



ITN/ETN Project Details

Borut Paul Kersevan

Jozef Stefan Institute
and
Univ. of Ljubljana



Basics

- We want to submit a proposal to the MARIE SKŁODOWSKA-CURIE INNOVATIVE TRAINING NETWORKS call [H2020-MSCA-ITN-2019](#), with the aim of improving the knowledge base within the HEP community on new programming approaches and technologies it can be applied to.

TOPIC : Innovative Training Networks

Topic identifier: MSCA-ITN-2019
Publication date: 27 October 2017

Types of action: MSCA-ITN-ETN European Training Networks
MSCA-ITN-EJD European Joint Doctorates
MSCA-ITN-EID European Industrial Doctorates

DeadlineModel: single-stage
Opening date: 13 September 2018
Deadline: 15 January 2019 17:00:00
Time Zone : (Brussels time)

 Horizon 2020
Pillar: Excellent Science
Work Programme Year: H2020-2018-2020
Work Programme Part: [Marie Skłodowska-Curie actions](#)
Call : [H2020-MSCA-ITN-2019](#)

[H2020 website](#)

[Call budget overview](#)

Topic	Budget (EUR) - Year : 2019	Stages	Opening date	Deadline
MSCA-ITN-2019 - MSCA-ITN-ETN European Training Networks	400,000,000	single-stage	13 September 2018	15 January 2019



Basics cont'd

MSCA-ITN-2019: Innovative Training Networks

Objective: *The Innovative Training Networks (ITN) aim to train a new generation of creative, entrepreneurial and innovative early-stage researchers, able to face current and future challenges and to convert knowledge and ideas into products and services for economic and social benefit.*

ITN will raise excellence and structure research and doctoral training in Europe, extending the traditional academic research training setting, incorporating elements of Open Science and equipping researchers with the right combination of research-related and transferable competences. It will provide enhanced career perspectives in both the academic and non-academic sectors through international, interdisciplinary and intersectoral mobility combined with an innovation-oriented mind-set.

- For **ITN European Training Networks (ETN)**: the **consortium** must be composed of at least three **beneficiaries** established in three different EU Member States or Horizon 2020 Associated Countries. All three legal entities must be independent of each other.
- The maximum duration of the action for ETN is **48 months from the starting date set out in the grant agreement.**



Relevant definitions

- **The following definitions apply:**
 - **'Beneficiaries'** are legal entities that contribute directly to the implementation of the research training programme of the network **by recruiting, supervising, hosting and training researchers**. They may also provide secondment opportunities. **Beneficiaries are signatories to the Grant Agreement**, receive funding, claim costs, and take complete responsibility for the proper implementation of the proposed research training programme.
 - Regardless of their size, all beneficiaries must be able to **physically host at their premises**, provide all necessary infrastructure and equipment, and offer appropriate supervision to the recruited researchers.
 - **'Partner organisations'** contribute to the implementation of the action, but do not sign the grant agreement. Partner organisations may not employ the researchers under the action.
 - Partner organisations identified in the proposal must include a letter of commitment (with the proposal) to ensure their real and active participation in the network. (The contribution of any partner organisations for which no such evidence of commitment is submitted will not be taken into account during evaluation).
 - When partner organisations are involved, **beneficiaries are encouraged to sign a partnership agreement** with them (for the internal relationship between participating organisations). These partnership agreements must comply with the grant agreement.



Relevant definitions con't

- **The following definitions apply:**
 - **'Academic sector'** means public or private higher education establishments awarding academic degrees, public or private non-profit research institutes whose primary mission is to pursue research, and international European interest organisations (IEIO).

Regulation). Examples of IEIO include CERN and EMBL. All members of *EIROForum* are considered international European interest organisations.

- **'Non-academic sector'** means any socio-economic actor not included in the academic sector and fulfilling the requirements of the Horizon 2020 Rules for Participation. This includes all fields of future workplaces of researchers, from industry to business, government, civil society organisations, cultural institutions, hospitals, etc.

ITN aims to improve the employability of researchers through exposure to organisations in the academic and non-academic sectors, thereby broadening the traditional academic research training setting and eliminating cultural and other barriers to mobility. **An essential part of any ITN is therefore the involvement of organisations from different sectors.** For EID, note that the participation of the non-academic sector as a beneficiary is an eligibility criterion.



Supervisory Board

- Each action must have a clearly identified **Supervisory Board** co-ordinating the network-wide training activities.
- **Composition:**

The Supervisory Board will be composed of representatives of all beneficiaries and partner organisations and may also include any other stakeholders of relevance to the research training programme, including those from the non-academic sector. An appropriate gender balance should be respected in the board's composition. It is also considered best practice to include a representative from among the recruited ESRs.
- **Tasks:**
 - The board will oversee the quality of the programme and ensure an adequate balance between scientific/technological and transferable skills training. This shall be achieved through personalised research projects and training, appropriate to the needs of each recruited researcher.
 - Involvement of the non-academic sector in the supervisory board aims to ensure that the skills acquired by researchers fulfil the needs of both academia and the non-academic sector and enhance the inter-sectoral employability of the researchers.
 - The Supervisory Board will also establish an active and continuous communication and exchange of best practice among the participating organisations to maximise the benefits of the partnership.
 - Finally, it will also oversee the quality and quantity of supervision of the ESRs.



Evaluation criteria

ITN: Marie Skłodowska-Curie Innovative Training Networks		
Excellence	Impact	Quality and efficiency of the implementation
Quality, innovative aspects and credibility of the research programme (including inter/multidisciplinary, intersectoral and, where appropriate, gender aspects)	Enhancing the career prospects and employability of researchers and contribution to their skills development	Coherence and effectiveness of the work plan , including appropriateness of the allocation of tasks and resources , (including awarding of the doctoral degrees for <i>EID</i> and <i>EJD</i> projects)
Quality and innovative aspects of the training programme (including transferable skills, inter/multidisciplinary, intersectoral and, where appropriate, gender aspects)	Contribution to structuring doctoral / early-stage research training at the European level and to strengthening European innovation capacity , including the potential for: a) meaningful contribution of the non-academic sector to the doctoral/research training, as appropriate to the implementation mode and research field b) developing sustainable joint doctoral degree structures (for <i>EJD</i> projects only)	Appropriateness of the management structures and procedures , including quality management and risk management (with a mandatory joint governing structure for <i>EID</i> and <i>EJD</i> projects)
Quality of the supervision (including mandatory joint supervision for <i>EID</i> and <i>EJD</i> projects)	Quality of the proposed measures to exploit and disseminate the project results	Appropriateness of the infrastructure of the participating organisations
Quality of the proposed interaction between the participating organisations	Quality of the proposed measures to communicate the project activities to different target audiences	Competences, experience and complementarity of the participating organisations and their commitment to the programme
50%	30%	20%
Weighting		
1	2	3
Priority in case of ex aequo		

Evaluation rules for Marie Skłodowska-Curie actions

Award criteria, scores and weighting

1. Proposals will be evaluated by experts, on the basis of the **award criteria** 'excellence', 'impact' and 'quality and efficiency of the implementation' (see Article 15 of the Horizon 2020 Rules for Participation Regulation No 1290/2013).

The aspects to be considered in each case and the **weighting** depend on the type of Marie Skłodowska-Curie action as set out in the tables below.

2. Evaluation **scores** will be awarded for each of the criteria, and not their individual elements. Each criterion will be scored from 0 to 5. Scores with a resolution of one decimal place may be awarded. The total score will be subject to a threshold of 70%.

3. If necessary, the panel will determine a **priority order** for proposals which have been awarded the same score within a ranked list. When the total scores are equal, priority will be based on scores for individual award criteria. For each action the priority order of the criteria is detailed in the tables below.

If necessary, any further prioritisation will be based on other appropriate characteristics, to be decided by the panel, related to the contribution of the proposal to the European Research Area (ERA) and/or general objectives mentioned in the work programme (e.g. intersectoral mobility, international co-operation, favourable employment and working conditions).

Whether or not such a prioritisation is carried out will depend on the available budget or other call conditions.

Publication of call	13 September 2018
Deadline for submission of proposals	15 January 2019 at 17:00:00, Brussels local time
Evaluation of proposals	February-April 2019
Information on the outcome of the evaluation	June 2019
Indicative date for the signing of Grant Agreements	September 2019



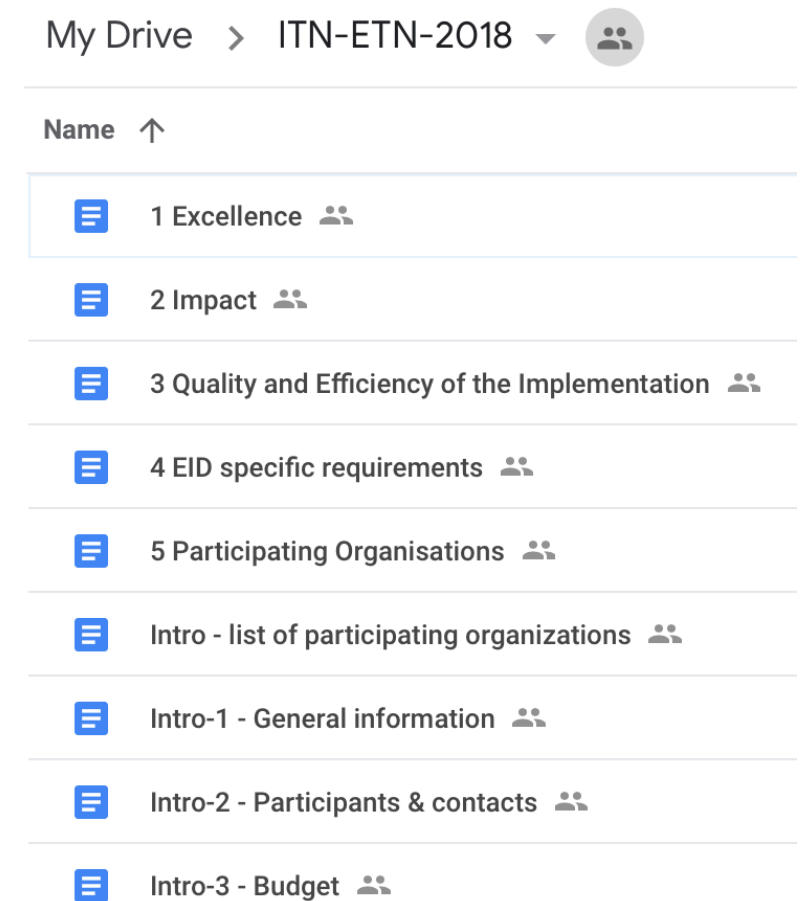
Required paperwork

- **Proposal:** The maximum length of a proposal is 30 pages, excluding the annexes ([link](#)).
 - Seems short by EU standards but needs to be well written!
 - We need to ‘tick’ all the boxes for evaluation as well as we can.
 - We need to discuss the workpackages and the work division (later).
 - **It is imperative to have a draft text very soon, considering the deadline of 15th of January!**

There is a Guide for applicants available ([link](#)) , please read!

- **Consortium agreement:** Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.
 - Thus, we should keep it in mind (**Need to worry when we win**).

I prepared GDocs placeholders for proposal sections ([link](#))!





Invited beneficiaries

- We invited the following beneficiaries ('nodes' in older nomenclature) for consortium, the listed order is arbitrary.
 1. CERN (CH) - IT, EP-SFT, Openlab
 2. INFN (IT)
 3. Sheffield U. (UK)
 4. Imperial C. (UK)
 5. Karlsruhe (DE)
 6. LAL/GRIF (FR)
 7. PIC (ES)
 8. Oslo U. (NO)
 9. University of Ljubljana (SI)
 10. **Non-academic (company)**



Partner organisations

2.2 Partner Organisations

Partner organisations complement the research training programme but **do not recruit any researchers**. They provide additional research and transferable skills training and/or secondment opportunities. They can also deliver the doctoral degree (EID, ETN and EJD⁸ modes). Partner organisations can be academic or non-academic organisations, located in any country. **They are not signatories to the Grant Agreement**. When partner organisations are involved, beneficiaries are encouraged to include them in the consortium/partnership agreement (for the internal relationship between participating organisations).

Partner organisations **cannot directly claim any costs**. Instead, the costs they incur for activities in the research training programme are to be covered by the unit costs paid to the beneficiaries.

- We need a well-balanced supervisory board. Here, partner organisations can play an essential role:
 - We have sent invites to potential industry partners (so far, advised by OpenLab: E4, Google, Nvidia, Intel, IBM). **We will consider an eligible one as beneficiary (if they agree)**.
 - We have sent invites to our US colleagues, who have very promising projects (e.g. IRIS-HEP), which can complement our activities and align our goals within experiments.
 - LBNL, MIT, Princeton, Washington U.

Each programme should have a clearly identified supervisory board co-ordinating network-wide training and establishing active and continuous communication and exchange of best practice among the participating organisations to maximise the benefits of the partnership.

Project name and acronym



- We need to figure out a name and an acronym, obviously...
- An idea: Bleeding Edge Software Technologies for HEP: BEST4HEP ?
- Other ideas?



What can we ask for ?

- In terms of funding, the MC ITN/ETN funds, the overall EU contribution for ITN actions is limited to a maximum of 540 person-months. **This translates to 15 Ph.D. students for 3 years (or about 4 M EUR, see later).**
- **Details on recruitment:**
 - ITN researchers must be **early-stage researchers (ESR)**, i.e. at the date of recruitment be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree.
 - Recruitment duration: **3-36 months.**
 - Researchers must comply with the **mobility rule:**
 - Researchers may not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the three years immediately before the reference date of recruitment
 - For 'international European interest organisations', 'international organisations', the EU's Joint Research Centre (JRC) or an 'entity created under Union law', the researchers may not have spent more than 12 months in the three years immediately before the call deadline/recruitment, in the same appointing organisation.
- **Secondments** are possible for up to 30% of the fellowship duration. Secondments in ITN of six months or less which require mobility from the place of residence must be financed using the Research, Training and Networking costs in order to prevent an unreasonable financial burden for the early-stage researchers.



What can we ask for: cont'd

- **All** beneficiaries are required to host at their premises and supervise recruited researchers, or use entities with a legal or capital link to host and supervise them. **For ETN, all beneficiaries must recruit at least one researcher.**
- Not more than 40.0% of the requested EU contribution may be allocated to beneficiaries in the same country or to any one international European interest organisation or international organisation (except for EID with only two beneficiaries).
- **Proposal:** This could translate into the following table in PM (sum = 540 = 36*15)
 1. CERN (CH) - IT, EP-SFT, Openlab (72)
 2. INFN (IT) (72)
 3. Sheffield U. (UK) (36)
 4. Imperial C. (UK) (36)
 5. Karlsruhe (DE) (72)
 6. LAL/GRIF (FR) (72)
 7. PIC (ES) (72)
 8. Oslo U. (NO) (36)
 9. University of Ljubljana (SI) (36)
 10. **Non-academic (36)**



Details on recruitment, cont'd

- **The yearly reference rates for calculating the living allowance of researchers recruited under an employment contract/equivalent direct contract are:**

- for early-stage researchers (ITN): **39 240/year (a country coefficient applies)**

The above amounts include all compulsory deductions under national legislation. Rates for individual countries are obtained by applying the country correction coefficients of table 2 (next slides).

- The beneficiary must pay to the recruited researchers at least the reference allowances (minus all compulsory deductions under national legislation in the context of the project). A top-up may be paid to the researchers in order to complement this contribution.



Details on recruitment, cont'd

- The beneficiary must recruit each eligible researcher under an **employment contract or 'equivalent direct contract' with full social security coverage** (including sickness, parental, unemployment and invalidity benefits, pension rights, benefits in respect of accidents at work and occupational diseases) except where national legislation or the equivalent internal regulations of IEIOs, the EU's Joint Research Centre (JRC), an 'entity created under Union law' or an international organisation, prohibit this possibility.
- When an **employment contract cannot be provided, the beneficiary must recruit the researcher under a 'fixed-amount fellowship'**. In this case, the **living allowance will be halved** and the beneficiary must ensure that the researcher enjoys minimum social security coverage.
 - **In fact, I need to figure out what this means in practice...**



Related tables

Table 1: EU contribution [in EUR]

Marie Skłodowska-Curie Action	Researcher unit cost person/month			Institutional unit cost person/month	
	Living allowance*	Mobility allowance	Family allowance	Research, training and networking costs	Management and indirect costs
Innovative Training Networks	3270	600	500	1 800	1 200
Individual Fellowships	4880	600	500	800	650

* A country correction coefficient applies to the living allowance. This coefficient is the one applicable to the country of the beneficiary, as listed in Table 2. The only exception are IF Global Fellowships with two different country correction coefficients:

- for the outgoing phase: the coefficient of the country where the researcher is hosted (i.e. the country of the partner organisation)
- for the return phase: the coefficient of the country where the researcher returns to (i.e. the country of the beneficiary).

- With no correction factors: $540 \cdot (3270 + 600 + 1800 + 1200) = 3,709,800$ EUR (**3,7 MEUR**)



Related tables

Table 2: Country correction coefficients (CCC) for ITN and IF living allowances

For countries where the correction coefficient is not indicated, the Commission will decide on a case-by-case basis.

Country Code ⁴⁷	CCC
EU Member States	
AT	106.7%
BE	100.0%
BG	62.0%
CY	82.6%
CZ	81.78%
DE	97.0%
DK	135.0%
EE	79.4%
EL	88.7%
ES	95.4%
FI	120.8%
FR	115.7%
HR	83.9%
HU	77.4%
IE	115.6%
IT	104.4%
LT	72.5%
LU	100.0%
LV	77.7%
MT	84.4%
NL	107.9%
PL	75.5%
PT	84.2%
RO	68.8%
SE	121.8%
SI	86.1%
SK	80.4%
UK	139.8%
Horizon 2020 Associated Countries	
AL	65.3%
AM	75.4%
BA	69.0%
CH	121.2%
FO	135.0%
GE	75.3%
IL	106.1%
IS	115.3%
MD	62.01%
ME	64.8%
MK	60.0%
NO	130.6%
RS	67.3%
TN	67.5%
TR	82.1%
UA	70.8%
Third Countries	
AE	91.5%
AO	128.1%
AR	65.6%
AU	104.4%
AZ	88.3%
BB	112.5%
BD	61.1%
BF	96.6%
BI	74.2%
BJ	97.0%
BM	151.5%
BO	67.5%
BR	97.9%
BW	51.7%
BY	59.5%
BZ	77.0%
CA	87.8%
CD	137.4%
CF	108.6%
CG	120.6%
CI	98.3%
CL	58.9%
CM	96.0%
CN	91.7%
CO	77.9%
CR	82.1%
CU	78.6%
CV	71.7%
DJ	86.5%
DO	62.9%
DZ	74.0%
EC	75.5%
EG	57.9%
ER	98.9%
ET	85.1%
FJ	68.1%
GA	107.8%
GH	64.1%
GM	69.0%
GN	73.7%
GT	82.6%
GW	96.6%
GY	62.2%
HK	100.4%
HN	73.4%
HT	94.6%
ID	69.8%
IN	63.4%
JM	92.0%
JO	86.5%
JP	105.5%
KE	81.5%
KG	80.3%
KH	74.5%
KM	69.1%
KR	97.6%
KZ	81.9%
LA	89.2%
LB	86.3%
LI	121.2%
LK	69.9%

⁴⁷ [ISO 3166 alpha-2](#), except for Greece and the United Kingdom (EL and UK used respectively instead of GR and GB).



Summary table

Overview Table

		ETN
BENEFICIARY (IES)	Minimum Number of beneficiaries	3
	Minimum MS or AC	3
	Academic sector	No restrictions
	Non-academic sector	No restrictions
	Max no. of person months	540
	Max 40.0% budget for 1 country	Mandatory
Beneficiary (or partner organisation) awarding PhD		Optional
Joint award of PhD		Optional
Joint degree – letter of institutional commitment		N/A
Joint supervision for ESRs		Encouraged
ESRs enrolment in the PhD		Optional
Inter-sectoral mobility must be international		Optional
Secondments: international, inter-sectoral, interdisciplinary		≤ 30%
Partner Organisation: Letter of Commitment		
Ranking lists		8 (Scientific) panels
Budget		€400 mn



Networking activities

- Networks will establish or strengthen the collaboration between the research teams, as well as between themselves and the wider scientific community, including through the use of the internet and social media.
- **Each network will be expected to organise workshops, seminars, summer schools, etc.** which should be directly related to the research training programme of the network. The content and quality of such events should be **detailed and fully justified** in the proposal. Networking activities could further include:
 - Organisation of scientific network meetings;
 - Visits and secondments between participating organisations in order to exchange knowledge;
 - Invitation of external experts for specialist input;
 - Attendance of the recruited researchers at international conferences and workshops;
 - Collaboration with other ITNs or research groups;
 - Organisation of a final network conference.
- Training events offered within the network may also be opened to **external** researchers. Note, however, that costs for external researchers cannot be funded under the action.



Workpackages

- We prepared a list of tentative workpackages with short descriptions:
 - WP 1: Accelerators
 - WP 2: Algorithms
 - WP 3: Hybrid data processing frameworks
 - WP 4: Training and Dissemination, Outreach
 - WP 5: Management
- We need to specify them in detail, define participants, objectives, deliverables etc ..

WP Number		Start Month – End Month
WP Title	<i>(e.g. including Research, Training, Management, Communication and Dissemination...)</i>	
Lead Beneficiary		
Objectives		
Description of Work and Role of Specific Beneficiaries / Partner Organisations <i>(possibly broken down into tasks), indicating lead participant and role of other participating organisations</i>		
Description of Deliverables <i>(brief description and month of delivery)</i>		

WP 1: Accelerators



- We have to develop and disseminate a knowledge-base about the optimal accelerator (e.g., Nvidia GPU/Tesla, FPGAs, [CSAs](#) , TPUs etc..) programming and software workflows to be employed in the next generation of HEP software. The crucial aspect are the investigations of applicability of accelerators to HEP computational problems, i.e. where the use of such accelerators would represent an advantage and what would be the cost of using them in terms of changes in the software paradigms, integration, deployment, etc.

WP 2: Algorithms



- Developing advanced and innovative algorithms (e.g. machine learning, CUDA, ..) on modern computing platforms for various kinds of HEP workflows and tasks, from simulation to data reconstruction, job brokering and data placement, in synergy with the existing initiatives and projects, EU and world-wide.



WP 3: Hybrid data processing frameworks

- There is a clear need for new software solutions, by using existing technologies and tools, improving on them or developing new creative approaches, that can efficiently connect leadership (Exascale) HPC computing facilities and future computing solutions with large scale scientific data stores and software repositories in order to process (or simulate) HEP data. This encompasses diverse aspects, from the need to develop HEP software processing frameworks that can exploit heterogeneous computing architectures in a robust manner to implementing adequate edge services (a minimally intrusive service placed at the periphery of the HPC system, that can also provide a link between external and HPC internal processes).



WP 4: Training and Dissemination, Outreach

Need to have a very concrete and detailed plan of schools , curriculum, deliverables as documentation & self-learning methods...

- In the most probable HL-LHC computing scenarios, developers/physicists will need to confront technologies different from what they have been exposed to up to Run 3. Modern accelerators, GPUs, FPGAs, Quantum Computing or even unexpected technologies are most probably going to be a part of the computing scenario; this needs a long range program on training, introduction to the new platforms, access to either emulators or early systems, using knowledge inside and outside the HEP community. Even sticking to more standard technologies, we cannot forget that C++ and Python are evolving programming paradigms, and a continuous program of training is needed to be able and confront with C++17, multi threading technologies, access to modern software libraries.