

BEST PRACTICES IN DOCTORAL TRAINING THROUGH THE MARIE SKŁODOWSKA CURIE ACTIONS

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Abstract: The article presents the features and structure of the Marie Skłodowska-Curie Actions (MSCA), a key European Union programme that supports researcher mobility, training, and career development. It highlights the objectives, funding mechanisms, and strategic importance of MSCA within the broader Horizon 2020 framework (2014–2020). The article also showcases best practices and successful examples of participation from Uzbekistan, including the involvement of Uzbek researchers and institutions. Specific cases illustrate how MSCA projects have contributed to international collaboration and capacity building in Uzbekistan's scientific community.

Key words: research, innovation, doctoral students, fellowships, career prospects.

Although Europe hosts a large and diversified pool of skilled human resources for research and innovation, it needs to be constantly replenished, improved, and adapted to the rapidly evolving needs of the labour market, and that's exactly the mission of the Marie Skłodowska-Curie Actions (MSCA).

With a budget of 6,6 Bn€ for the period 2021-27, the Marie Skłodowska Curie Actions is the research and training programme that supports the career, skills development, and mobility of researchers at all stages of their careers and from all over the world. The MSCA does this through excellent doctoral networks (half of MSCA budget), post-doctoral fellowships, and R&I staff exchanges with a focus on international, inter-sectoral (between academic and non-academic organisations) and inter-disciplinary cooperation. The MSCA also funds science communication events such as the European Researchers' Night and Researchers at schools.

The programme funds bottom-up research in all fields based on scientific excellence and competitive funding. It is open to both academic and non-academic organisations and to excellent researchers from all over the world. It is expected that 65,000 of them will have participated in MSCA by 2021-27.

1) What are the ingredients of MSCA Doctoral Networks' success?

Launched in 1990, the MSCA programme has evolved into a widely recognised EU programme which focuses on training, transferable skills and researchers' career development, openness to the world, to all fields of research (bottom-up approach), structural impact on participating organisations, emphasis on intersectoral collaboration and insistence on providing attractive and fair employment conditions. Inter-sectoral cooperation is notably promoted through financial incentives in different actions. Researchers are also offered possibilities for multiple **secondments** in any organisation worldwide during their fellowship period.

MSCA Doctoral Networks (MSCA DN) are the biggest action of the programme (half of its budget) and are implemented by consortia of institutions that submit proposals together and, if successful receive up to 15 fellowships for three years each, to recruit doctoral fellows (through open and transparent recruitment with vacancies published on EURAXESS, the European research portal) in line with their project objectives. By doing so, MSCA-DNs create structural links among institutions in consortia that usually include both the academic and non-academic sectors (on average around 10 different organisations). Funding is also provided for the training and networking of doctoral candidates, for equipment and consortia's management costs.

In addition to the standard DNs, there are two strategic types of DNs, namely, the MSCA Joint Doctorates (JD) and Industrial Doctorates (ID).

- Consortia selected to implement **Joint Doctorates** must establish joint operational procedures for the recruitment, admission, supervision, and evaluation of doctoral candidates, that will lead to the award of joint, double or multiple doctoral degree. This represents a highly integrated type of cooperation which acts as catalyst for structuring collaboration among higher education institutions.

- MSCA **Industrial Doctorates** are implemented by partnerships of universities, research institutions and infrastructures, industry, SMEs and other socio-economic actors. Their objective is to promote inter-sectoral collaboration in doctoral training in Europe and beyond. To achieve this, doctoral candidates are co-supervised by supervisors from both sectors and must spend at least 50% of their time in the non-academic sector. This allows academic partners to become more tuned to the market dynamics and more capable of attracting talents and gaining more international visibility. The non-academic partners get access to top research talents and tap into a wealth of academic knowledge and know-how. Doctoral fellows get the best of both worlds and become a natural choice for future employers.

The selected consortia implementing MSCA DNs offer to their doctoral candidates opportunities to develop their **transferrable skills**, that will allow them to move from academic to non-academic careers, as researchers need to acquire skills beyond those they use to perform their academic work. Within academia, researchers need more than scientific and technical skills to be effective: to raise funds, to manage a team, to interact with society, to communicate the result of their research, and to work with administrations, they also need management, communication, entrepreneurship skills, knowledge of intellectual property rights, artificial intelligence and negotiation skills, etc. Developing all these competences is an essential part of MSCA's mission and allows the acquisition of new skills adapted to Europe's highly competitive research environment and increasingly demanding requirements in terms of individual excellence and autonomy. MSCA provides researchers with the necessary skills to match the future needs of the labour market, to innovate and to convert knowledge into products and services.

“The Marie Skłodowska-Curie Actions were crucial at the beginning of my career in Sweden. [...] Receiving support from MSCA to train and supervise

doctoral and postdoctoral fellows within a network was very important for me. [...] I think the MSCA have helped a lot to increase networking and communication among research actors.” [1]

The programme therefore contributes to **improving the career prospects** of researchers as more than 80% MSCA fellows and participating organisations state that MSCA’s support contributes to better career prospects to a very large or large extent.

By setting standards in terms of **high-quality supervision and mentorship**, MSCA incentivises participating organisations to develop individual **career development plans** for researchers and to provide access to career advice. The programme offers stable and **appealing working conditions** (attractive salaries, mobility and family allowances), allowing researchers to fully concentrate on their research and the development of new skills. They are recruited under an employment contract with full social security coverage (including sickness, parental, unemployment benefits, pension rights).

Organisations and researchers have the obligation to implement the principles of the **European Charter for Researchers**, which is a set of principles underpinning the development of attractive research careers. The focus of the Charter lies in the rights and responsibilities of researchers, employers, funders and policy makers; it consists of the following key principles: ethics, integrity, gender, open science; researchers’ assessment, recruitment and progression; working conditions and practices; research careers and talent development.

The MSCA also makes a notable contribution to the **reform of research assessment** systems, promoting a broad definition of excellence and diverse career paths, in line with the European Commission’s commitment to the process initiated by the COARA (Coalition for Advancing Research Assessment).

“When I needed it most, the MSCA empowered me with my most precious core value – ‘courage’. My Marie Curie grant for example served as a vital resource for my newly established independent research lab at Boğaziçi University. Being the first researcher with a Marie Curie reintegration grant project funded in Türkiye, not only marked a significant milestone in my career and research, but also served as an inspiration for future researchers.” [2]

2) Beyond an impact on individual researchers

The MSCA programme goes beyond the positive impact on individual researchers: it has a strong institutional dimension, notably through the development of large doctoral networks and partnerships between academic and non-academic organisations. By putting a great emphasis on interdisciplinary and inter-sectoral collaboration, it is instrumental for the mobility and dialogue between universities and industry, and other non-academic partners, offering the right instruments for them to cooperate.

The MSCA has long-lasting effects at organisational level by strengthening the quality and content of the training offered and enhancing the international visibility and attractiveness of the organisations involved in the programme. In addition, participation in MSCA projects leads to improved recruitment practices

and working conditions for researchers, as well as a more attractive, supportive, and inclusive research environment, in line with the principles outlined in the European Charter for Researchers.

A [recent study](#) [3] confirmed that the doctoral programmes funded by MSCA lead to excellent research and innovation and demonstrated that the basic features of their setup (e.g. social innovation, networking opportunities, innovative training, synergies, etc...) create the appropriate research environment leading to more innovation. The incentives provided by MSCA to foster joint training programmes with the industry are leading to tangible **innovation outputs, including patents** in fields such as pharmacology, nanosciences and physics.

3) Fostering international collaborative research and innovation

MSCA is open to researchers from all over the world and is by far the most international part of the EU Framework Programme for Research and Innovation, with almost 40% of its researchers being non-EU nationals and accounting alone for half of the total participation of third country organisations in Horizon Europe. The Actions continue to shine through their remarkably strong international dimension and are praised as highly effective in providing transnational mobility opportunities for researchers.

4) Involvement of researchers and institutions from Uzbekistan in MSCA

A few organisations from Uzbekistan have been active in MSCA, through its Staff Exchange action (see below), which is often considered as the entry point to the programme. It allows research teams from different countries in the world to jointly work on R&I projects and receive funding to cover the costs of secondments abroad. No organisation from Uzbekistan has so far been involved in MSCA Doctoral Networks despite the strategic dimension of this action, as described above. Organisations from Uzbekistan (academic and non-academic) are eligible to apply for Doctoral Networks as part of international consortia, can receive funding and recruit doctoral candidates or host researchers during their secondment periods.

Uzbekistan's participation in Horizon 2020 (2014-2020)

During Horizon 2020 (2014-2020), 46 researchers from Uzbekistan were involved in the MSCA projects, most of them under the RISE action (now the Staff Exchanges action) (35), followed by Innovative Training Networks (now Doctoral Networks) (7), COFUND (2) and Individual Fellowships for postdoctoral researchers (2). Most of the researchers participated in projects in Sweden (10), Portugal (7), Latvia (6) and Uzbekistan (6). 22 researchers were funded to undertake research in Uzbekistan, coming mainly from Türkiye (7), Uzbekistan (6), Ukraine (5) and Italy (2).

9 organisations (including one from the non-academic sector) participated in 7 projects, all of which were RISE projects (now called “Staff Exchange” projects).

Two examples of RISE projects involving organisations from Uzbekistan:

- Hydro4U - Hydropower For You - Sustainable small-scale hydropower in Central Asia (2021-2026)

Big plans for Europe's small-scale hydropower technology

Small-scale hydropower (SHP) has been used to generate electricity since the end of the 19th century. Usually installed in small rivers or streams, it is versatile, cost-efficient, and has minimal impact on wildlife and ecosystems. Despite considerable potential to satisfy unmet electricity demand, SHP is not extensively exploited in Central Asia. The EU-funded Hydro4U project will adapt European SHP technologies to meet Central Asia's needs. Specifically, it will install and assess two demo plants with reduced planning and construction costs that do not compromise efficiency. The overall aim is to find innovative solutions that are fit-for-purpose and to demonstrate EU quality standards and create entry points in developing markets for the entire European SHP industry.

- SSHARE - Self-sufficient humidity to electricity Innovative Radiant Adsorption System Toward Net Zero Energy Buildings (2019-2023)

European technology and creativity for net-zero buildings

Amid rising energy prices, energy independence, and the impact of climate change, buildings are the primary consumers of energy. This underscores the importance net-zero buildings that produce as much energy as it uses over the course of a year. The EU-funded SSHARE project aims to develop innovative envelopes for buildings aimed at net zero energy, contributing significantly to European technology and creativity. Envelope is a combination of two technologies that cool or heat the building depending on the time of year using only atmospheric humidity as both thermal and electric energy supply.

Uzbekistan's participation in Horizon Europe (2021-2027)

In Horizon Europe, 12 **organisations** from Uzbekistan are participating in 7 projects, all of which Staff Exchanges. The organisations mainly come from the academic sector (higher education establishments and research organisations), but the public and private sector are also represented. The selected projects are in the areas of social sciences (3), Economics (2), Life sciences and Chemistry (one each).

Currently 46 **researchers** from Uzbekistan are participating in MSCA, 43 in Staff Exchanges, one in COFUND (co-funded programmes) and two in Doctoral Networks (one standard, one industrial). In terms of researchers' profiles, 18 are postdoctoral fellows, 8 doctoral candidates and the rest administrative and managerial staff (16 and 4 respectively). Top hosting countries for the researchers are Sweden (19), Türkiye (13) and Uzbekistan (6). Gender ratio is 63% male and 37% female participants.

Three project examples under Horizon Europe:

- MOCCA - Multilevel Orders of Corruption in Central Asia (2023-2026)

[3]

Contributing to anti-corruption programmes and efforts in Central Asia

There is no such thing as a universal cure or even a quick-fix for corruption – a disease that can be particularly devastating for global economies. In light of the

limited success of global anti-corruption initiatives, there has been a growing call to rethink the existing approaches, arguing for the necessity to develop new approaches and solutions. With the support of the Marie Skłodowska-Curie Actions programme, the MOCCA project will contribute to the global and national efforts to understand and counteract corruption. Specifically, it will study the multilevel orders of corruption in five countries in post-Soviet Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). The findings will benefit EU-based political and economic actors interested or working in Central Asia.

Participating:

- GENERAL PROSECUTOR'S OFFICE OF THE REPUBLIC OF UZBEKISTAN

- KURULTAI PE

- Commissioner for Protection of Rights and Legitimate Interests of Entrepreneurs under the President of the Republic of Uzbekistan

- TOSHKENT DAVLAT IQTISODIYOT UNIVERSITETI

- TOSHKENT SHAHRIDAGI XALQARO WESTMINSTER UNIVERSITETI

- **CARSI - Caucasus and Central Asia Research on Social Innovation: Development Assistance, Innovation and Societal Transformation (2023-2027)**

[4]

A closer look at the EU's approach to the Caucasus and central Asian regions

The Caucasus and central Asian regions boast some large reservoirs of natural resources. They are also fertile markets with links to Europe. With the support of Marie Skłodowska-Curie Actions, the CARSI project will explore the uniqueness of the EU's approach compared to that of other countries like China and India. Most notably, the EU's interest is not only in technical innovation and local market shares but also the regions' social and human development. In this context, the project will develop a research programme bringing together institutions across two continents with a focus on the Caucasus and Central Asia. The aim is to train fellows and eventually produce new empirical evidence on the region.

Participating:

- TOSHKENT DAVLAT YURIDIK UNIVERSITET

- TOSHKENT DAVLAT IQTISODIYOT UNIVERSITETI

- **Non-Western Migration Regimes in a Global Perspective (2024-2028)**

[5]

Understanding migration towards non-Western destinations

The latest World Migration Report reveals that, in 2020, 12 of the top 20 destinations for international migrants were non-Western countries. Despite this shift, mainstream literature predominantly concentrates on the experiences and policies of migrants in Western liberal democracies, leading to a noticeable gap in the representation of major non-Western migration destinations in current migration studies. To address this, the MSCA-funded MARS project aims to

enhance global, regional, and national comprehension of migration governance. The project will undertake research and implement a staff exchange programme focusing on non-Western migration regimes. It aims to gather empirical data, contribute to relevant theoretical debates, develop innovative approaches, translate research findings into policy-relevant formats, and enhance migration governance practices.

Participating:

- KURULTAI PE
- GENERAL PROSECUTOR'S OFFICE OF THE REPUBLIC OF UZBEKISTAN
- VATANDOSHLAR JAMOAT FONDI
- THE AGENCY OF EXTERNAL LABOUR MIGRATION UNDER THE MINISTRY OF EMPLOYMENT AND LABOUR RELATIONS OF THE REPUBLIC OF UZBEKISTAN
- MIGRANT INFO LLC
- TOSHKENT DAVLAT YURIDIK UNIVERSITET

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