

**EURAXESS Korea  
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*Dear Colleagues,*

I hope this summer has brought you new ideas and opportunities, and despite the ever-changing pandemic situation, we will see each other soon at one of many events we will be happy to organize for you.

In this edition of our Quarterly Newsletter, I would like to introduce you to Belgium, a country located in the heart of the European continent, offering numerous research and collaboration opportunities.

Carrying on from our open science feature in the last Quarterly Newsletter, in this issue we explore the importance of 'FAIR principles', as the bedrock of solid research and replicable data, through the work of the European Open Science Cloud (EOSC) and GO-FAIR Organisation.

Finally, I am happy to inform you that EURAXESS Worldwide and the House of European History initiated a collaboration to highlight the role of science in the way history has shaped a sense of European memory and how it continues to influence our lives. In our newsletters, we will focus on historical objects and documents from the museum's collection that illustrate the contributions of the scientific world to the recent history of Europe. This year we will focus on three scientific objects from their collection— starting here with the Cooke and Wheatstone Dual-Needle Telegraph, a scientific milestone concerning communication.

I look forward to serving you throughout the rest of the year and beyond! Have questions, comments, feedback, or just want to say hi? [Send me an email](#) and share your thoughts!

*Tomasz Wierzbowski.*

- *Tomasz Wierzbowski*, EURAXESS Korea Representative

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# EURAXESS members in focus: BELGIUM



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## Some facts about Belgium

Capital: Brussels

Government: Federal State, made up of:

- 3 Communities with different languages: the Flemish Community, the French-speaking Community and the German-speaking Community
- and 3 Regions: the Flemish Region, the Brussels Capital Region and the Walloon Region.

Belgium is also a constitutional monarchy.

Population: 11.6 million

Surface area: 30,528 km<sup>2</sup>

Neighbouring countries: France, Germany, The Netherlands, Luxembourg.

Belgium was created as an independent kingdom in 1830 but its history is much longer and has always been deeply involved in international relationships within and outside Europe. Located at the crossroads between the Latin and Germanic worlds, in the heart of Western Europe – its capital, Brussels, hosts the official seats of the European Institutions and is the home to many international businesses and organizations –, this multilingual and cosmopolitan country is well-known for its beers (around 1500 Belgian beer brands), its comics and its surrealist taste (the land of Magritte, Delvaux or Folon), but also for its first-class universities and its long-standing tradition of promoting scientific and technical research. Many Belgian scientists are involved in a wide range of international scientific programmes – for example in the fields of nuclear research at the European Organisation for Nuclear Research (CERN), research into space exploration, and environmental research at its Princess Elisabeth Station in Antarctica, but also in nanotechnology, biotechnology or vaccination research –, and are received into prestigious universities abroad, while Belgium welcomes various foreign students and researchers attracted by the high scientific level of its universities together with the quality of life in the country.

Several Belgian universities appear in the top 200 of international rankings. Recently, the Reuters ranking of Europe’s most innovative universities included 7 Belgian universities, and most of all it is topped by a Belgian university.

EURAXESS – Researchers in Motion is an initiative of the European Research Area (ERA) that addresses barriers to the mobility of researchers and seeks to enhance their career development. This pan-European effort is currently supported by 41 countries, each of which will be profiled in our quarterly e-newsletters.

In this edition, we will zoom on Belgium

## Research and Innovation landscape in Belgium



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In Belgium, approximately 148,000 persons are employed in R&D, with nearly 92,000 of these working as researchers (2019 figures). More than half of the R&D personnel and of the researchers is to be found in the business sector (respectively 58% and 53%). Since 2019, the Belgian intra-muros R&D Expenditure (known as the *R&D intensity*) has reached the Lisbon target, with 3.17% of GDP, placing the country among the most active EU Member States with respect to innovation and R&D.

For up-to-date information and indicators on research and innovation in Belgium, as well as for a full overview of the Belgian research landscape, please refer to the website of the [Monitoring and Evaluation of Research and Innovation](#) (MERI). By publishing the most recent data and indicators, this department of BELSPO shows the complexity, but also the richness of the National R&I landscape.

In Belgium, universities and other higher education institutions are managed by the language communities:

- The Dutch-speaking universities and colleges, in Flanders and Brussels, are managed by the Flemish community.
- French-speaking universities and other higher education institutions, in Wallonia and Brussels, are managed by the French-Speaking Community (Wallonia Brussels Federation).

The only exception is the Royal Military Academy, located in Brussels, which is still a federal institution.

### The Federal authority

With its 2,800 employees, and through its major [research programmes](#), the Federal Science Policy department offers the government reliable, validated data, allowing it to take decisions with full knowledge of the facts in areas such as sustainable development, the fight against climate change, biodiversity, energy, health, mobility and the information society.

BELSPO also manages the Belgian contribution to the [European Space Agency](#). Since Belgium is the fifth net contributor to the ESA, this participation is strategic for our country and crucial for our companies. At the same time, BELSPO offers R&D aid to companies with the desire to participate in various AIRBUS programmes.

BELSPO supervises [10 federal scientific Institutes](#) these offer scientists an exceptional framework and research materials. They also house artistic and historical collections, which are visited by more than 1.2 million people every year.

10 Federal Scientific Institutions (Museums and Research Institutes) fall under BELSPO:

- [Institute for Cultural Heritage](#)
- [Institute of Natural Sciences](#)
- [Institute for Space Aeronomy](#)
- [Meteorological Institute](#)
- [Museums for Art and History](#)
- [Museum for Central Africa](#)
- [Museums of Fine Arts](#)
- [Observatory and Planetarium](#)
- [Royal Library](#)
- [State Archives](#) (of which [SOMA-CEGES](#) is now a DG)



There are four other Federal Scientific Institutes that fall under other administrations:

- [National Institute for Criminalistics and Criminology](#) (in French or Dutch),
- Penitentiary Center for Research and Clinical Observation,
- [Sciensano](#) (merger of the Scientific Institute of Public Health & the Veterinary and Agrochemical Research Centre),
- [Royal Museum of the Armed Forces and Military History](#).

BELSPO co-ordinates the research effort lead by all the country's authorities. As such, it co-ordinates R&D and innovation surveys. It also serves as the secretariat of concertation bodies involving all Belgian authorities. BELSPO monitors the R&D fiscal incentives, amounting to 1.5 billion per year. It ensures that Belgium takes part into great European and international infrastructures and network.

The Federal Science Policy is also connected to a wide range of [prestigious institutions](#) such as the Academia Belgica in Rome, the Biermans-Lapôte Foundation in Paris, the Junfrauoch in the Alps, the Académie Royale des Sciences d'Outre-Mer, the Royal Belgian Film Archive, the Euro Space Center, the Princess Elisabeth Antarctica Research Station, the Research Vessel Belgica and the Institut Von Karman. Through these infrastructures, the Federal Science Policy offers our researchers an international reputation.

At the Federal level, there is one university: the [Royal Military Academy](#). This military institution provides education at university level that is responsible for the basic academic, military and physical training of future officers, and for the continuing advanced training of officers during their active career in the Defence department. Furthermore, though located in Flanders, the [Belgian Nuclear Research Center](#) (SCK-CEN) is a federal organization. Through its activities it remains a global leader in the field of nuclear research, services and education.

## Flanders

The backbone of the Flanders' knowledge sector is shaped by 5 university associations ([UHasselt](#), [KU Leuven](#), [UAntwerpen](#), [VUB](#), [UGent](#)), 4 strategic research centres, and a number of other knowledge institutes in specific domains such as marine sciences, tropical health, agricultural research, and various collective research institutes active in specific fields. Several of these seats of knowledge in Flanders are recognized as centres of excellence in their field of activity and conduct research integrated in renowned international networks and with partners throughout the world. Some of these, such as KU Leuven, UGent, IMEC or VITO, have established subsidiary activities abroad (USA, Asia), often involving local counterparts or partners.

### Useful links:

[Information on Studying, working, housing, schools, ... in Flanders](#)

[Research at Flanders' University Colleges](#)

[Research at Flanders' Universities](#)

[TTO](#) - Tech Transfer Offices Flanders

[VLIR](#) - Flemish Interuniversity Council

[ECOOM](#) - Centre for Research & Development Monitoring is an interuniversity consortium with participation of all Flemish universities

The main contributors in the research and innovation landscape are businesses and industries. Companies in Flanders (and Belgium) are among the most innovative in the EU: With a score of 70% (versus 68% for Belgium) Flanders ranked 2nd during the period 2016-2018 in the list of the highest proportion of enterprises with innovation activity (product innovations, business process innovations and/or ongoing or abandoned innovation activities), behind Estonia (73%) and ahead of Cyprus, Germany and Norway (all 68%). Of all people employed in Flanders, 8,8% are active in an high-tech sector. Flanders is specialised in labour intensive (plastics, diamonds) and capital intensive (vehicles) goods. The main high-tech export product is pharmaceuticals, that represented almost 60% of all high-tech exports in 2020.

If you are you looking for research topics, research teams or researchers, you'll find them on the e [Flanders Research Information Space](#).

In addition, the publication "[STI in Flanders](#)" will give you in depth information about Science, Technology and Innovation policy in Flanders, important figures or indicators, the broad context and the performance of the research and innovation landscape, and an overview of the main actors and the public entities engaged in the field of R&D and innovation.

## The French-speaking Community (Wallonia-Brussels Federation)

([USL-B](#)), who participate in international university networks, whether institutional or disciplinary, and maintain numerous student exchange partnerships with universities all over the world. These university institutions, with their laboratories and research centres, enjoy access to cutting edge scientific support and top-quality infrastructure.

More than 12,000 researchers are working in the French-speaking Community. Alongside the 6 universities, there are 223 spin-off universities, 300 public and private units specialised in research and development, and 6 competitiveness clusters bringing together businesses and researchers in priority sectors for the economic and industrial development of French-speaking Belgium.

These "**competitiveness hubs**" are key elements of the economic development and innovation policy of Wallonia-Brussels, aiming to strengthen the ties between the various public and private research bodies. They group together higher education institutions, businesses, research units and other stakeholders involved in common innovative projects, over a limited territory. In this "triangle of innovation" or "triangle of knowledge", higher education institutions play an important part. On the one hand, they provide high quality teaching with a focus on research, and on the other, they produce research and innovation. To make the most of the results obtained, each university has established a knowledge transfer office (KTO).

### Useful links:

Study in Belgium: [Information on studying, working, housing, schools, ... in French-Speaking Belgium](#)

[CRef \(Rectors' Council\)](#)

[ARES](#) (Academy of Research and Higher Education).

[Official Portal of Scientific Research in Wallonia-Brussels Federation](#)

[WBI](#) (the agency responsible for international relationships in the Wallonia-Brussels Federation)

[LiEU Network](#) (the Businesses and University Link)

[SynHERA](#) (the office which represents applied research within French-speaking Universities of Applied Sciences (UAS) and associated Research Centres)

Each of these is represented in the [LiEU Network](#) (the Businesses and University Link) network, which facilitates the pooling of resources.

## Innovation

Innovation support is governed by the regions through dedicated agencies and subsidy programmes. In Flanders, Flanders Innovation and Entrepreneurship ([VLAIO](#)) acts as a one-stop-shop for all guidance and support for businesses, including innovation support, while [Innoviris](#) and the [SOWALFIN group](#) take up this role in the Brussels Capital Region and the Walloon Region, respectively.

Besides financing, the regions offer hands-on support. While the established policy is implemented by the agencies, **preparation, monitoring and evaluation of policy** happens within the administration of the respective governments, in particular the Department of Economy, Science and Innovation ([EWI](#)) and the Ministry of Education and Training ([O&V](#)) in Flanders, and the directorates ([SPW Economie, Emploi, Recherche](#) and [DGESVR](#)) of the public services of the Walloon Region and the French-speaking Community, respectively.

## Funding tools/opportunities

Belgium offers various recruitment opportunities for international candidates. All university research positions that are open to international researchers are listed on the job portal [www.euraxess.eu](http://www.euraxess.eu)

Basic research funding is largely administered by the [FWO](#) (Flemish community) and [F.R.S.-FNRS](#) (French-speaking community) agencies.

Other information on support for research projects in French-Speaking community: <https://www.objectif-recherche.be/en/funding-options>

Other information on support for research projects in Flanders: <https://www.vlaanderen.be/en/support-for-research-projects>

At the European level, Belgium is very successful in securing research funding both from the [Marie Skłodowska Marie Funding program](#) and [ERC funding](#). The 5 National Contact Points ([NCPs](#)) present in Belgium provide candidates with information and help about the latest developments in Horizon Europe, to help them find suitable project partners or join a consortium, to support them in preparing a project proposal and to provide feedback on their project proposals.

## Important information for incoming researchers

These are the six competitiveness hubs in the WBF:

- [Skywin](#) – Wallonia – Aeronautics and space sector
- [Logistics in Wallonia](#) – Transport and logistics sector
- [GreenWin](#) – Green chemistry, sustainable construction and environmental technologies sector
- [BioWin](#) – Nutrition and health sector
- [WagrALIM](#) – Agricultural-industry sector
- [MecaTech](#) – Transversal technologies sector



Belgium belongs to the EURAXESS initiative that provides support to researchers and their families when coming to Belgium (in key areas such as visas, housing, schooling, etc.). Additional information can be found at <https://www.euraxess.be/>

About the immigration procedures system, see also the following pages:

- [Work permits for foreign workers](#) | Flanders.be (vlaanderen.be)
- [Work permit to hire foreign workers from outside the European Union](#) | Wallonie.be
- [Work Permits](#) | Brussels Regional Public Service
- [Working in Belgium](#) | International.socialsecurity.be



# HOT TOPIC: All's FAIR in love and ... science

Carrying on from our open science feature in the [last Quarterly Newsletter](#), this time we explore the importance of 'FAIR principles', as the bedrock of solid research and replicable data, through the work of the European Open Science Cloud (EOSC) and GO-FAIR Organisation.

Even at the height of the Covid-19 pandemic, anti-vaccination propaganda proliferated across the internet. It was a wake-up call for the scientific community that its methods and motivations can never be taken for granted.

Throughout the ages, scientific advances have relied on a solid foundation of evidence underpinned by reliable data. The more unconventional the innovation or development, the higher the standard of proof needed to overcome natural conservatism. Early reticence about the novel RNA-based Covid vaccines is a case in point.

To counter such resistance, scientists' measurements and observations typically focus on building and strengthening a body of evidence fed by carefully scrutinised datasets to "anticipate, identify and minimise (or even eliminate) sources of error", according to the New South Wales government's guidance on evaluating scientific data. The Australian State adds:

*"Every aspect of a scientific investigation must be scrutinised for errors, as they may affect the investigator's conclusions. When experiments are repeated, the errors of measurement may compound. Therefore, scientists use several criteria to decide if an experiment, and the conclusions derived from it, are acceptable."*

The internet, digital technologies and powerful tools to sort, search and understand research results, including machine-learning, are fuelling a data-led scientific revolution. But with these developments comes added responsibility and new challenges warranting the creation of new disciplines and even operating system to foster coherent solutions for what is being called a global 'Internet of FAIR Data and Services (IFDS).

Early developments have centred on the work of the European Open Science Cloud ([EOSC](#)) and the [GO-FAIR](#) initiative to catapult this nascent domain worldwide.

## So, what does FAIR stand for?

First communicated in a 2016 article, 'FAIR Guiding Principles for scientific data management and stewardship' ([Nature – Scientific Data](#)), the concept of making digital assets Findable, Accessible, Interoperable, and Reusable

### What is open science?

"Open science is the movement to make scientific research and its dissemination accessible to all levels of society, amateur or professional. Open science is transparent and accessible knowledge that is shared and developed through collaborative networks." ([Wiki](#))

"Open science is based on the principle of openness and transparency in the whole research cycle, fostering sharing and collaboration as early as possible. Open and transparent practices accelerate the research process at an unprecedented speed and they reinforce core academic values, such as research integrity, cooperation and knowledge sharing. Open science is also key to increasing public trust in science and as a means to spark interest and foster the public's participation in research activities." ([European University Association](#))

was introduced. The principles emphasise “machine-actionability”, or how easily computers can interact with increasingly complex and large datasets.

Efforts to build the IFDS are well underway across Europe and in other regions, including Australia, Africa, and the US. The work focuses on establishing what GO-FAIR describes as a “federated environment” for scientific data-sharing and re-use based on existing and emerging elements in EU Member States and “lightweight” international guidance and governance.

Emphasis is on avoiding top-down decrees and allowing a “large degree of freedom regarding practical implementation” in much the same way as the internet currently functions with “no single centralised governance”.

Here, GO-FAIR stresses that the “dominance of a very limited number of private or public parties should be avoided by copying the internet’s [hourglass model](#)” of minimal yet rigorous standards and protocols.

This, the organisation adds, allows open and common implementation through different stakeholders: “All kinds of providers, both public and private, can start implementing prototype applications for the Internet of FAIR Data and Services on the day minimal standards and minimal rules of engagement are released.”

## FAIR practices

Guidelines have been published on how FAIR works in practice and summarised on GO-FAIR’s website ([‘Three-point FAIRification Framework’](#)). The principles apply to three main types of entities: data (or any digital object), metadata (information about that digital object), and infrastructure.

For the [EURAXESS Worldwide’s](#) busy community, we provide a quick overview of the main points.

### **Findable**

Good metadata (machine-readable descriptions) is key to making your data ‘findable’. The FAIR data framework assigns (meta)data a unique globally recognised identifier, which should be clearly and explicitly included in the rich data descriptions and registered or indexed in a searchable repository/resource.

### **Accessible**

Once users find the data, they need access and possibly permission to do so (authentication/authorisation). For this, (meta)data must be retrievable using the identifier and standard communications protocols, which should be open, free and universally implemented. Metadata should remain accessible even when the data are no longer available.



### ***Interoperable***

Data should be well integrated with other datasets, applications and workflows for optimal analysis, storage, and processing. This means using accessible and broadly applicable language (lexicon) that follows FAIR principles and includes qualified references to other (meta)data.

### ***Reusable***

Replicability is vital to good science and underpins FAIR principles. (Meta)data should thus be well-formulated for ease of use and re-use in different settings. That means it should be “richly described” with accurate and relevant attributes, released with clear and accessible data-usage licensing and provenance information, and should meet domain-relevant community standards.

## More info

To keep abreast of GO-FAIR’s developments, EWW community can sign up to its newsletter ([see the March-April edition here](#)) edition and participate in relevant [events and webinars](#).

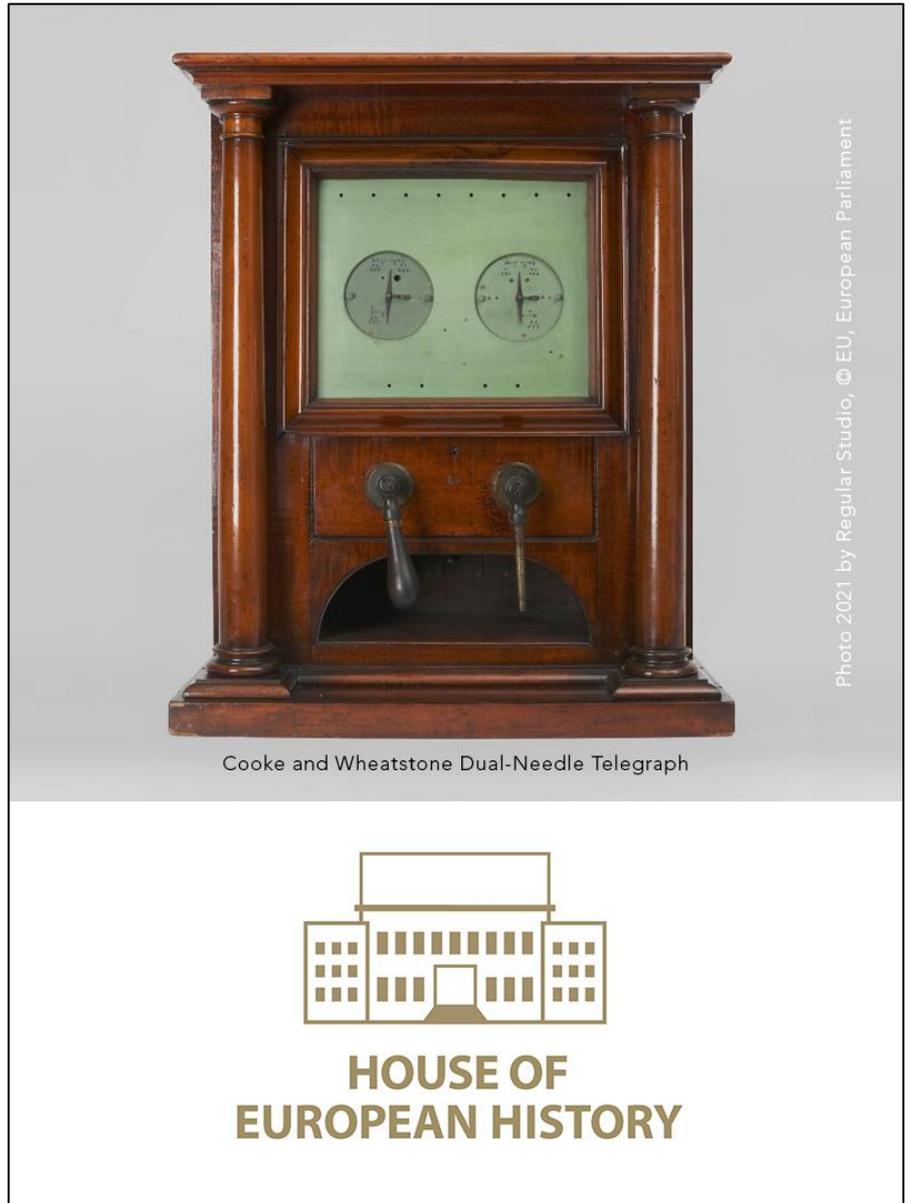
## Scientific Milestones

### From [the House of European History](#)

*This year we will focus on three scientific objects from their collection—starting here with **the Cooke and Wheatstone Dual-Needle Telegraph**, a scientific milestone concerning communication.*

The [House of European History](#) and [EURAXESS Worldwide](#) collaborate in order to highlight the role of science in the way history has shaped a sense of European memory and how it continues to influence our lives. In our newsletters we will focus on historical objects and documents from the museum’s collection that illustrate the contributions of the scientific world to the recent history of Europe.

At the House of European History, a European story is being told by way of objects, documents, and audio-visual testimonies from across Europe and beyond. Hundreds of artefacts of various origins have been brought together in one physical space in Brussels, and are progressively featured online as well. Discover now one of these objects and its historical significance on the House of European History’s online collection page: the [Cooke and Wheatstone Dual Needle Telegraph](#) is an exceptional testimony of the ingenuity of Europeans in the late 1850s, demonstrating how undersea telegraph lines would allow for truly global communication. Learn more [here](#).



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