed by the individual Principal Investigators and their teams working alone.

Synergy projects should enable substantial advances at the frontiers of knowledge, stemming, for example, from the cross-fertilisation of scientific fields, from new productive lines of enquiry, or new methods and techniques, including unconventional approaches and investigations at the interface between established disciplines. The transformative research funded by Synergy Grants should have the potential of becoming a benchmark on a global scale.

Principal Investigators of any career stage are welcome and must demonstrate the ground-breaking nature, ambition, and feasibility of their research proposal. Principal Investigators must also demonstrate that their group can successfully bring together the scientific elements necessary to address the scope and complexity of the proposed research question.

Applications must be submitted by a group of a minimum of two and a maximum of four innovative and active Principal Investigators, referred to as the 'Synergy Grant Group', with competitive track records as appropriate to their career stage.

Synergy Grant Groups are expected to demonstrate that they can successfully bring together those elements – such as skills, knowledge, experience, expertise, disciplines, methods, approaches, teams,

Up to
EUR 10 000 000
for a period of
6 years.
Additional
funding up to
EUR 4 000 000.

Actual Cost

access to infrastructures – necessary to address the scope and complexity of the proposed research question. Applicants are expected to describe the contribution of each PI, their team, and the resources to achieve the objectives proposed.



Eligibility windows

Eligibility period: Principal Investigator(s) who have successfully defended their first PhD		
Starting Grant	Consolidator Grant	Advanced and Synergy Grant
> 2 and ≤ 7 years prior to 1 January 2024 Cut-off dates: Successful defence of PhD between 1 January 2017 and 31 December 2021 (inclusive)	> 7 and ≤ 12 years prior to 1 January 2024 Cut-off dates: Successful defence of PhD between 1 January 2012 and 31 December 2016 (inclusive)	No specific criteria



Eligibility windows: medical degree

6. Applicants holding a degree in medicine:

A first degree in medicine will not be accepted by itself as equivalent to a PhD degree. To be considered an eligible Principal Investigator, applicants holding a degree in medicine need to provide **the certificates of both the medical degree and the PhD, or proof of an appointment that requires doctoral equivalency** (e.g. post-doctoral fellowship, professorship appointment). Additionally, candidates must also provide information on their research experience (including peer reviewed publications) in order to further substantiate the equivalence of their overall training to a PhD.

For applicants holding both a degree in medicine and a PhD, **the date used for the calculation of the eligibility period** (i.e. medical degree plus two years or the date of the successful defence of their PhD degree) **is the date of the earliest degree that makes the applicant eligible.**



Eligibility window extensions

The date of the PhD considered for the calculation of the eligibility period is the date of the successful defence of the first PhD degree.

The eligibility periods set out in the table above can be extended beyond 7 and 12 years for the Starting and Consolidator Grants, respectively, for the following properly documented circumstances³⁰, provided they started before the call deadline:

*- **Maternity**: 18 months extension for each child born before or after the date of the successful defence of their first PhD degree. If the applicant can document a longer total maternity leave, the eligibility period will be extended by the documented amount of actual leave(s) for all children taken before the call deadline.*

*- **Paternity**: extension by the documented time of paternity leave taken before the call deadline for each child born before or after the date of the successful defence of their first PhD degree.*

*- **Long-term illness³¹ or national service**: extension by the documented amount of leave taken by the Principal Investigator before the call deadline for each incident, which occurred after the date of the successful defence of their first PhD degree.*

*- **Clinical training**: extension by the documented amount of clinical training received by the Principal Investigator **after** the reference date of the first eligible degree and before the call deadline, **up to a maximum of 4 years**.*

*- **Natural Disaster³²**: extension by the documented time of a Principal Investigator's inability to work³³ before the call deadline due to a natural disaster, which occurred after the date of the successful defence of their first PhD degree.*

*- **Seeking Asylum**: extension by the documented time of the Principal Investigator's inability to work before the call deadline due to seeking asylum³⁴, which occurred after the date of the success defence of their first PhD degree.*



Working Time on the ERC project

Minimum percentage of the working time of a Principal Investigator that must be spent	Starting Grant	Consolidator Grant	Advanced Grant	Synergy Grant
On the ERC project	50%	40%	30%	30% for each Principal Investigator
In a Member State or Associated Country ^{36,37}	50%	50%	50%	50% for each Principal Investigator engaged and hosted by an institution in the EU or Associated Countries



Resubmission limits

Call to which the Principal Investigator applied under previous ERC Work Programmes and proposal evaluation outcome		2024 ERC calls to which a Principal Investigator is <i>not</i> eligible
2022 and 2023 Starting, Consolidator, Advanced Grant or 2022 Synergy Grant	Rejected on the grounds of a breach of research integrity	Starting, Consolidator, Advanced, and Synergy Grant
	C at Step 1	Starting, Consolidator, and Advanced Grant
2022 Starting, Consolidator, or Advanced Grant	A or B at Step 2	No restrictions
	B or C at Step 1	Starting, Consolidator, and Advanced Grant
2023 Starting, Consolidator, or Advanced Grant	A or B at Step 3	No restrictions
	B at Step 1 or 2	No restrictions
	C at Step 1	Synergy Grant



	Starting Grant	Consolidator Grant	Advanced Grant	Synergy Grant	Proof of Concept Grant
Call opens	11/07/2023	12/09/2023	29/05/2024	12/07/2023	16/11/2023
Deadline to submit applications	24/10/2023	12/12/2023	29/08/2024	08/11/2023	14/03/2024
					17/09/2024
Budget	€601m	€584m	€578m	€400m	€30m



	<i>Starting Grant</i>	<i>Consolidator Grant</i>	<i>Advanced Grant</i>	<i>Synergy Grant</i>
<i>Budget million EUR (estimated number of grants)</i>	601 (387)	584 (291)	578 (237)	400 (39)
<i>Planned dates to inform applicants after each step</i>	10 May 2024 23 August 2024	21 June 2024 13 December 2024	31 January 2025 13 June 2025	3 May 2024 30 August 2024 4 November 2024
<i>Indicative date for signature of grant agreements</i>	21 December 2024	12 April 2025	18 November 2025	24 March 2025



Evaluation

Excellence

is the sole evaluation criterion

Excellence of the Research Project

- Ground breaking nature
- Scientific impact
- Scientific Approach

Excellence of the Principal Investigator

- Intellectual capacity
- Creativity
- Commitment



Evaluation panel structure (2024)

Life Sciences

- LS1 Molecules of Life: Biological Mechanisms, Structures and Functions
- LS2 Integrative Biology: From Genes and Genomes to Systems
- LS3 Cell Biology, Development, Stem Cells and Regeneration
- LS4 Physiology in Health, Disease and Ageing
- LS5 Neuroscience and Disorders of the Nervous System
- LS6 Immunity, Infection and Immunotherapy
- LS7 Prevention, Diagnosis and Treatment of Human Diseases
- LS8 Environmental Biology, Ecology and Evolution
- LS9 Biotechnology and Biosystems Engineering

Physical Sciences & Engineering

- PE1 Mathematics
- PE2 Fundamental Constituents of Matter
- PE3 Condensed Matter Physics
- PE4 Physical and Analytical Chemical Sciences
- PE5 Synthetic Chemistry and Materials
- PE6 Computer Science and Informatics
- PE7 Systems and Communication Engineering
- PE8 Products and Processes Engineering
- PE9 Universe Sciences
- PE10 Earth System Science
- PE11 Materials Engineering

Social Sciences and Humanities

- SH1 Individuals, Markets and Organisations
- SH2 Institutions, Governance and Legal Systems
- SH3 The Social World and Its Interactions
- SH4 The Human Mind and Its Complexity
- SH5 Texts and Concepts
- SH6 The Study of the Human Past
- SH7 Human Mobility, Environment, and Space
- SH8 Studies of Cultures and Arts (new in WP 2024)





The fundamental activity of the ERC, via its main frontier research grants¹, is to provide attractive, long-term funding to support excellent investigators (Principal Investigators) and their research teams to pursue ground-breaking, ~~high-risk/high-gain~~ and ambitious research.



1. Research Project

Ground-breaking nature, ambition, and feasibility

Starting, Consolidator, Advanced, and Synergy Grants

Ground-breaking nature and potential impact of the research project

To what extent does the proposed research address important challenges?

To what extent are the objectives ambitious and beyond the state of the art (e.g. novel concepts and approaches or development between or across disciplines)?

To what extent is the proposed research high risk high gain (i.e. if successful the payoffs will be very significant, but there is a high risk that the research project does not entirely fulfil its aims)?

Scientific Approach

To what extent is the outlined scientific approach feasible bearing in mind the extent that ground-breaking nature and ambition of the proposed research is high risk high gain (based on the Extended Synopsis)?

To what extent does the proposal go beyond what the individual Principal Investigators could achieve alone (for Synergy Grants, based on the Extended Synopsis)?

To what extent do the Principal Investigators succeed in proposing a combination of scientific approaches that are crucial to address the scope and complexity of the research questions to be tackled (for Synergy Grants, based on the Extended Synopsis)?

To what extent are the proposed research methodology and working arrangements appropriate to achieve the goals of the project (based on the research proposal)?

To what extent does the proposal involve the development of novel methodology (based on the research proposal)?

To what extent are the proposed timescales, resources, and PI commitment adequate and properly justified (based on the research proposal)?

Ground-breaking nature and potential impact:

challenges, ambitious objectives, novel concepts

High risk/high gain balance:

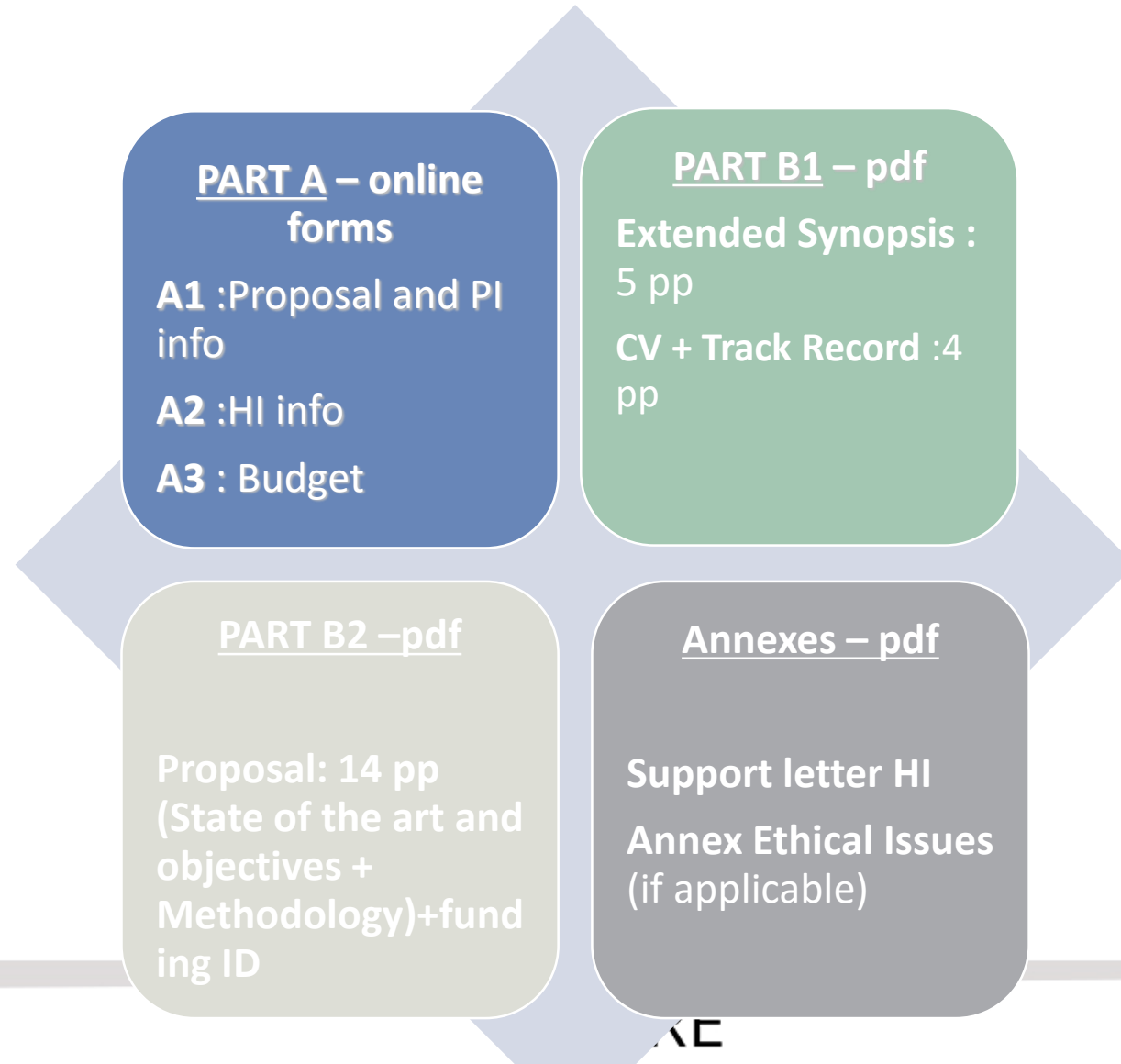
new or unconventional methodology, major breakthrough

Feasibility:

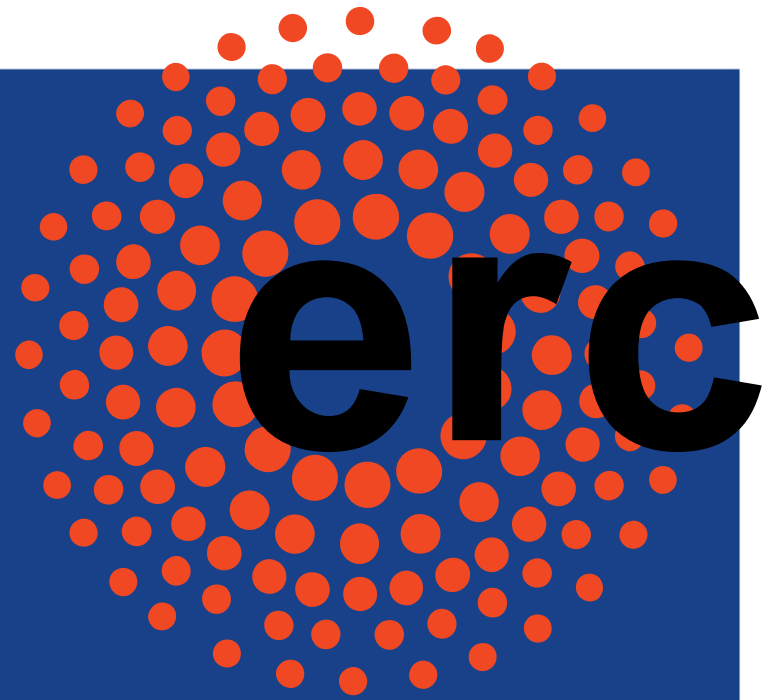
appropriate approach, timescale, resources



TEMPLATES



B1 e B2





DIFFERENZE TRA B1 E B2

Nella prima fase di valutazione: Panel members leggono e valutano solo la **B1**

- Prestare particolare attenzione alla natura innovativa del progetto di ricerca - nessuna ricerca incrementale. Lo stato dell'arte non basta. Pensare in grande!
- Conosci i tuoi concorrenti: qual è lo stato di avanzamento e perché la tua idea e il tuo approccio scientifico sono eccezionali?
- La presentazione concisa e chiara è fondamentale (non tutti i valutatori sono esperti nel tuo campo)
- Si raccomanda una descrizione dell'approccio metodologico (valutazione di fattibilità) → rischi!
- Mostra la tua conoscenza e competenze (fattibilità) nel tuo CV e track record



DIFFERENZE TRA B1 E B2

Nella fase 2: Entrambe le parti saranno lette da Panel Members e Remote Referees (esperti esterni)



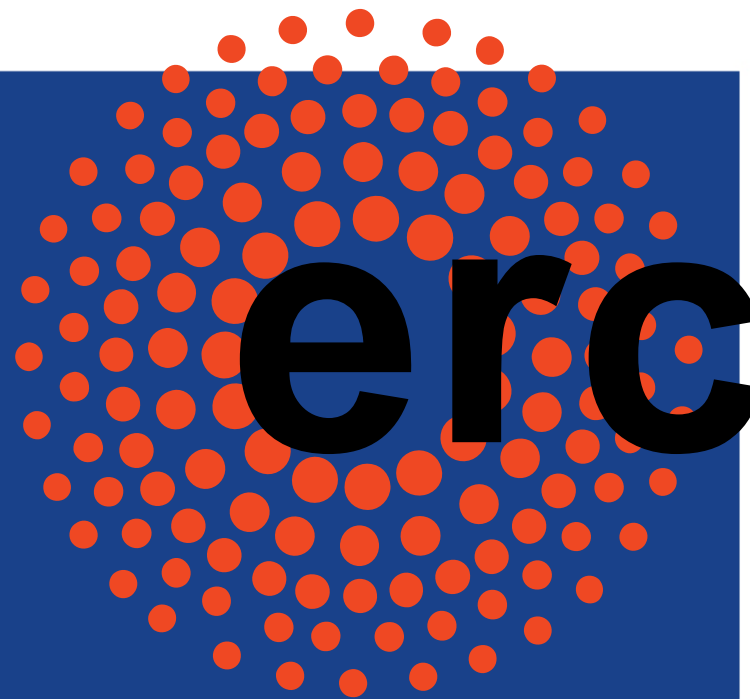
NON RIPETERE LA B1- SYNOPSIS, ENTRA NEI DETTAGLI

- Fornire dettagli sufficienti su metodologia, piano di lavoro (fasi/step/Work Package), selezione di casi studio, ecc. (14 pagine)
- Spiegare le ipotesi o fornire dati preliminari (se esistenti)
- Assicurati di fornire la lista completa delle references (esclusa dai limiti di pagina)
- Fornire strategie alternative per mitigare i rischi
- Spiegare il coinvolgimento dei membri del team (le proposte ERC NON sono collaborative)
- Dimostrare la necessità di collaboratori (se presenti)

Moduli B1 e B2 - "Cose da fare"

- ▣ Assicurati che il tuo testo sia chiaro e mirato.
- ▣ Tieni a mente gli aspetti visivi di presentazione del testo.
- ▣ Ricorda chi è il tuo «pubblico».
- ▣ Evita i «salti logici» nel testo.
- ▣ Sebbene entrambi i moduli B1 e B2 verranno valutati insieme nella seconda fase di valutazione, mantenere ciascuno di essi come documento a sé stante. Pertanto, astenersi dal fare riferimenti incrociati tra la sinossi estesa e la proposta completa fornita in B2.

La sezione B1





Moduli B1 "Cose da non fare"

- ❏ Non è necessario includere i seguenti elementi / aspetti nella sinossi estesa (B1):
 1. Piano di lavoro dettagliato
 2. Richiesta / giustificazione del budget



L'importanza della B1

- ❏ Per dirla senza mezzi termini: in base al tuo B1, i membri del panel decidono se il mondo esterno (gli esperti esterni) riuscirà mai a leggere il tuo B2... La fase 1 della procedura di valutazione si basa completamente sul tuo B1, che contiene non solo la sinossi della tua proposta di ricerca, ma anche il tuo CV e track record. Massimo 44 progetti passano alla fase 2 della valutazione (NOVITÀ).
- ❏ Il modulo B1 è costituito da due segmenti: (1) La sinossi estesa (sezione a); e (2) il profilo PI (sezioni b, c e l'appendice ID finanziamento). C'è un limite di 5 pagine per questa sezione, che rappresenta una grande sfida nella stesura di una sinossi estesa altamente competitiva e concisa per il tuo ambizioso progetto di ricerca.



Cosa scrivere nella B1

- ❏ Descrivi il tuo progetto, mentre ti occupi di tutti gli aspetti chiave ERC, inclusa la novità della tua idea, le caratteristiche che rendono ambiziosa l'idea, spiegazione di come non si tratti di un'idea incrementale, che si tratti di un progetto guidato dal PI e (potenzialmente) basato su ipotesi scientifiche. Tutti questi aspetti devono essere ben spiegati all'interno del testo della sinossi estesa.
- ❏ Anche il ragionamento scientifico del vostro progetto deve essere presentato nella sinossi. Spiega qual è lo stato dell'arte nel campo, evidenziando le lacune di conoscenza che stai affrontando. Ciò dovrebbe anche portare a spiegare la motivazione e gli obiettivi del progetto, seguiti dalla metodologia selezionata.



Domande «guida» per scrivere la Extended Synopsis

- ❏ What is the research challenge?
- ❏ Why is this research challenge important?
- ❏ Why was it not tackled until now?
- ❏ Why is your project new/innovative? (Concentrati su aspetti che sono radicalmente diversi rispetto a quanto fatto in passato)
- ❏ What is the new idea/approach?
- ❏ Does it go substantially beyond state of the art?
- ❏ Have you proven/supported your case? Do you have a hypothesis?
- ❏ What are the concrete aims of the project?
- ❏ Is this groundbreaking, transformative research?
- ❏ Is it feasible? (Uno degli argomenti più importanti da trattare in una B1)
- ❏ What is the risk?
- ❏ Have you given a realistic picture of your collaborations? This should not be a collaborative project – only collaborate when need expertise. Should be clear you are driving the project.
- ❏ What is the potential impact/gain?

Consigli

- ❏ Fornisci una struttura e una narrazione chiare in tutta la tua proposta, in modo che il tuo progetto si legga come una storia avvincente.
- ❏ Introduzione/stato dell'arte sono sezioni importanti per fornire il "quadro generale", descrivere la sfida della ricerca e motivare i tuoi obiettivi di ricerca. Tuttavia, non dovrebbero dominare la proposta (sia nella B1 che nella B2):
- ❏ La maggior parte della proposta dovrebbe spiegare il tuo nuovo approccio
- ❏ Presenta gli scopi/obiettivi concreti del tuo progetto in anticipo e in modo altamente visibile (ad es. punti elencati, grassetto, casella di testo). Ai valutatori piace vederli a prima vista, non in fondo alla B1.



Consigli

- ▣ La perfetta corrispondenza di scopi/obiettivi con la metodologia e il piano di lavoro del progetto dovrebbe essere facilmente evidente al valutatore (ad esempio facendo riferimento agli obiettivi 1 e 2 quando si descrive il metodo x o il work package y). La sinossi estesa dovrebbe quindi contenere tutte le informazioni importanti per valutare sia il “carattere di svolta” che la fattibilità del progetto. Ciò include:
 - dati preliminari
 - gestione del rischio (quali sono i rischi significativi e i tuoi piani di emergenza)
 - informazioni su come validerai i risultati del tuo progetto.

- ▣ Sulla base dei commenti dei valutatori, consiglio di includere anche un breve paragrafo/frase sulla composizione del team in B1 (messaggio: le competenze necessarie saranno raccolte nel tuo team), nonché brevi informazioni sui tempi (1-2 frasi, o ad es. aggiungendo le informazioni sui tempi tra parentesi: "Obiettivo/work package 1... [Anno 1-3]" / "Obiettivo intermedio chiave x [Anno 3]").



Diamo una struttura e un ordine

NOVELTY, AMBITION AND FEASIBILITY:

research challenge; aims, groundbreaking nature vs. state of the art; originality, feasibility, impact, methodology, expertise of PI & team, brief time plan



ESEMPIO PRATICO: Progetto INITIUM PE2 Fundamental Constituents of Matter

↻ La struttura della B1:

↻ **1. The importance of the subject at study**

↻ **1.1 The state of the art**

↻ **2. The innovation brought by the project to the state of the art**

↻ **3. The goal of the project**

↻ **4 The feasibility and the impact of the project**



Capitolo 1: The importance of the subject at study:

Massimo 1 pagina

1. INITIUM SCIENTIFIC AND EXPERIMENTAL BACKGROUND

The presence of DM in the Universe is nowadays an established, yet still mysterious, paradigm: deciphering its essence is one of the most compelling tasks for fundamental physics today [1]. Direct DM searches look for very low energy (10-100 keV) nuclear recoils due to the elastic scattering of Weakly Interactive Massive Particles (WIMPs) in the active volume of the detector. The present experimental limits for Spin-Independent (SI) WIMP-nucleon coupling are of the order $10^{-39} - 10^{-45} \text{ cm}^2$ (see Fig. 1), depending on WIMP mass [2]. The rarity of the expected interaction requires any backgrounds indistinguishable from the DM signal (i.e. neutrons and neutrinos) to be strictly controlled and minimised. For this reason, experiments are typically located underground to suppress cosmogenic backgrounds and are manufactured from materials with excellent radio-purity. While not all experiments are endowed with it, neutron/electron recoil discrimination is also highly advisable, in order to be able to reject beta decays and Compton scatterings, that produce electronic recoils with $O(100 \text{ keV})$ energy.

Argomenti affrontati

- What is Dark Matter
- How we try to measure it directly
- Why the approach I propose is crucial and timeliness
- How the detector I propose can realise such approach



FRASI CHIAVE

The presence of DM in the Universe is nowadays an established, yet still mysterious, paradigm: deciphering its essence is one of the most compelling tasks for fundamental physics today [1]. Direct DM searches look

to Earth's axis orientation with respect to DM wind. The determination of the incoming direction of the WIMP particle can provide a correlation with an astrophysical source that no background whatsoever can mimic and therefore offers an unique key for a positive, unambiguous identification of a DM signal [3]. Such

For all these reasons I believe that the development of INITIUM, a negative ion gaseous TPC with active electron/neutron recoil discrimination, high resolution 3D tracking, easy scalable readout and He-based gas mixture at atmospheric pressure can give a significant contribution to the DM direct search field at O(GeV)



Capitolo 1.1 The state of the art

Massimo 1 pagina (compresa eventuale tabella/immagine)

1.1 Existing directional DM detectors and future prospects

TPCs can potentially provide the best observables and architecture for a DM search experiment. For a comprehensive review of directional readout technologies, we refer the reader to [11], that I helped author.

	Drift	Amplification + Readout	Gas Mixture	Pressure (mbar)	Volume (L)	Energy Threshold (keV)	Active Mass (gr)
DRIFT	i ⁻ , 50 cm	MWPC	73% CS ₂ + 25% CF ₄ + 2% O ₂	55	800	20	33.2
NEWAGE	e ⁻ , 40 cm	mu-PIC	CF ₄	100	37	20	11.5
MIMAC	e ⁻ , 25 cm	Micromegas	70% CF ₄ 28% CHF ₃ 2% C ₄ H ₁₀	50	5.8	2	1.1
DMTPC (in R&D)	e ⁻ , 27 cm	Meshes + CCD + PMT	CF ₄	30-100	1000	20	~50-100
INITIUM	i ⁻ , 75 cm	GEMs + CMOS + PMT	He + CF ₄ + SF ₆	1000	1000	1	~1000

Argomenti affrontati

- concentrarsi sullo stato dell'arte più vicino al tuo progetto (cioè solo directional DM detectors, non tutti i DM detectors).
- Contestualizza il tuo progetto all'interno delle sfide presenti e future.
- Sottolinea il tuo contributo allo stato dell'arte.
- Suggerimento: usa la tabella per sintetizzare concetti



Capitolo 2: The innovation brought by the project to the state of the art

Massimo 1 pagina (comprese eventuali figure)

TITOLO ACCATTIVANTE

2. INITIUM INNOVATIONS TO MEET DIRECTIONAL DM EXPERIMENTAL CHALLENGES

The main experimental challenge of a DM detector aiming at directional sensitivity is to instrument a large volume with high enough granularity to be able to infer recoiling tracks direction down to low energy, while

Argomenti affrontati

- Usa elenchi puntati o tabelle per sottolineare la tua innovazione allo stato dell'arte
- Sii audace e convinto di ciò che scrivi (“Credo fermamente che il mio progetto lo farà...)..
- ..ma avvalora correttamente la tua affermazione! (fattibilità)
- Sottolinea il tuo contributo personale allo sviluppo di tali innovazioni in passato



FRASI CHIAVE

based on optical readout and negative ion drift. Backed by some recent breakthroughs in the field (to which I and my group significantly contributed), INITIUM will bring together and optimise in a mannerly fashion the following innovative features:

mass. With the NITEC detector I developed during my Marie Curie Individual Fellowship, I recently proved for the first time the feasibility of negative ion operation at nearly atmospheric pressure with

consuming than CCDs [30]. Together with the group I gathered around my Marie Curie Individual Fellowship, I recently developed the 7 L sensitive volume prototype LEMOn with 20 cm drift distance,



Capitolo 3: The goal of the project

Massimo 1 pagina

3. INITIUM DESIGN AND EXPECTED SENSITIVITY

A sketch of INITIUM detector is shown in the central panel of Fig.1. The CMOS sensors will be located at the TPC anode behind the GEM planes and will detect the scintillation light produced in the amplification

Argomenti affrontati

- Come le caratteristiche innovative descritte nel «**Capitolo 2 -The innovation brought by the project to the state of the art**» saranno realizzate
- Sii audace nelle tue affermazioni, ma tenendo sempre presente la fattibilità
- Fornire una possibile soluzione di backup per mitigare i rischi
- Discutere il risultato atteso e l'impatto a lungo termine



Un altro esempio di presentazione degli obiettivi

In order to tackle these challenging questions, we set the following goals:

Aim 1: Understanding symptom X

(...)

Aim 2: Creation of a new model of mind structure

The new model will for the first time integrate the factor Y which so far has not been implicated in this context. Our first results strongly suggest that factor Y is critical for the development of symptom X, which would disprove the existing model.

(...)

Aim 3: Experimental validation of the model |

(....)



FRASI CHIAVE

Ethic Annex attached). From the results I obtained on gas performances with LEMOn (better light yield with higher He to CF₄ fraction) and NITEC (few % of SF₆ is sufficient to induce the negative ion drift), we can foresee a He:CF₄:SF₆ gas mixture ranging from 600:140:10 Torr to 645:100:5 Torr. A dedicated DAQ system

background contribution to come from the GEMs. Given the expected dimensions, from simulations within the CYGNUS collaboration, we expect about 2.6×10^3 gamma/year between 1-10 keV (3.7×10^4 gamma/

rate from all the other internal components added together. Given that DRIFT showed 1.98×10^{-5} gamma rejection at 20 keV [16] and [34] similar capabilities with 2D optical readout and 100 Torr of CF₄ at 10 keV, I believe INITIUM will be able to control all the gamma induced backgrounds. DRIFT has demonstrated that



Capitolo 4: The feasibility and the impact of the project

Massimo 1 pagina

4. *IMPLEMENTATION*

The INITIUM project will last for 60 months and will be divided in four Working Packages (WPs), namely Prototype studies (WP I), Detector design optimisation, engineering and construction (WP II), Detector

5. *APPROPRIATENESS OF THE FACILITIES, RESEARCH TEAM AND COSTS*

The Host Institution will be the Gran Sasso Science Institute (GSSI), an international PhD school and research center recently established in l'Aquila. in order to exploit its academic excellence to build a new.

Argomenti affrontati

- Devi dimostrare di poter «mantenere ciò che prometti»
- Delinea l'approccio metodologico di cui parlerai in dettaglio nella parte B2 attraverso una breve descrizione dei WP, dei deliverable e delle milestones
- Discuti l'esperienza del team
- Motiva la tua capacità di essere il PI del progetto descritto



FRASI CHIAVE

The Host Institution will be the Gran Sasso Science Institute (GSSI), an international PhD school and research center recently established in l'Aquila, in order to exploit its academic excellence to build a new, young and motivated research group around the PI. GSSI proximity and strong connections with LNGS, the largest underground laboratory in the world, offer an exclusive opportunity for the success of the INITIUM

subnuclear, nuclear and astroparticle physics. Its partnership is crucial condition for the success of INITIUM, thanks to the outstanding INFN research facilities. LNGS and Laboratori Nazionali di Frascati (LNF) are the

member peculiar skills into the project. INFN collaborators possess a longstanding tradition in tracking detectors, especially with GEMs, and are among the first developers of the optical readout approach with CMOS cameras [37]. This same group, lead by the PI, has been the first to establish negative ion operation at

Institution and partner laboratories, together with the research team, offer an unique combination of the best academic researchers and experimental facilities available in Italy for the success of the INITIUM project and to launch the development of the international CYGNUS effort.



FRASI CHIAVE – Altri esempi

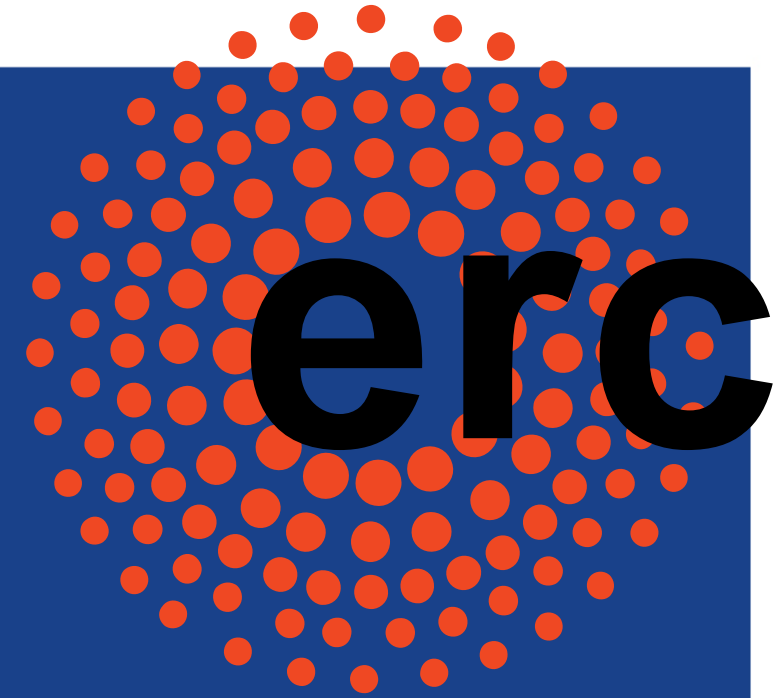
If some of our approaches are successful, we can expect within the next few years a **detailed understanding of.....**

The proposed project should provide a rich set of scientific data on X, which will suggest new research experiments in the area of X.

The expected result **will open a new research area/** ...can open up new perspectives for analyzing ...

The results are to drastically advance not only the fields of X systems and Y but also the current understanding of Z which is of **great importance far beyond the borders of...**

Il cv e il track record





Valutazione

Evaluation criterion and elements

For Starting, Consolidator, Advanced, and Synergy grants, scientific excellence is the sole criterion of evaluation.

The panels will primarily evaluate:

- the ground-breaking nature, ambition, and feasibility of the research project.

At the same time, the panels will evaluate:

- the intellectual capacity, creativity, and commitment of the Principal Investigator(s), with a focus on the extent to which the Principal Investigator(s) has the required scientific expertise and capacity to successfully execute the project.

Additional considerations

During the evaluation, the peer review panels shall take into account the phase of the Principal Investigator's transition to independence, diverse research career paths and particularly noteworthy contributions to the research community, as well as possible breaks in the research career of the applicant and the effects of major life events or pandemic restrictions on the applicant's progression as a researcher. Applicants may include relevant additional information on their research careers to provide context to the evaluation panels when assessing their research achievements and peer recognition (see "Proposal description" above). Synergy Grant Principal



La valutazione: il
Principal
Investigator

2. Principal Investigator(s)

Intellectual capacity and creativity

~~Starting and Consolidator~~, Advanced, and Synergy Grants

To what extent has the PI demonstrated the ability to conduct ground-breaking research?

To what extent does the PI provide evidence of creative ~~independent~~ and original thinking?

To what extent does the PI have the required scientific expertise and capacity to successfully execute the project?

~~Intellectual capacity and creativity~~

~~Advanced and Synergy~~

To what extent has/have the PI(s) demonstrated the ability to conduct ground-breaking research?

To what extent does/do the PI(s) has/have the required scientific expertise and capacity to successfully execute the project?

To what extent has the PI demonstrated sound leadership in the training and advancement of young scientists (~~for Advanced Grant applicants~~)?

Intellectual capacity &
creativity:

Achievements

Independence

Initiating new lines of thinking



II template

~~**Curriculum Vitae:** The CV should include the standard academic and research record as well as a succinct "funding ID" which must specify any current research grants and their subject, and any on-going application for work related to the proposal. Any research career gaps and/or unconventional paths should be clearly explained so that they can be fairly assessed by the evaluation panels.⁶⁴~~

~~**Track Record:** Each Principal Investigator must provide a list of achievements reflecting their track record⁶⁵. The type of achievements expected for Curriculum Vitae and Track Record: The CV and Track Record should include personal details, education, key qualifications, current position(s) and relevant previous positions, a list of up to ten research outputs that demonstrate how the applicant has advanced knowledge in their field, with an emphasis on more recent achievements, and a list of selected examples of significant peer recognition. A short explanation of the significance of the selected outputs, the role of the applicant in producing each of them, and how they demonstrate the applicant's capacity to successfully carry out their proposed~~

project may be included, as well as a short explanation of the importance of the listed examples of significant peer recognition.

The applicant may also include relevant additional information on career breaks, diverse career paths, and life events⁶⁶, as well as any particularly noteworthy contributions to the research community. These will provide context to the evaluation panels when assessing the Principal Investigator's research achievements and peer recognition in relation to their career stage. See section "Evaluation criterion and procedure".

Scientific Proposal: This should be a description of the scientific and technical aspects of the project, demonstrating the ground-breaking nature of the research, its potential impact, and research methodology. This should include a succinct "funding ID" which must specify any current research grants and their subject, and any on-going application for work related to the proposal.



II template

Extended Synopsis: 5 pages

Curriculum Vitae: ~~2~~ and Track Record: up to 4 pages for each Principal Investigator

~~Track Record: 2 pages for each Principal Investigator~~



Novelties – Research Assessment

- **Intellectual capacity, creativity, and commitment of the PI** also evaluated
- No prescriptive **Principal Investigator profiles**
- New **Curriculum Vitae and Track Record** template (4 pages):
 - Personal details: education, employment
 - Research achievements (≤ 10):
 - demonstrating advancement in the field
 - emphasis on more recent achievements
 - short narrative on significance of achievements
 - Peer recognition: prizes, fellowships, academy membership, etc.
 - Additional information:
 - career breaks, diverse career paths, life events
 - other contributions to research community

Cosa NON è necessario

- ❏ Avere una posizione permanente o essere un professore ordinario
- ❏ Presentare un progetto in un'area “alla moda”
- ❏ Avere un elevato numero di pubblicazioni
- ❏ Applicare per una Host Institution prestigiosa
- ❏ Articoli su riviste top di settore (per esempio, Science o Nature)
- ❏ h-index astronomico

Cosa è necessario

- ▣ Essere indipendenti ed avere successo nella ricerca
- ▣ Avere finanziamenti (a seconda del proprio stato di carriera)
- ▣ Interessante e/o originale percorso di carriera nella ricerca

Chi è "materiale ERC"?

Gli elementi principali di un profilo di Principal Investigator (PI) competitivo sono:

- ☒ Pensiero creativo
- ☒ Curriculum e pubblicazioni ad alto impatto (a seconda del proprio stato di carriera)
- ☒ Orientato alla ricerca di base
- ☒ È il momento migliore per applicare ad uno schema di finanziamento ERC. In termini di tempismo, ci sono due dimensioni a cui fare riferimento: la carriera dei PI e il concetto del progetto



What you need to prove

- you are fully independent
- you can carry out successful research as an independent PI

Publications

Selected Journal Articles (* contributed equally) (# invited)

Rosselli BF*, Alemi A*, Ansuini A & Zoccolan D (2015). **Object similarity affects the perceptual strategy underlying invariant visual object recognition in rats.** *Front. Neural Circuits* 9(10). doi: 10.3389/fncir.2015.00010 [\[link\]](#) [\[pdf\]](#) (Frontiers Research Topic *What can simple brains teach us about how vision works*)

Zoccolan D# (2015). **Invariant visual object recognition and shape processing in rats.** *Behav. Brain. Res.* 285, 10-33 [\[link\]](#) [\[pdf\]](#) (Special Issue on *Object Recognition Memory in mice and rats*)

Baldassi C*, Alemi-Neissi A*, Pagan M*, DiCarlo JJ, Zecchina R & Zoccolan D (2013). **Shape similarity, better than semantic membership, accounts for the structure of visual object representations in a population of monkey inferotemporal neurons.** *PLoS Comput. Biol.* 9(8): e1003167 [\[link\]](#) [\[pdf\]](#)

Alemi-Neissi A*, Rosselli BF* & Zoccolan D (2013). **Multifeatural shape processing in rats engaged in invariant visual object recognition.** *J. Neurosci.* 33, 5939-5956 [\[link\]](#) [\[pdf\]](#)

DiCarlo JJ, Zoccolan D & Rust NC (2012). **How does the brain solve visual object recognition?** *Neuron* 73, 415-434 [\[link\]](#)

Tafazoli S*, Di Filippo A* & Zoccolan D (2012). **Transformation-tolerant object recognition in rats revealed by visual priming.** *J. Neurosci.* 32, 21-34 [\[link\]](#) [\[pdf\]](#)

Zoccolan D, Graham JB & Cox DD (2010). **A self-calibrating, camera-based eye tracker for the recording of rodent eye movement.** *Front. Neurosci.* 4:193 [\[link\]](#) [\[pdf\]](#)

Zoccolan D*, Oertelt N*, DiCarlo JJ & Cox DD (2009). **A rodent model for the study of invariant visual object recognition.** *Proc. Natl. Acad. Sci. USA* 106, 8748-53 [\[link\]](#) [\[pdf\]](#) [\[Supp Inf\]](#)

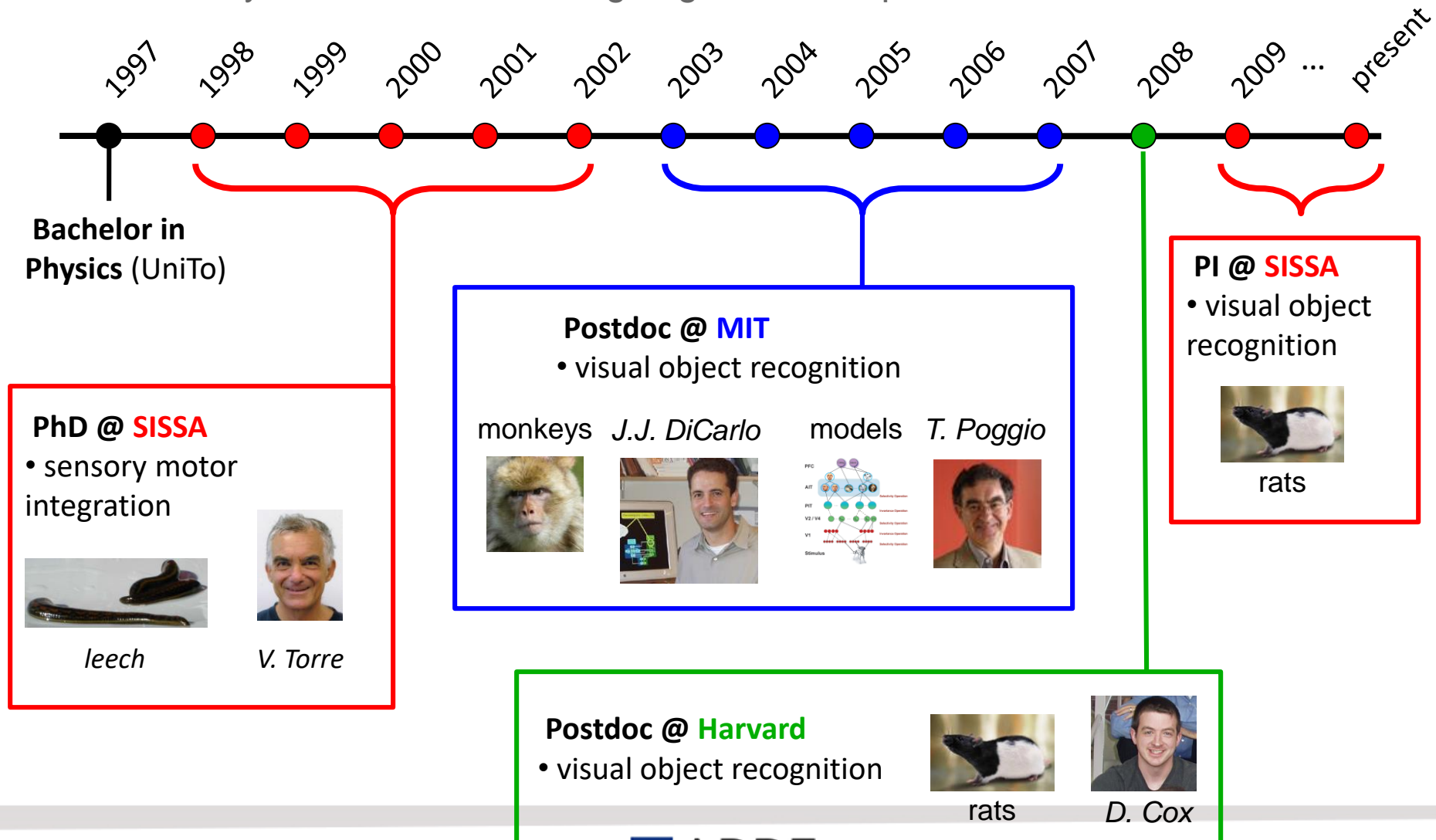
Li N, Cox DD, Zoccolan D & DiCarlo JJ (2009). **What response properties do individual neurons need to underlie object recognition in clutter?** *J. Neurophys.* 102, 360-376 [\[link\]](#) [\[pdf\]](#)

Zoccolan D, Kouh M, Poggio T & DiCarlo JJ (2007). **Trade-off between object selectivity and tolerance in monkey inferotemporal cortex.** *J. Neurosci.* 27, 12292-12307 [\[link\]](#) [\[pdf\]](#) [\[Supp Inf\]](#)

Zoccolan D*, Cox DD* & DiCarlo JJ (2005). **Multiple object response normalization in monkey inferotemporal cortex.** *J. Neurosci.* 25, 8150-64 [\[link\]](#) [\[pdf\]](#)

What you need to prove

- you have an interesting/original career path and track record

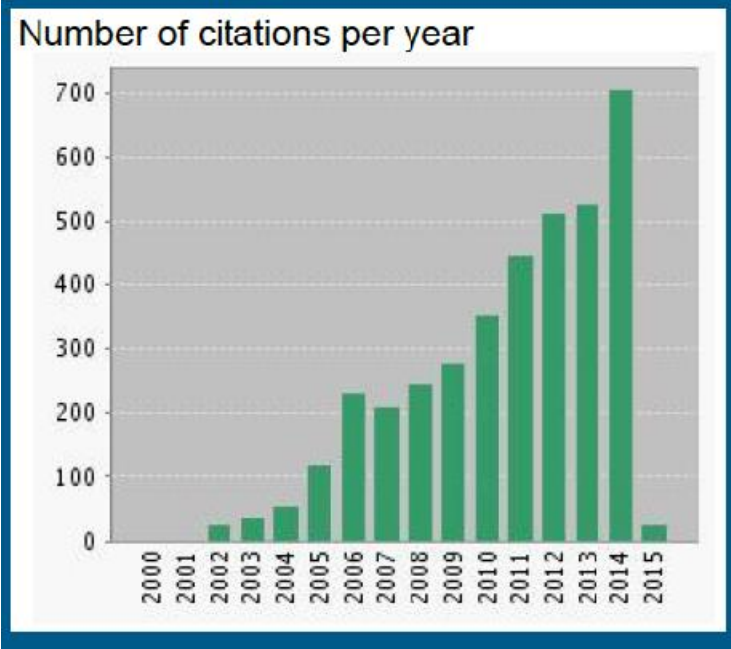


Consigli

"I have published XX peer-reviewed articles in major international journals with XX citations (excluding self citations) yielding an H-index of xx. The publications include xx in blabla journal, xx in blabla 2 journal.....I have xx patent applications...."

researcherID:XXXXXXXXXXXXXXXX (from the database)" .

Link to the full list of publications (if you don't have space to list all of your publications prepare a website for that)



LA PROPOSTA

B1: IL PRINCIPAL INVESTIGATOR – CV E TRACK RECORD

- ✓ **Introdurre** le singole sezioni specificando che si elencano solo i lavori più rilevanti su un totale di X
- ✓ terminare con un' affermazione per giustificare che si è al punto giusto della carriera per intraprendere questo passo
- ✓ Fornite tutte le informazioni (es. indicare i coautori e autore corrispondente delle pubblicazioni che presentate, numero di citazioni, etc.)
- ✓ Spiegate il vostro ruolo e l'impatto delle pubblicazioni.



LA PROPOSTA

B1: IL PRINCIPAL INVESTIGATOR – CV E TRACK RECORD

- ✓ Informazioni su premi, articoli, presentazioni, studenti supervisionati
- ✓ La tua capacità di modellare e creare campi di ricerca. Gioca con i numeri: tassi di accettazione, citazioni, download.
- ✓ Attrazione di finanziamenti o avvio di nuove linee di ricerca, capogruppo, coordinatore
- ✓ Documenta i tuoi risultati - non è sufficiente dire "Ho partecipato a molti progetti internazionali". Di quali
- ✓ Arriva al punto. Sii preciso. „Ho stabilito / ho identificato / ho dimostrato / ho iniziato / sono stato premiato ...”
- ✓ Riassumi il tuo lavoro. Ad esempio, "più di 30 articoli in riviste internazionali peer reviewed come autore principale..."

LA PROPOSTA

B1: IL PRINCIPAL INVESTIGATOR – CV E TRACK RECORD

Nel tuo CV ti stai vendendo, non descrivendo.

- ✓ Identifica i tuoi punti di forza relativi e falli risaltare.
- ✓ Nel caso in cui le riviste che hai pubblicato non siano al top ma il lavoro è comunque importante, inserisci il tuo numero di citazioni in grassetto (citazioni più importanti della rivista).
- ✓ Usa un paragrafo intitolato «Contributi scientifici sul campo» per mostrare come sei particolarmente adatto per eseguire il progetto che hai proposto.
- ✓ Tra le «current and previous positions», mettete anche quelle rifiutate
- ✓ Menzionate anche eventuali attività di reviewer per riviste
- ✓ Menzionate anche i grant/progetti conclusi!

LA PROPOSTA

B1: IL PRINCIPAL INVESTIGATOR – CV E TRACK RECORD

- ✓ Sottolinea la mobilità
- ✓ Sottolineare la gestione dei finanziamenti
- ✓ Sottolineare le esperienze internazionali
- ✓ Sottolineare le collaborazioni/partecipazioni in network
- ✓ Sottolinea la tua capacità di adattamento alle nuove sfide e creatività (nuovi esperimenti, nuovo campo di ricerca, nuovo laboratorio/team)
- ✓ Sottolinea posizioni di responsabilità (come PI, leader di un WP, organizzatore di conferenze, ecc...)
- ✓ Sottolineare ogni esperienza preparatoria al progetto presentato (aiuta la fattibilità)

ESEMPIO PRATICO – CV

Section b: Curriculum Vitae

ELISABETTA BARACCHINI

ORCID ID 0000-0003-4686-128X

Date of birth: 26th April 1982

Nationality: Italian

• EDUCATION

- 2009 PhD in Particle Physics at Università La Sapienza of Rome, Italy, with grade "Optimum", thesis title "Search for $B \rightarrow l \nu$ at BaBar with $l = (e, \mu)$ and Phenomenological Implications".
- 2005 Master Degree in Particle Physics at Università La Sapienza of Rome, Italy, with grade 110/110 *cum laude*, thesis title "Correzioni radiative ai decadimenti in due corpi del mesone B".

• CURRENT POSITION

2018-present Assistant Professor of the Astroparticle Physics Department at the Gran Sasso Science Institute (GSSI), l'Aquila, Italy.

• PREVIOUS POSITIONS AND INTERNATIONAL MOBILITY

- 2017 Researcher of the Istituto Nazionale di Fisica Nucleare (INFN) at Università La Sapienza of Rome, Rome, Italy.
- 2015-2017 INFN Senior Researcher (within the Marie Skłodowska-Curie Individual Fellowship) at the Laboratori Nazionali di Frascati, Frascati, Italy.
- 2012-2015 Researcher of the International Center for Elementary Particle Physics (ICEPP) at the University of Tokyo, Tokyo, Japan, for the MEG experiment.
- 2012 Researcher of Université Paris Sud at the Laboratoire de l'Accélérateur Linéaire (LAL), Orsay, France, for the SuperB project.
- 2011 Researcher of the Institute of Particle and Nuclear Studies (IPNS) at the High Energy Accelerator Research Organization (KEK), Tsukuba, Japan, for the MEG experiment.
- 2008-2011 Post Doctoral Scholar Employee of the Department of Physics and Astronomy of the University of Irvine, California, USA, for the MEG experiment.

• FELLOWSHIPS AND AWARDS

- 2016 ERC Starting Grant for the project "NICE: a Negative Ion Chamber Experiment" in the framework of Horizon 2020, evaluated to fully meet ERC excellence criteria (panels score 'A' and 'A'), not funded due to ranking and limited funds.
- 2015 Marie Skłodowska-Curie Individual Fellowship for the project "NITEC: a Negative Ion Time Expansion Chamber for directional Dark Matter searches" in the framework of Horizon 2020, Supervisor G. Beniciventi.
- 2011 Research Fellowship at the Université Paris Sud in the framework of the European Project "Research Chairs of Excellence Based University - Universities of Paris" (RBUCE-UP), funded as a part of Marie-Curie Actions under the 7th Framework Programme.
- 2003 Student Excellence Award "Enrico Persico" from the Accademia Nazionale dei Lincei, Rome, Italy.

• QUALIFICATIONS

2014 National scientific qualification as Assistant Professor in the sector "02/A1 -Experimental Physics of Fundamental Interactions".

• TEACHING ACTIVITIES

- 2018 Lecturer of the PhD course "Direct Dark Matter Searches and its Experimental Challenges" at the Gran Sasso Science Institute.
- 2015 Tutor for the "GEMPix TPC tracker characterization at the BTF" class of the Gaseous Detector Laboratory for the Excellence in Detector and Instrumentation Technology International School 2015 (EDIT 2015) at Laboratori Nazionali di Frascati (INFN).
- 2006-2007 "Radiation Detector Laboratory" class for the Physics Master Degree at Università La Sapienza of Rome, Italy, as Assistant of Prof. Mattioli.

• ORGANIZATION OF SCIENTIFIC MEETINGS

- 2016 Co-organizer and chair of "CYGNUS-TPC meeting" at Sheffield University, Sheffield, United Kingdom.
- 2016 Organizer and chair of "CYGNUS-TPC kick-off meeting: a mini-workshop on dark matter

2 pages





ESEMPIO PRATICO – TRACK RECORD (Introduzione per raccontarsi)

Iniziare con una dichiarazione forte:

My research interests focus on fundamental physics, in particular the answer to the questions what the Universe is made of and which are the laws of physics that govern its fundamental constituents. For this

Proseguite con una breve excursus della vostra carriera:

reason, I took part in accelerator-based particle physics experiments (Babar, MEG), aimed to probe
Strong of the experience acquired during my studies and my seven postdocs years, I recently moved my attention to DM and neutrinos, in my opinion the most interesting and fertile fields where to work right now,

- Ripercorri la tua carriera da oggi all'indietro mostrando scopi e direzioni
- Dimostra la tua capacità di indipendenza come ricercatore e come project manager
- Spiega il significato, l'importanza delle tue principali attività di ricerca
- Dimostra che hai già iniziato a fare lavori preliminari propedeutici al tuo progetto
- Concludi il racconto della tua carriera elencando le abilità che hai acquisito che ti rendono il migliore candidato per portare a termine il progetto e spiega come, ottenere l'ERC, ti consentirebbe di iniziare (o consolidare) la tua linea di ricerca



ESEMPIO PRATICO – TRACK RECORD (pubblicazioni)

I revisori non sono stupidi: quello che devi dimostrare è che sei stato indipendente dal tuo supervisore, anche se avete collaborato in alcune pubblicazioni. Usa la presentazione (slide precedente).

Scegliete le pubblicazioni collegate al progetto

Se le vostre pubblicazioni hanno un alto numero di citazioni, scrivetelo:

5. J. Adam et al. [MEG Collaboration], “*New constraint on the existence of the $\mu^+ \rightarrow e^+ \gamma$ decay*”, Phys. Rev. Lett. 110 (2013) 201801, **(527 citations)**.
6. A. M. Baldini et al. [MEG Collaboration], “*Search for the lepton flavour violating decay $\mu^+ \rightarrow e^+ \gamma$ with the full dataset of the MEG experiment*”, Eur. Phys. J. C 76 (2016) no.8, 434, **(165 citations)**.

Cercate di dimostrare consistenza nelle vostre pubblicazioni: per es. una pubblicazione all’anno ordinare numericamente le pubblicazioni, e utilizzare questi numeri come riferimenti per citare i tuoi lavori nella parte discorsiva:

In the previous years (2008-2015), I worked in the MEG collaboration as the responsible for the simulation, reconstruction and analysis of charged tracks in the drift chambers (DCH) [5,6] and from 2011 in the cylindrical drift chamber of the MEG II upgrade. The MEG experiment searches for the $\mu \rightarrow e \gamma$ decay, a

ESEMPIO PRATICO N°2 – TRACK RECORD (pubblicazioni)

Section c) Ten years track-record (max 2 pages)

Key publications as main author

I have a total of xx publications in peer reviewed journals as main author/x monographies...
 The following 10 publications are either relevant to the project or representative of work I have carried out.

- 1) Behavioural and Cognitive Psychotherapy (2017),34, 203-24; *The Psychopathology of Everyday Life*, Martin Baumgartner, Ingrid Maier, Kim Possible

Studying the various deviations from the stereotypes of everyday behavior, strange defects and malfunctions, as well as seemingly random errors, we postulate that they indicate the underlying pathology of the psyche, the symptoms of psychoneurosis. This publication has already attracted a high number of citations (320).

- 2) *Journal of Cognitive Neuroscience*, June 2017, Vol. 30, No.6, pp 785-798, Beyond the Pleasure Principle, Kim Possible and Wiliam Sidis

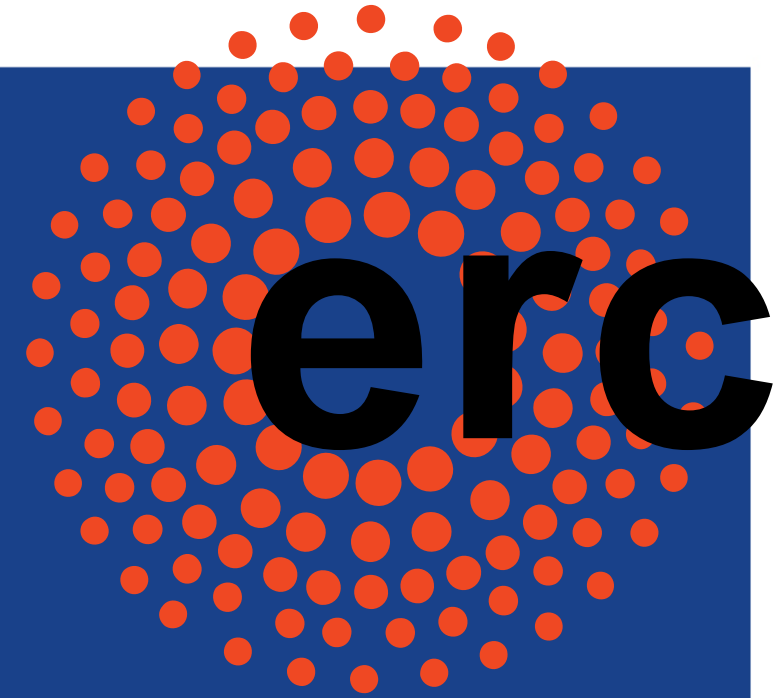
This paper marks a turning point of my previous theoretical approach. In “going beyond” the pleasure principle, I developed a theory of drives, adding the death instinct. **Highlighted as best paper of the year 2017.**



Domande «guida» per scrivere cv e track record

- ❏ Why are you the best/only person who can do this? Why is this a better approach than your competitors?
- ❏ Have you shown independence (for more junior applicants)? You need to be able to handle 5 years of funding. Explain if you have managed that before.
- ❏ Are you active and internationally recognised? List your committees, research mobility, international collaborations, editors/reviewer.
- ❏ Show scientific leadership in CV.

La sezione B2





Di cosa parlare?

- ▣ Qui hai più spazio per descrivere il piano di lavoro, comprese le tempistiche e il personale, nonché il lavoro precedente che ha portato a questa idea di ricerca. Ciò include una descrizione più dettagliata dello stato dell'arte attuale e dei progressi previsti oltre lo stato dell'arte risultante dal progetto. Inoltre, i piani di fattibilità e di mitigazione del rischio dovrebbero essere descritti più dettagliatamente qui.
- ▣ Poiché i revisori nella fase 2 della valutazione hanno accesso sia a B1 che a B2, copiare i testi non è una buona idea. Piuttosto, in B2 dovresti approfondire tutti gli elementi menzionati brevemente in B1, come gli aspetti innovativi e la tempestività della proposta.



Di cosa parlare?

- Il modulo B2 è il documento principale che gli esperti esterni esamineranno, oltre al modulo B1. In ERC, a differenza di molte altre sovvenzioni, gli esperti esterni vengono selezionati in base alla natura specifica della proposta di progetto. In alcuni casi, gli esperti possono persino essere assunti per esaminare solo una singola proposta: la tua proposta, e possono provenire da qualsiasi parte del mondo. Quindi, devi scrivere il tuo modulo B2 tenendo a mente queste informazioni e redigere il testo come se stessi presentando la tua ricerca ai tuoi colleghi scientifici o consulenti scientifici / esperti nel campo specifico.
- Poiché il modulo B2 è la principale proposta di ricerca, dovrebbe includere una descrizione completa del progetto. Per raggiungere questo obiettivo, inizia affrontando lo stato dell'arte e gli obiettivi, chiarendo sia le lacune di conoscenza scientifica (potenzialmente significative) che il tuo progetto affronta, sia l'approccio di ricerca scelto. Successivamente, la proposta dovrebbe presentare la metodologia di ricerca e un piano di lavoro.



Diamo una struttura e un ordine

State of the Art and Objectives

- Start with one paragraph shortly explaining the
 - Aims
 - Significance
- Continue with
 - State of the Art

Methodology

- Methodology per objective (1,2,3 or a,b,c)
- Challenges
- Strategy, Tasks, detailed approach per objective. **Three objectives is the sweet spot**
- Feasibility (facilities, know-how, collaborations, previous data etc)
- Risk analysis. If risky have a plan B and write about it!!!
- Ethics !!!
- Time schedule and work flow



Riepiloghiamo

- ▣ Argomenti principali: Metodologia e avanzamento dello stato dell'arte
- ▣ Dì loro esattamente cosa ti aspetti di fare, il piano di lavoro, esplora ipotesi e qualsiasi prova a sostegno (se ce l'hai)
- ▣ Presentazione obiettivi: Struttura utile per ogni Obiettivo (R01, R02, ecc...):
 - Natura rivoluzionaria: motivazione/base logica
 - Approccio Scientifico: Metodologia (alla fine di ciascuna, una frase di ciò che mostrerà).
 - Impatto potenziale: risultato atteso. Includi applicazioni più ampie (altri settori?).
 - Includere la valutazione del rischio e la fattibilità: evidenziare «guadagno», l'alto rischio, evidenziare il supporto di esperti e dati preliminari/expertise PI a supporto della fattibilità.
 - Come guida approssimativa, pensa a 4 pagine per lo stato dell'arte e gli obiettivi, 2 pagine per il progresso oltre lo stato dell'arte, 8 pagine per la metodologia.

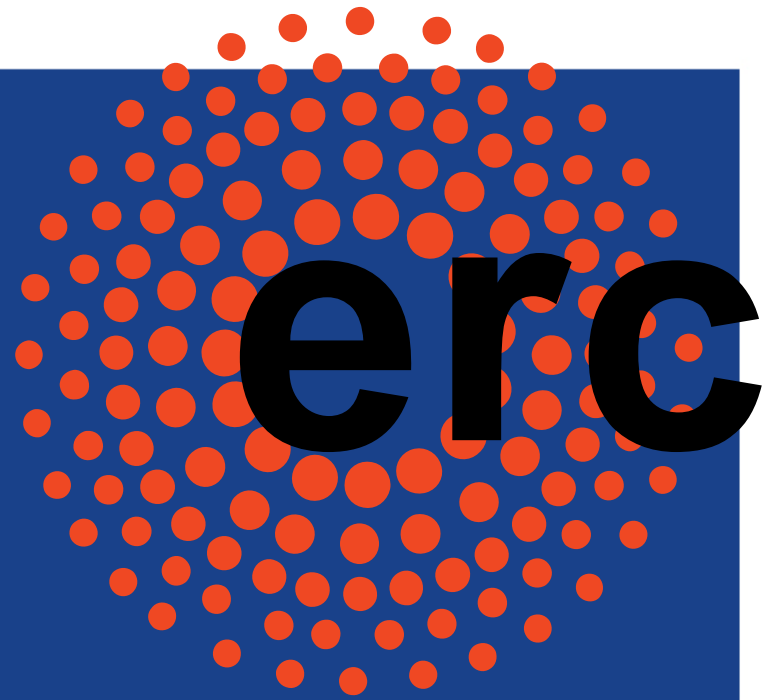


Obiettivi: Ricorda!

Opinione di un valutatore:

Not all goals need to be achieved but what is needed is to create the best possible conditions for doing so.

Lo stato dell'arte





Presentazione di uno stato dell'arte mirato

- ❏ Lo stato dell'arte è un elemento obbligatorio della sezione B2, in particolare nel primo paragrafo “State of the art and objectives” e va presentato anche nella sezione B1 del tuo progetto ERC.
- ❏ Lo stato dell'arte dovrebbe presentare ai valutatori ciò che è stato fatto fino ad oggi in quest'area di ricerca. Questa dichiarazione ha due obiettivi principali: (a) informare i valutatori sulla concorrenza diretta (e talvolta indiretta) che consideri per il progetto suggerito; e / o (b) per convincere i valutatori che tu, il ricercatore, sei un esperto nel tuo campo di ricerca



Identificazione del divario di conoscenza

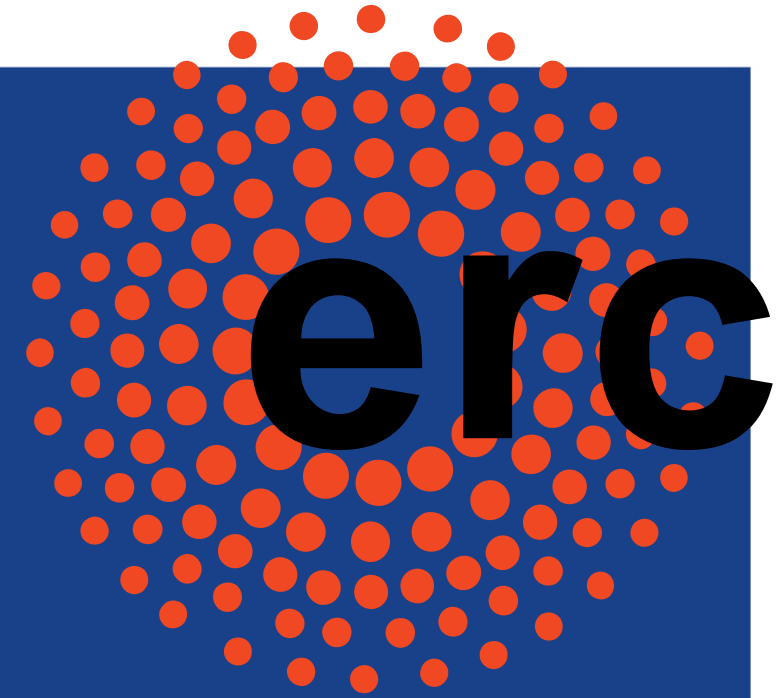
- Una presentazione chiara e mirata dello Stato dell'arte pone le basi per il passaggio successivo: identificare e dichiarare senza problemi il divario di conoscenze che il progetto presentato mira a colmare



Metodologia «appropriata»

- ▣ Avendo pienamente stabilito e giustificato il divario di conoscenze, il passo successivo è mostrare ai valutatori che il progetto presentato ha le capacità e i metodi giusti per colmare questo divario.
- ▣ Per farlo con successo, presenta i meriti scientifici del progetto, l'approccio e i metodi con cui lo eseguirai. Analogamente allo stato dell'arte, i valutatori apprezzeranno discussioni scientifiche / tecnologiche approfondite pertinenti a sostegno delle affermazioni del progetto.

La metodologia





Cosa scrivere

1. Fornire un piano di lavoro chiaro e conciso fornendo i dettagli di obiettivi intermedi
2. Spiega cosa sta facendo ogni membro del team (e il suo background/profilo)
3. Evidenziare eventuali fasi intermedie in cui potrebbe essere necessario modificare la pianificazione del progetto
4. Fornire una valutazione del rischio e un piano B
5. Spiega chiaramente come gestirai il tuo progetto e diffondere i risultati
6. Includere un diagramma di Gantt per illustrare la pianificazione del progetto e mostrare l'interrelazione dei compiti coinvolti nel completamento il progetto.



ESEMPIO PRATICO – B2 – STATE OF THE ART AND OBJECTIVES

Inizia con una dichiarazione forte che chiarisca immediatamente l'obiettivo, l'innovazione e l'importanza del progetto:

INITIUM goal is to boost the development and advancement of gaseous Time Projection Chamber detectors, in particular in the Dark Matter (DM) searches field. I believe this approach to be superior because of its active electron/nuclear recoil discrimination, directional and fiducialization capability down to low energies and versatility in terms of target (Sec. A.2). Thanks to advances in recent years in Micro Pattern as Detectors

Partendo dall'abstract della B1, usalo come guida di quanto verrà discusso in B2, con opportuno riferimento alle sezioni:

and versatility in terms of target (Sec. A.2). Thanks to advances in recent years in Micro Pattern as Detectors (MPGD) for amplification and improved readout techniques (Sec. A.3, A.4), TPCs are nowadays mature

cameras and PMTs at Laboratori Nazionali del Gran Sasso (LNGS). Thanks to the foreseen innovative features discussed in Sec. A.5., INITIUM will be able to put new remarkable constraints in a WIMP-nucleon

Presentate i risultati attesi: features discussed in Sec. A.5., INITIUM will be able to put new remarkable constraints in a WIMP-nucleon scattering parameter space still unexplored to these days, with sensitivity down to $\sim 10^{-42}$ - 10^{-43} cm² for Spin

Concludi con una dichiarazione forte sull'impatto a breve e lungo termine

measure the coherent scattering of neutrinos from the Sun and Supernovae. I firmly believe that INITIUM can start a new era for NITPC detectors in directional DM search, while giving me the chance to solidly establish my research team and line in Italy and worldwide.



ESEMPIO PRATICO – B2 – STATE OF THE ART AND OBJECTIVES

L'idea generale è di seguire la struttura della B1 senza ripeterla ma elaborandola dando dettagli sugli «statement» dati lì

A.2 DIRECT DARK MATTER SEARCHES: SCIENTIFIC AND EXPERIMENTAL BACKGROUND

Several astrophysical measurements (cosmic microwave background, cluster and galaxy rotations, lensing and Big Bang nucleosynthesis) indicate that the majority of the matter in the Universe is cold and dark (i.e. non-luminous and non-absorbing) [1]. All together these observations argue for the existence of at least one

A.2.1 Current status of direct DM searches

Figure 1 report the current status of the direct DM search, for SI (on the left) and SD proton (on the right) WIMP-nucleon coupling. Four preeminent features can be observed:

A.2.2 The case for directional DM searches with gaseous TPCs

The measurements of the rotation curve of our Galaxy suggest the presence of high concentrations of DM at the galactic radius of the Sun, although its exact distribution remains still highly unconstrained. A standard

A.3 DIRECTIONAL DARK MATTER EXPERIMENTAL STATE OF THE ART

The principal characteristics of all existing directional gaseous DM detectors are summarised together with INITIUM expected features in Table 1. The main experimental challenges of DM detectors aiming at

A.4 RECENT BREAKTHROUGHS IN TPCs FOR DIRECTIONAL DM SEARCHES

The experience of a decade of DRIFT operations, together with the advances of the experimental efforts described in Sec. A.3 and recent R&Ds progresses, generated several breakthroughs in these past years that

A.5 INITIUM DESIGN AND INNOVATION BEYOND THE STATE OF THE ART

For all the reasons discussed above, INITIUM goal is the development of an innovative approach towards large TPCs sensitive to the direction of nuclear recoils down to O(1) keV energy, based on optical readout

A.5.3 INITIUM expected performances and sensitivities for direct Dark Matter searches

I believe that detector approach described in Sec. A.5, supported by the recent breakthroughs discussed in Sec. A. 4. will make INITIUM one of the most sensitive DM detectors to both SI and SD couplings below 10

discutere il progetto nel contesto di tutti gli esperimenti DM, non solo sul DM direzionale

approfondire l'importanza e caratteristiche delle ricerche direzionali

elaborare su altri DM detectors con ulteriori dettagli

approfondire le scoperte recenti che supportano la fattibilità del progetto

approfondire la sfida/ aspetti non convenzionali del tuo progetto con una descrizione aggiuntiva dei tuoi lavori preliminari

discutere e motivare i vostri risultati attesi con studi/numeri preliminari



ESEMPIO PRATICO – B2 – Stato dell’arte - Impatto e visione

Dimostra come il tuo progetto potrebbe aprire nuove opportunità e scenari (anche oltre i 5 anni del progetto)

If some of our approaches are successful, we can expect within the next few years a **detailed understanding of.....**

The proposed project should provide a rich set of scientific data on X, which will suggest new research experiments in the area of X.

The expected result **will open a new research area/** ...can open up new perspectives for analyzing ...

The results are to drastically advance not only the fields of X systems and Y but also the current understanding of Z which is of **great importance far beyond the borders of...**



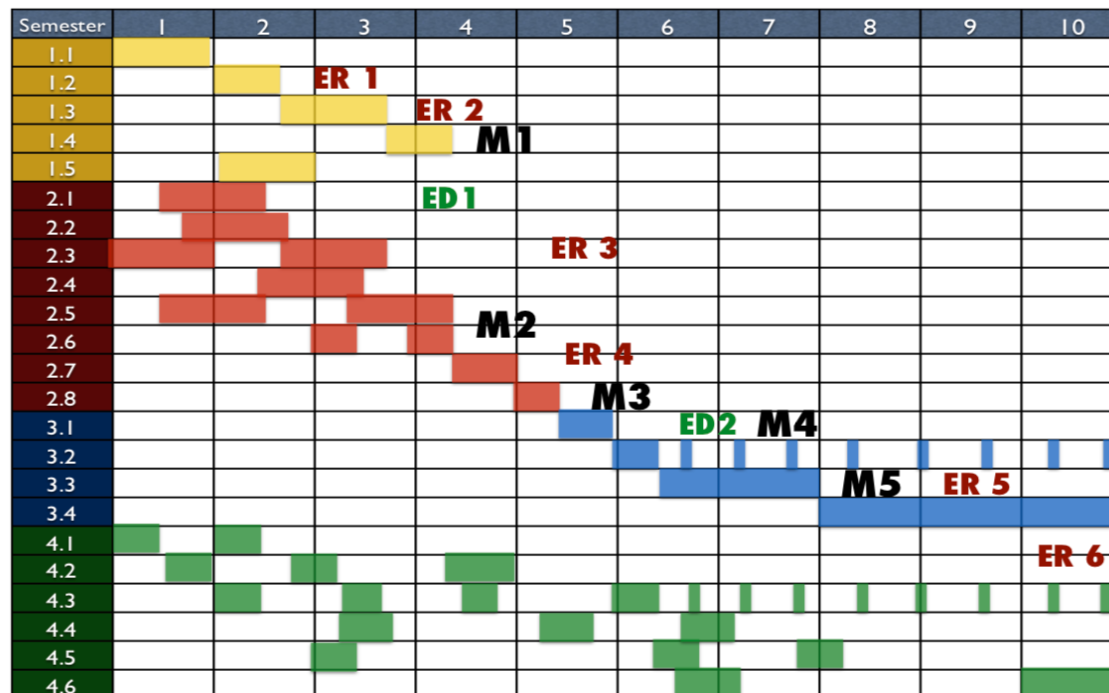
ESEMPIO PRATICO – B2 – METODOLOGIA

Consiglio di usare una gantt chart per presentare la pianificazione di WP, deliverable e milestones
Descrivi ogni WP, includendo attività, impatti e risultati attesi e i passi successivi

SECTION B: METHODOLOGY

B.1 INITIUM PROJECT IMPLEMENTATION

The INITIUM project will last 60 months and will be divided in four Working Packages (WPs), namely Prototype studies (WP I), Detector design optimisation, engineering and construction (WP II), Detector underground commissioning and physics run (WP III) and Data analysis, calibrations and simulation (WP IV). A detailed breakdown of the INITIUM time development is shown in Figure 4. The different expertise



ESEMPIO PRATICO – B2 – METODOLOGIA - Rischi

B.2 RISK ASSESSMENT

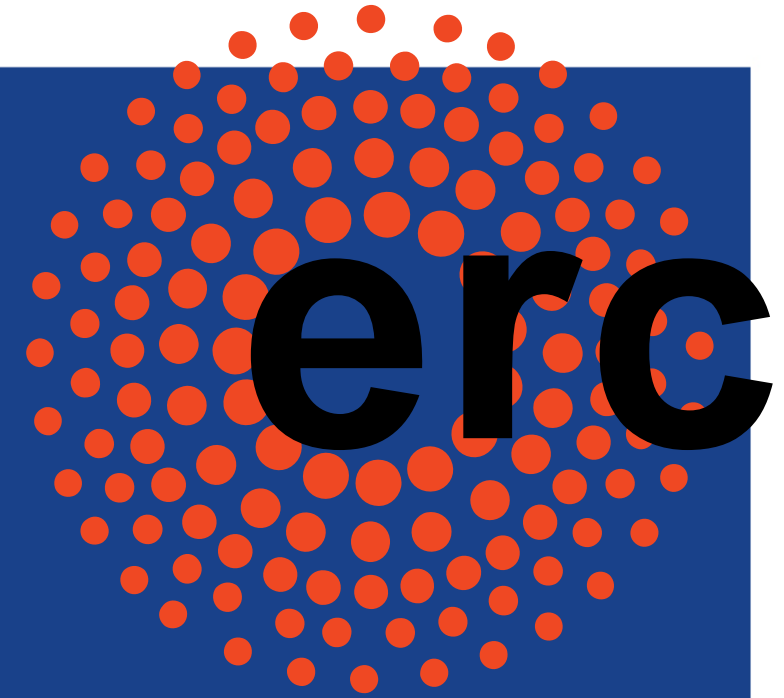
I believe that the proposed approach, combined with chosen institutions and research team, can mitigate the expected contingencies. The time devoted to the optical readout design and performances optimisation will allow us to sustain our final detector choices with experimental data in addition to simulations. The



APRE

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IL BUDGET





Template budget

Application forms

Proposal ID
Acronym **Acronym is mandatory**

3 - Budget

Beneficiary Short Name	PI	Senior Staff	Postdocs	Students	Other Personnel costs	A Total personnel costs/€	B Subcontracting Costs/€ (No indirect costs)	C.1 Travel and subsistence	C.2 Equipment - including major equipment	Consumables incl. fieldwork and animal costs	Publications (incl. Open Access fees) and dissemination	Other additional direct costs	C.3 Total other goods, works and services	Total Purchase costs/€	D. Internally invoiced goods and services/€ (No indirect costs)	E. Indirect Cost/€	Total Eligible Costs	Requested EU contribution /€
	0	0	0	0	0	0.00	0	0	0	0	0	0	0.00	0.00	0	0.00	0.00	0.00
Total	0	0	0	0	0	0.00	0	0	0	0	0	0	0.00	0.00	0	0.00	0.00	0.00

Application forms

Proposal ID
Acronym **Acronym is mandatory**

Section C. Resources (Maximum 8000 characters allowed)

This section and the budget table will be made available to the experts evaluating the proposal at Step 2. Important: your description of resources will be truncated once it exceeds the maximum allowed characters. Please make sure that your description is complete before submitting.

State and fully justify the amount of funding considered necessary to fulfil the objectives for the duration of the project. The project cost estimation should be as accurate as possible. The evaluation panels assess the estimated costs carefully; unjustified budgets will be consequently reduced. Please specify if you will use third parties giving in-kind contributions to the action.

If applicable, please specify the cost items covered by your 'Other personnel costs' category and the cost items covered by your 'Other additional direct costs' category.

Request for additional funding if applicable (All items MUST be included in the overall budget table above): (Cost in EUR)

Justification:





The online budget table

Application forms

Proposal ID

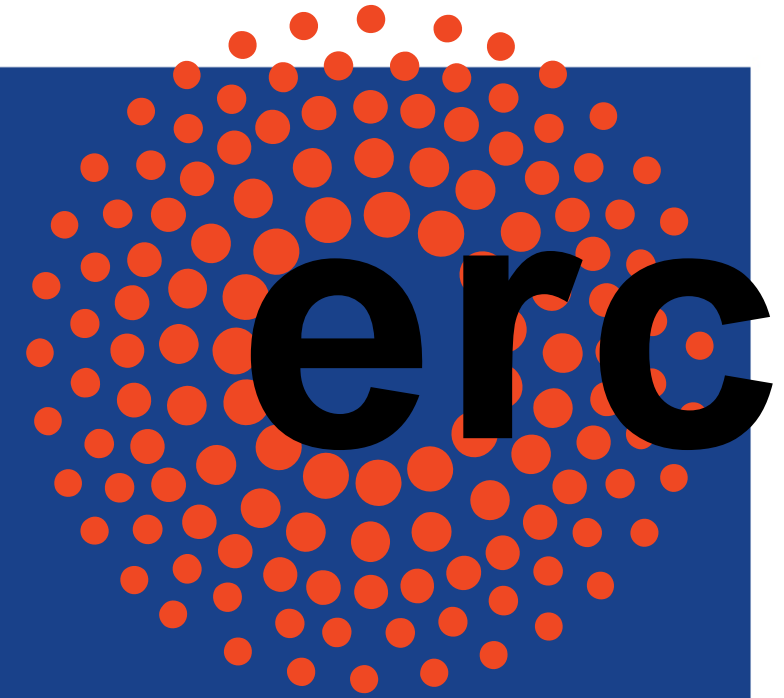
Acronym: **Acronym is mandatory**

3 - Budget ?

Beneficiary Short Name	PI	Senior Staff	Postdocs	Students	Other Personnel costs	A. Total personnel costs/€	B. Subcontracting Costs/€ (No indirect costs)	C.1 Travel and subsistence	C.2 Equipment - including major equipment	Consumables incl. fieldwork and animal costs	Publications (incl. Open Access fees) and dissemination	Other additional direct costs	C.3 Total other goods, works and services	Total Purchase costs/€	D. Internally invoiced goods and services/€ (No indirect costs)	E. Indirect Cost/€	Total Eligible Costs	Requested EU contribution /€
	0	0	0	0	0	0.00	0	0	0	0	0	0	0.00	0.00	0	0.00	0.00	0.00
Total	0	0	0	0	0	0.00	0	0	0	0	0	0	0.00	0.00	0	0.00	0.00	0.00

- Una riga di **budget** per beneficiary / additional beneficiary/affiliated entity

COMMENTI POSITIVI E NEGATIVI





5 motivi principali di non finanziamento

1. Progetto con uno scopo troppo «stretto» o troppo ampio
2. Ricerca incrementale
3. Sforzo collaborativo
4. Non abbastanza dettagliato
5. Strategia di gestione del rischio insufficiente (Quali sono le insidie concettuali e tecniche e cosa puoi fare al riguardo? La capacità di valutare il rischio e mitigarlo può essere ciò che separa una proposta superficiale da una buona. Scava in profondità – non dire solo che sei familiare con l'approccio, quindi non prevedi problemi o farai solo modifiche. Cosa accadrebbe se la tua ipotesi venisse smentita? C'è spesso un modo per presentare insidie che non minano la tua proposta ma dimostrano invece una grande cultura).



COMMENTI POSITIVI

EVALUATION EXAMPLES: GROUND-BREAKING?



- The project clearly **opens new** technological opportunities and challenges.
- High risk project but **novel and very exciting**
- The proposed research addresses **important challenges** in the field.
- The proposed research is **very original**

COMMENTI NEGATIVI

EVALUATION EXAMPLES: GROUND-BREAKING? (2)



- unfortunately rather conventional
- ...not really go beyond the state-of-the-art
- ...seems to be a continuation of ongoing projects with a lot of cruises and equipment but little additional staff.
- The state-of-the-art modeling approaches are not as bad as the proposer described.
- The realization of [...] is quite interesting and important for applications but it represents mainly a technological development



COMMENTI POSITIVI

EVALUATION EXAMPLES: CLEAR AND AMBITIOUS OBJECTIVES?



- It has clearly **very ambitious objectives** that, if reached, will go substantially beyond the current state-of-the-art. Indeed the methodology is well illustrated and the **intermediate tasks** are clearly described.
- To tackle this challenge the proposal is structured into five objectives. Each of these **objectives is described clearly and supported by evidence** from previous publications.
- A good balance between short, medium and long term objectives is maintained.
- the project is very clearly written, and delineates **a testable mechanistic hypothesis** concerning [X]

COMMENTI NEGATIVI

EVALUATION EXAMPLES: CLEAR AND AMBITIOUS OBJECTIVES? (2)



- It is a very important objective. However, a grant proposal should be explicit about the detailed tasks to be performed, with specific goals, with reference to previous works....
- The set of objectives does not go substantially beyond the current state of the art in the field.
- The [tools] would have a significant impact on [X] applications, but higher level research objectives are lacking



COMMENTI POSITIVI

EVALUATION EXAMPLES: FEASIBILITY



- the methodology is **very comprehensive** and appropriate for the project
- the outlined approach is highly feasible....it is **highly reflective about its own limitations and particular choices and research strategies.**
- the scientific project is **both doable and ambitious** at the same time.
- The work plan is cutting edge and has inherent risk. However, **this risk is legitimate and minimized** based on the PI's previous work.
- There is also a **good balance** of low risk/high risk tasks.

COMMENTI NEGATIVI

EVALUATION EXAMPLES: FEASIBILITY(2)



- ... methodology is not equally well developed with regard to all subprojects
- Some **specific examples (or application scenarios)** would help here
- ...However the panel felt that **more preliminary data** were needed to support the feasibility of the whole project, and in particular for the second WP.
- **No alternative approaches** are given, if....
- some of the sub-aims would have benefited from preliminary results or "plan B" strategies in order to evaluate their feasibility.



COMMENTI POSITIVI

EVALUATION EXAMPLES: IMPACT



- If granted, **very high impact** for biology, material science and structural chemistry...
- The new experimental set-up that is proposed is based on new and original ideas of the proponent and will be **undoubtedly of large impact for the community** of future users. This community will surely expand to transdisciplinary areas.
- *Potential impact:* The ideas behind the project are very unusual but make much sense, they may lead **to a breakthrough in the X field**.

COMMENTI NEGATIVI

EVALUATION EXAMPLES: IMPACT (2)



- doubts on the possible impact of the scientific results
- not clear how the results might impact on X
- no ground breaking expectations are visible



COMMENTI POSITIVI PI



- The PI has been recognized for her papers with **outstanding results demonstrating her level of independent thinking and originality**. She does not have a permanent position, thus the ERC grant would help.
- The PI has an excellent research background and **outstanding track record** with publications in **high-quality peer reviewed** journals as first or only author.
- It was also found that the scientific output of the PI is excellent and **very well fitted** to the aspects of the project.

The PI is experienced in many areas, but to-date her experience in detector development remains to be demonstrated.



COMMENTI NEGATIVI GENERALI

PROJECT OVERALL



- The proposal would have benefitted of **being better framed and focused**.
- It was noted by the panel that the project is **not clearly written; it lacks relevant background information** on X signaling and the **actual work plan is often unclear**. The panel noticed that the project is related to ongoing work conducted in the X lab, and it would be advisable to clearly indicate the particular research directions that will be **independently developed** by the applicant.



COMMENTI NEGATIVI GENERALI

The proposal is well written, but lacks the necessary details to judge the probability of success.

The proposed project is interesting and timely, but it seems to be mainly a continuation of what the applicant is already doing at the moment. It is unclear to what extent the concepts are really novel and innovative.

On the other hand, the panel felt that the PI failed to address key technical challenges which will surely impact the proposed workplan. The feasibility of the overall workplan was found difficult to assess given the lack of milestones and schedule.



COMMENTI POSITIVI SYNERGY

The panel appreciated the sheer scope of the project, the synergy and the value of combining so many powerful methods focused coherently on a single project of biological and pathological relevance.

All PIs are world-class scientists with exceptional CVs and ample evidence of innovative thinking in the last 10 years



COMMENTI POSITIVI SYNERGY

The project's adaptivity, teamwork and close communication in fundamental research together combine to make it potentially transformative in these timely, fundamental issues

Excitingly, this proposal is also planning [x] experiments that capture a level of complexity never tried before



LINK UTILI

- Progetti finanziati: <https://www.horizonteeuropa.es/propuestas-erc-exitosas-financiadas-y-en-abierto>
- Membri dei panel: https://erc.europa.eu/support/document-library/archive?f%5B0%5D=document_category%3A17



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