Research-Intensive Universities Serving Society

LERU paper for the EU institutions
May 2024

LERU

PUSHING
THE FRONTIERS
OF INNOVATIVE
RESEARCH

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Acknowledgements

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LERU publications

LERU publishes its views on research, innovation and higher education in several types of publications which are freely available in print and online at www.leru.org/publications.

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Foreword by the LERU Chair

As Chair of the League of European Research Universities (LERU), it is my honour to present this briefing paper which delves into the indispensable role of research-intensive universities and fundamental research. In an era marked by unprecedented challenges and opportunities, it is imperative to highlight the significance of these universities and the fundamental research they conduct in shaping the future of Europe and the rest of the world.

This briefing paper identifies sixteen key messages focusing on European research, education, and innovation policy. Each message is crafted to underscore the pivotal contributions of research-intensive universities to the advancement of knowledge, the nurturing of talent, and the fostering of innovation ecosystems across Europe.

Creating a supportive environment for universities, facilitated by local, regional, national, and European public and private actors, is crucial. While financial support is essential, it is not the sole factor. Hence, we emphasize the necessity for the next Multiannual Financial Framework to double its investment in research and innovation, and we urge EU member states to support such a budget increase. You can find good examples showcasing the added value of investments in research and innovation not only in this publication but also in the recently published policy briefs of the European Commission's Directorate-General for Research and Innovation[1].

In an increasingly competitive global landscape, where knowledge is the currency of progress, our research-intensive universities stand as beacons of progress, driving innovation, and pushing the boundaries of human understanding. Through fundamental research, they not only address pressing societal challenges but also lay the groundwork for future breakthroughs and discoveries that will benefit generations to come. R&I is crucial to boost Europe's competitiveness, improve living standards and meet the EU's climate objectives.

With this publication, we offer you a number of LERU messages, recommendations and solutions based on the views and policy papers that our association has built up carefully over the past 20 years. Together, let us ensure that our institutions receive the support and recognition they rightfully deserve, as we collectively strive towards a future of prosperity, innovation, and progress for all citizens of Europe.

Dr Linda Doyle
Chair of LERU
Provost & President, Trinity College Dublin

1 The added value of European investments in research and innovation: https://op.europa.eu/en/publication-detail/-/publication/66e846db-e4eb-11ee-8b2b-01aa75ed71a1/language-en/format-PDF/source-310304880# and Why investing in research and innovation matters for a competitive, green, and fair Europe: https://op.europa.eu/en/publication-detail/-/publication/e830b15b-e4db-11ee-8b2b-01aa75ed71a1/language-en/format-PDF/source-310304814#

Introduction

This publication is the League of European Research Universities (LERU) contribution to shaping the EU research, innovation and education policy agenda for the period 2024-2029, a period which promises to be challenging in many ways. The European Union will need to have important internal discussions, and make decisions, on its membership, governance, on funding, and on political and policy orientation on issues such as enlargement, industry, and defence. Treaty changes will probably be necessary. At the same time, a number of global challenges will need continued European reflection and action: wars, combating diseases, sustainable development, tackling climate change, fighting inequality, migration, rising populism, fake news, digitalisation for all, human rights violations, and many more.

How can research universities, like the LERU member institutions, best help the European Union, and 21st century society, in general to cope with these challenges? Our answer is, by serving society: by training excellent students, performing outstanding research, forging scientific breakthroughs, producing new products and services, building science-policy-society interfaces, etc. In a nutshell, by engaging with society, stimulating innovation and creating societal added value.

As comprehensive, multidisciplinary institutions, with a long-term vision, bright students and talented staff members, research universities are one of the very few forces capable of rendering this service to society. They are publicly funded knowledge repositories ready for politicians to mine. And this service will be crucial if the United Nations' Sustainable Development Goals are to be achieved and Europe wants to remain competitive at a global level.

At the same time, universities themselves face numerous challenges: increased internationalisation, reduced funding, fake news undermining values, criticism of excellence and expertise, demands for societal and institutional diversity, damaging cases of lack of integrity, and the need for institutional collaboration, to name just a few. While universities are willing to meet these challenges, the reality is that not all universities are ready or sufficiently able to tackle them. As a consequence, they cannot fully take up the potential role of serving society at their best, risking leaving society behind, disappointed by and in its universities. Although we consider this a possible rather than inevitable scenario, one thing is absolutely clear: a more supportive environment for universities, facilitated by local, regional, national and European public and private actors, is absolutely crucial. Such an environment is not only about funding, although it remains an essential element.

In this paper, LERU sets out 16 key messages for the incoming European Commission and Parliament, supported by our 24 outstanding research-intensive universities:

1. **Develop a future-proof Multiannual Financial Framework**
2. **Establish clear responsibilities and funding lines for action**
3. **Create workable synergies between EU programmes and with EU funds**
4. **Increase investment in research, innovation and education**
5. **Harmonise national regulatory frameworks to stimulate innovation and growth**
6. **Introduce a research, innovation, education check for EU legislative action and inaction**
7. **Make education a shared competence of the EU and Member States**
8. **Enshrine the protection of academic freedom in the EU treaties**
9. **Strengthen sustainable societal transformation and innovation by increasing support for frontier research across disciplines**
10. **Ensure and stimulate open international collaboration**
11. **Recognise and support frontrunners**
12. **Involve universities as key partners in the EU industrial policy**
13. **Build a real European Research Area**
14. **Enhance research careers**
15. **Strengthen the digital sovereignty of universities**
16. **Support universities to thrive in a changing environment**

LERU's key messages for the EU institutions

1. Develop a future-proof Multiannual Financial Framework

Recent crises, such as the covid pandemic, migration crisis, energy crisis and especially the war in Ukraine have clearly shown that the current model of the EU's multi-annual budget, the Multiannual Financial Framework (MFF), has reached its limits. An increase in the number of Member States, and especially the potential membership of Ukraine, will make reform of the MFF unavoidable. LERU recommends that the European Commission starts working on this reform as soon as possible.

This reform should include ring-fencing of all EU programmes, including the next research and innovation Framework Programme (FP10) and Erasmus+, to prevent the current practice of raiding these programme budgets to fund new initiatives or cut overall EU spending. For instance, measures are needed to bring budgetary stability to FP10, by ending the tendency seen in Horizon Europe to reshuffle budget lines in order to (co-)fund new initiatives and to add new priorities. Both result in the watering down of all budget lines, most of which are already underfunded.

At the same time, the flexible funding in the MFF for the Commission to develop new initiatives or tackle emerging priorities (defence, industry, etc) should be increased, allowing the Commission to act without needing to shift funding from existing programmes. This should be supported by an increase in the level of own resources available to the EU.

LERU recommends that the EU institutions reform the EU's multiannual budget, ring-fence the budgets of EU programmes like FP10, and ensure that sufficient flexible funding is available to address new priorities.

2. Establish clear responsibilities and funding lines for action

The Von der Leyen Commission has adopted a Commission-wide approach to new EU initiatives and policies, for instance supporting green and digital transitions, guaranteeing industrial supply chains, and stimulating the deployment and manufacturing capacity of technologies. While it is important to get all relevant actors on board, this approach comes with a risk. With all EU programmes seeking to address these priorities, the likelihood increases of creating wasteful or even harmful overlaps. To ensure the best and most efficient spending of EU funding, and to avoid a waste of effort generated by overlapping initiatives, LERU recommends that the portfolios of new Commissioners be clearly delineated, making it very clear who is in the driver's seat for each policy domain and giving that person the responsibility of avoiding overlap across services.

It is also crucial that this delineation is extended to the administration, making clear which Directorate-General or service has the lead in specific policy fields. In recent years, universities have been confronted with overlapping and fragmented initiatives from many different Commission services. For example, with valorisation-oriented activities, there was no consistency across actors and agencies belonging to different European innovation pillars.

LERU recommends that the EU institutions ensure that the portfolios of new Commissioners are clearly delineated to avoid overlap across policy fields and services.

3. Create workable synergies between EU programmes and with EU funds

While all EU programmes and initiatives should keep their specific focus, avoiding overlaps, it is also important that they can reinforce each other through well-developed synergies. Such synergies have been on the Commission's agenda for many years, to little effect. To make them a reality, the means for creating them must be written into the legal texts of EU programmes, including where necessary changing state aid provisions. This should begin with the next Multiannual Financial Framework, and programmes such as FP10 and the European Structural and Investment Fund.

To stimulate the use of synergies, LERU proposes that the Commission develops complementary timelines or designated pathways from one programme into another, in order to avoid funding gaps, loss of talent, and innovation leakage. Such pathways could, for instance, be developed between FP10 and the successor to Erasmus+ or the European Defence Fund.

To realise the above, LERU would also like to see a cross-unit service established in the Commission. This service would take responsibility for training EU staff, including project officers, and Member State government departments and agencies, to better utilise cumulative funding rules. It should also provide regular briefings to project coordinators and the professional support staff of EU programme beneficiaries.

LERU recommends that the EU institutions develop clear and specific pathways between programmes to avoid funding gaps, loss of talent and innovation leakage.

4. Increase investment in research, innovation and education

Achieving strategic autonomy and further stimulating sustainable transitions in both society and the economy[2] require more research and innovation (R&I), for example in sustainable energy generation and storage technologies. Yet, while these areas clearly need more investment, it would be a mistake to gear all funding towards the technology alone, not least because a pure focus on industry and the economy will further alienate European citizens from EU policy and politics in general. A recent study[3] from the Joint Research Centre for instance highlights why addressing gender inequalities is important for an inclusive energy transition. More R&I, with a human-centred approach, is also needed to address challenges such as rising inequality, the loss of faith in democracy and lack of social cohesion.

More R&I can only be achieved with increased long-term investment. To approach investment levels in the United States and China, and remain a relevant competitor at the global level, the EU needs to go beyond the current target of 3% of GDP. This increased investment is needed at the national, regional and EU levels, and should come from both public and private sources.

In addition to investing more in R&I, increased investment in education, including higher education, is needed to ensure more people are trained with technical and soft skills needed in a rapidly changing society and economy.

LERU calls on the Commission to push for increased investment in research, innovation and education through four actions:

- Set an example by proposing an increased and ring-fenced budget for FP10 and for the successor to Erasmus+
- Push Member States more strongly to increase national and regional investment in research, innovation and education
- Incentivise private investment in R&I, along with private engagement in local innovation ecosystems
- Set a new target for R&I investment at 4% of GDP instead of 3%

LERU recommends that the EU institutions and the Member States increase investment in research, innovation and education, as these areas play a crucial role in realising more strategic autonomy and sustainable transitions in society and the economy.

2 See 2023 Strategic Foresight Report: https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight/2023-strategic-foresight-report_en
3 Gender and Energy: The effects of the energy transition on women (2024): https://publications.jrc.ec.europa.eu/repository/handle/JRC132744

5. Harmonise national regulatory frameworks to stimulate innovation and growth

Europe needs a regulatory framework that stimulates innovation, rather than putting obstacles in its way. Instead of increasing the amount of regulation applied to innovation, the EU should take initiatives to unify regulatory frameworks across Europe and help innovators engage with regulations through initiatives such as regulatory sandboxes. These recommendations are also clearly articulated in the Enrico Letta Report on the future of the Single Market.[4] A unified regulatory framework is a better guarantee of an increased scaling-up of innovative technologies, products and services across borders in the EU than any funding scheme at EU or national level.

More broadly, an effort to reduce regulatory fragmentation in general, and to complete the European Single Market, would have an immensely beneficial effect on innovation and its commercial exploitation. In particular, further development of a European Capital Markets Union is required to stimulate greater activity in the venture capital and private equity markets, especially when it comes to funds willing to invest the large amounts new deep-tech companies need to scale up into larger entities.

Without this action at European level, the supportive regulatory environment and abundant investment opportunities available in the United States will continue to draw the brightest and best of Europe's innovators and company founders.

LERU recommends that the EU institutions harmonise regulatory frameworks across Europe to stimulate innovation and to further develop a European Capital Markets Union.

4 Much more than a market: https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf

6. Introduce a research, innovation, education check for EU legislative action and inaction

Too much EU legislation is produced without considering how research and education will be affected. Recent laws on data, like the GDPR for example, have slowed down research and make European and transatlantic collaboration much more difficult. It is feared that the forthcoming Artificial Intelligence Act will have a similar effect. At the same time, the EU has missed an opportunity to eliminate obstacles to the free circulation of knowledge in laws on social security, the labour market, taxes, intellectual property, education, and so on.

Instead of an innovation check only, LERU repeats the call for a research, innovation and education check for newly proposed EU legislation that would prevent universities' work being hampered. Also, existing national legislation should be revised where it has introduced or maintains obstacles to the free circulation of knowledge.

LERU recommends that the EU institutions introduce a research, innovation and education check for newly proposed EU legislation in order to prevent universities' work being hampered.

7. Make education a shared competence of the EU and Member States

Unlike research, education is not a shared competence of the EU and its Member States. It is a full national competence, with its own characteristics, systems, mechanisms and legislative frameworks. This makes it difficult, for example, to create and deliver joint degree programmes, and frustrates the mutual recognition of degrees and credits, and the exchange of students and staff. A minimum level of harmonisation, realised by making education a shared competence, could eliminate many obstacles to these highly beneficial initiatives, and to the realisation of the EU's policy to create a European Education Area.

The drive to create European University Alliances is a case in point. Enthusiastically welcomed by Europe's universities, this initiative has highlighted obstacles to cross-border collaboration in education, such as the diversity of national or regional quality assurance mechanisms, degree and credit recognition systems, educational exchange programmes, tuition fee demands, etc. To allow this important endeavour to continue, sufficient and sustainable investment is also needed, both at EU and Member State level.

LERU recommends that the EU institutions make education a shared competence of the EU and its Member States.

8. Enshrine the protection of academic freedom in the EU treaties

Recent research indicates that academic freedom is increasingly threatened in Europe, and that more action is needed to protect it. However, this need is poorly served by the current legal framework, in which academic freedom is covered by a patchwork of rules embedded in the jurisprudence of the European Court of Human Rights and the European Court of Justice, in the EU Treaties, the EU Charter, national constitutions, and international treaties.

Once again, the omission of education as a shared competence undermines the EU's ability to act. For this reason, a recent proposal for an EU regulation on academic freedom, introduced by MEP Christian Ehler, could only address the research-related aspects of academic freedom.

A legal initiative by the EU institutions, such as including the protection of academic freedom in the EU treaties, or the adoption of a specific regulation or directive on academic freedom, could bring light and order to this confusing patchwork of rules.

LERU recommends that the EU institutions take more legal action to protect academic freedom.

9. Strengthen sustainable societal transformation and innovation by increasing support for frontier research across disciplines

Recent economic crises have limited policymakers' views on research to something that needs to deliver or be applied quickly. However, the extensive, long-term research underpinning innovations such as the covid vaccine and lithium-ion batteries indicates that it would be short-sighted and unwise to focus only on research that is close to the market. Frontier, pre-competitive research forms the basis of new and sustainable products, technologies, approaches and policies. It feeds positive, sustainable transformations in society. Unfortunately, timescales involved in generating these transformations are varied and unpredictable. Investment in this type of research is no guarantee for results in the short run, but it is a guarantee for a better future.

Both the covid pandemic and the war in Ukraine have clearly shown that we cannot foresee what the next societal crisis will be, nor which areas of expertise will be needed to guide us through it. So, more research and innovation, across disciplines, is needed to secure the EU's prosperity and sustainable competitiveness, now and in the future.

LERU calls on policymakers at EU and national/regional level to increase investment in frontier research. The EU should increase its support for such research in FP10 through the European Research Council, the Marie Skłodowka Curie Actions and in (what is now) pillar II, while a good mix of investment in both frontier and applied research is absolutely necessary at national and regional level.

LERU recommends that the EU institutions fund R&I across disciplines and recognise the transformative potential of frontier research, by increasing investment in it. The European Research Council and the Marie Skłodowka Curie Actions should clearly benefit from this in FP10.

10. Ensure and stimulate open international collaboration

However challenging the current geopolitical context, limiting international collaboration in research will undermine Europe's R&I strengths and hence its competitiveness and ability to address current and future societal challenges, most of which are complex and borderless. Research collaboration across borders will also be vital in ensuring the EU's strategic autonomy, so the desire for autonomy should not lead to significant restrictions on universities when it comes to choosing international partners and research topics.

The new European Commission should continue to support and incentivise international research collaboration through all its programmes, and especially through FP10. Association agreements with strong R&I partners worldwide should continue to be made in Horizon Europe, and be swiftly concluded for FP10. In view of the damage caused to European research by the non-association of the UK and Switzerland to Horizon Europe, all willing European countries should be able to associate with present and future programmes, independent of broader political frameworks of agreements.

While international research collaboration within and outside Europe should be strengthened, there is a need for increased awareness on issues linked to knowledge security and foreign interference. The Commission's Research Security Recommendation[5] of January 2024 is a step in the right direction, as it gives universities the autonomy to decide upon their own paths, according to their own risk and ethical criteria.

LERU is worried, however, by increasingly 'hard' legislation, such as recent laws on dual-use technologies and export controls, which increases red tape for universities in ever-expanding fields of application. Harmonisation between the US and EU, for example, is urgently needed to prevent European R&D falling victim to new controls and restrictions.

LERU recommends that the EU institutions continue to support and incentivise international research collaboration through all EU programmes, and especially FP10, while raising awareness and action on research security issues.

5 Council recommendation on enhancing research security (2024)
https://research-and-innovation.ec.europa.eu/document/download/e82a2fd9-ac12-488a-a948-87639eef10d4_en

11. Recognise and support frontrunners

While EU policies must support all universities, research institutes and companies equally, a lot of effort is currently geared towards those that are smaller or less strong. LERU underlines that there is also a need to incentivise the frontrunners, the few who are in a position to effect transformational change in Europe's economy and society. This is not favouritism, but providing the necessary support for actors and mechanisms that already make a difference.

To remain competitive with top universities/research centres globally and their top researchers, these frontrunners would also benefit from a stimulus to do even better, or to improve performance in areas that are not yet that strong.

So when EU policy is developed, how to incentivise frontrunners should be included. For top researchers, the selective support for excellence demonstrated by the European Research Council and the Marie Skłodowska-Curie Actions are good examples, and both need much more support than they presently get.

LERU recommends that the EU institutions cherish frontrunners when developing EU policy and incentivise them to do even better.

12. Involve universities as key partners in the EU industrial policy

Universities, especially research-intensive institutions, are wellsprings of talent and technology, convenors of innovation actors, and a primary source of deep-tech startups. Yet, when industrial policy is formulated (cf Net-Zero Industry Act, AI Act, etc), their role is often limited to that of delivering much-needed skills to the workforce. Their pivotal contribution to broader economic and societal development through impactful R&I initiatives is rarely recognised.

Universities can also contribute important insights and expertise to debates in the industrial policy arena. Therefore, the Commission should involve universities much more in the development of industrial policy, and ensure their voice is heard in strategic bodies, such as the recently announced body on the risks and benefits of AI for humanity.

LERU recommends that the EU institutions make better use of the expertise and insights that universities can contribute to the development of industrial policy.

13. Build a real European Research Area

Despite two decades of activity, the European Commission and Member States have failed to truly build the European Research Area (ERA). The most recent ERA policies (cf the Pact for R&I in Europe, the Council conclusions on ERA governance, and ERA Policy Agenda 2022-2024), have the merit of keeping ERA on the agenda of Member States but lack financial ambition, are not legally binding, and do little to establish responsibility for taking the project forward.

For LERU, realising ERA, in combination with the European Higher Education Area and European Innovation Area, is essential. The Commission and Member States must create, in close consultation and partnership with universities, the legal and financial preconditions to make a real ERA possible at last. In this process, the focus must be on the elimination of European and national obstacles to the free circulation of knowledge. A European Knowledge Act is the best guarantee for achieving this.

This legal underpinning of the ERA and the free circulation of knowledge in the EU (the so-called "fifth freedom") was recently confirmed by the Internal Market report of Enrico Letta.[6]

LERU recommends that the EU institutions eliminate European and national obstacles to the free circulation of knowledge in order to create a real European Research Area.

6 Much more than a market: https://www.consilium.europa.eu/media/ny3j24sm/much-more-than-a-market-report-by-enrico-letta.pdf

14. Enhance research careers

Europe needs more researchers, but risks losing many to global competitors as it fails to make research careers more attractive. This is a combined challenge for research universities, research-performing organisations, Member States, and the EU.

The main barrier to a European career path system is the lack of a European labour market for researchers, as universities and academic careers are ruled by regulations that differ in every Member State, while impactful, long-term initiatives need to go beyond national traditions, cultures, and frameworks.

Recognising that the responsibility for attractive research careers in Europe cannot be solely assigned to the institutions, the European Commission must play a pivotal role in driving significant progress. LERU recommends that it:

- Recognises researchers as a profession with a special status, to address persistent hurdles to mobility.
- Demands consistency among Members States to ensure decent pay and full social security coverage for researchers at all career stages.
- Requires active engagement of Member States on career-related matters, both in terms of regulations and funding.
- Commits to a much stronger coordination role among Member States, to overcome structural barriers, and to recognise that these obstacles can also work as mechanisms of exclusion for minority groups of researchers.
- Takes the lead in developing more sustainable funding mechanisms for researchers, relieving universities and other research actors from the burden of addressing problems originating from an inadequate funding landscape, like the issue of precarity of early career researchers.

LERU recommends that the EU institutions take actions to improve mobility, careers and funding of researchers.
National authorities should play a more active role in this.

15. Strengthen the digital sovereignty of universities

Digital sovereignty has been a priority for the Von der Leyen I Commission, and rightly so. Unfortunately, the initiatives it has taken to date, notably the EU Data Act, do not protect the research and education sector from any threats.

When universities and academics cannot take autonomous decisions and actions regarding digital infrastructures and data, their digital sovereignty is threatened. This in turn undermines their ability to pursue the academic values they are founded on and to uphold their public function as autonomous knowledge producers in the digital era.

Universities increasingly rely on digital technologies and services supplied by companies, often based outside the EU, which maintain a high degree of control over how they are used. This is endangering their digital sovereignty. Another concern is that student, research and other data from universities' digital environment are being extracted by suppliers, and exploited for economic gain. Universities need tools that allow them to keep control over their own digital destiny, i.e. the data, software and hardware they rely on and often help to create.

LERU therefore calls on the Commission to develop policy initiatives that envisage securing and defending the position of universities, and European research and education in general, towards the big tech companies and with publishers, and thus secure universities' digital sovereignty.

LERU recommends that the EU institutions develop policy initiatives that ensure and defend the autonomy of universities, in particular to secure their digital sovereignty.

16. Support universities to thrive in a changing environment

Universities are expected to engage with society, to change research career paths, to collaborate more intensively with each other and to support policy development more actively. While universities are ready and eager to meet these challenges, they need facilitating frameworks and policies and sustainable investment to do this.

Artificial intelligence, for example, is not only a highly relevant research topic, but it also impacts the nature of research and challenges the way education is offered and assessed. However, there is a lack of systematic and serious investigation of the potential impacts of AI. This is necessary to further develop the concept of responsible AI, which is human-centred, ethical, legal, safe, dependable and sustainable.

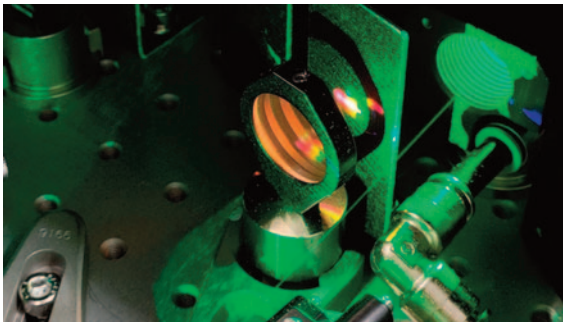
Universities are also working hard to become more sustainable institutions, making their activities, buildings and investments compatible with the UN's Sustainable Development Goals, for example, and moving towards net-zero emissions. Universities should be consulted on developments in sustainable development policy, and their specific needs taken into account.

Finally, resources are required not only to fund research and researchers, but also to nurture a conducive, attractive, and sustainable research culture. This is not a luxury that can be supported only if the money is available, but needs a reliable European budget. Similarly, investment in staff to run research infrastructure is largely overlooked in favour of investment in hardware. New financial models for employing specialised, skilled staff, and ensuring that they have adequate training and career development options, need further investigation.

LERU recommends that the EU institutions empower universities to serve society at the best of their abilities by creating robust (legal) frameworks, sustainable investments, and dedicated policies.

Explore our impact

LERU's 24 members have an impressive history of conducting fundamental research projects that have significantly influenced society. Here you can find some of the many examples which vividly illustrate cutting-edge research at LERU universities and their enduring impact, highlighting the imperative of sustained investment in research.



Nobel Prize winning experiments give humanity new tools for exploring the world of electrons inside atoms and molecules.

Anne L'Huillier, Professor of Atomic Physics at Lund University and Ferenc Krausz, Chair of Experimental Physics / Laser Physics at LMU Munich were awarded the Nobel Prize in Physics 2023 alongside Pierre Agostini of the Ohio State University, for experiments that have given humanity new tools for exploring the world of electrons inside atoms and molecules. They have demonstrated a way to create extremely short pulses of light that can be used to measure the rapid processes in which electrons move or change energy.

Already in 1987, Prof. L'Huillier made a groundbreaking discovery. By focusing infrared laser light in a noble gas, she was able to produce numerous harmonics of the laser light. She saw the possibility that this light could lead to extremely short pulses of light – attosecond pulses. Developing the technology required to measure these ultrashort light pulses, however, proved to be difficult. But despite the challenges, Prof. Agostini and Prof. Krausz both succeeded in measuring isolated light pulses on the attosecond timescale in 2001.

While much of the research in this field has been basic research, it holds exciting potential for future applications in medicine, electronics, energy, and the environment. For instance, Prof. L'Huillier is exploring how to measure the motion of an electron leaving an atomic or molecular potential and how to optimize the harmonic light for applications in the semiconductor industry. Additionally, Prof. Krausz' advancements in attosecond laser technology have enabled the identification of specific molecules in blood, which hopefully will permit the early detection of certain types of cancer.

Lund University
Ludwig-Maximilians-Universität München

LUND UNIVERSITY

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

First study of Ireland's new abortion services informs government legislative review.

Abortion services were introduced in Ireland in January 2019 following a landmark referendum removing the constitutional ban on abortion. Researchers from the School of Social Work and Social Policy at Trinity College Dublin conducted a review of women's experiences of the first three years of the operation of the service. The qualitative study, commissioned by the Irish Health Service, involved in-depth interviews with women providing a comprehensive picture of how the service was operating.

The study found that abortion services in Ireland were overall working well and were being delivered by committed healthcare staff. The research, however, also identified that the needs of women seeking abortion services for severe foetal abnormality were not being met. In addition, the study recommended changes to a mandatory three-day waiting period following certification of pregnancy.

The study was released in 2022 and was designated as a strand of service-user research informing a statutory review of the new abortion legislation. The lead author of the study, Dr Catherine Conlon, appeared twice before the Irish parliament's Joint Committee on Health to discuss recommendations in the Review arising from the study. The Committee recently approved full implementation of these recommendations.

Trinity College Dublin

Pioneering research helps to reshape urban and food dynamics to ensure universal access to sustainable food.

Pioneering research on urban food systems by Dr Ana Moragues-Faus, Senior Research Fellow at the University of Barcelona, has provided critical insights into how we can reshape urban and food dynamics to ensure access to sustainable food for all. Her research has gained support from international competitive funds, and resulted in numerous high-impact publications and practitioner guides.

Dr Moragues-Faus' recommendations on how to develop impactful urban food policies have been adopted in policy reports and by city councils around the globe. The academic relevance of her work on cities has also been recognised through her appointment as a member of the High-Level Panel of Experts of the United Nations, to produce a report on urban food systems, and as one of only two academics participating in the Urban Agenda for the European Union to advise on future urban food interventions. She has also conducted the first measurement of food insecurity levels in Spain pre- and post-covid, revealing that more than 6 million people lack access to adequate food. This new evidence was reported in the media, reaching an audience of more than 140 million people and leading to changes in the Spanish food policy agenda.

Universitat de Barcelona

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

UNIVERSITAT DE BARCELONA

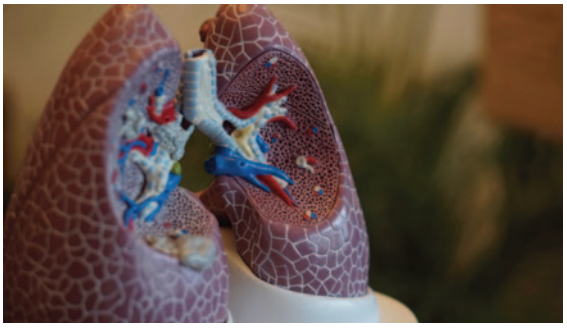
Harmonizing nature and technology: innovative solutions for energy-efficient construction and renewable materials.

At the University of Freiburg, the Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (livMatS) combines the best of two worlds, namely nature and technology, as it develops life-like materials systems inspired by nature. The aim is to create systems that adapt autonomously to their environment, harvest clean energy from it, and are insensitive to damage or recover from it.

Striving to make the construction industry more sustainable, livMatS, together with the Stuttgart Cluster of Excellence IntCDC, has demonstrated ways to minimize the material consumption of wooden buildings by 50 percent by using a robotically manufactured modular structure inspired by the construction principles of the sea urchin skeleton. In the area of sustainable energy materials, research promises similarly great impact: livMatS has identified potential to create systems using materials that can replace lithium, which is currently mined predominantly in the global south in precarious conditions.

Purely technical, but behaviourally quasi-living materials systems meet the demand for future-oriented environmental and energy technologies. Research into their acceptance, social relevance and sustainability are important components of development.

University of Freiburg



New endosonography techniques led to improved treatment of lung cancer.

Lung cancer, the most common cause of cancer death worldwide, kills more than 35.000 people in the United Kingdom each year. Optimal treatment requires determination of whether cancer has spread to lymph nodes in the chest. Historically, this has been assessed using a surgical approach termed mediastinoscopy. Mediastinoscopy, however, is invasive, requiring general anaesthesia, an incision in the neck and surgical sampling of multiple lymph nodes.

Robert Rintoul, Professor of Thoracic Oncology at the University of Cambridge, led research that demonstrated endosonography-based techniques are less invasive, just as accurate, better tolerated and more cost-effective than mediastinoscopy. As a direct consequence, day-case endosonography has replaced mediastinoscopy as the first-line test to stage lung cancer in the National Health Service (NHS) and other global healthcare systems including those in the USA, Europe, Ireland and New Zealand. In the NHS, this has resulted in 58-80% fewer mediastinoscopy operations and savings of approximately £1.9 million per year.

The widespread use of endosonography techniques has also led to significant improvements in patient quality-of-life during lung cancer staging. Patients now experience staging (the process of determining how much cancer is within the body and if it has spread) under sedation as a day case, rather than under general anaesthetics as inpatients for one to two days.

University of Cambridge

universität freiburg

UNIVERSITY OF CAMBRIDGE

A last resort for cold cases.

In 2015, Dr Sofie Claerhout, Doctor in Forensic Genetics at KU Leuven, began exploring the fascinating scientific world of the Y-chromosome, long considered genetic 'no man's land'. While autosomal DNA provides various insights, the Y-chromosome was often overlooked due to its limited role in indicating gender. However, this characteristic proved to be a treasure trove for forensic investigation, where the stability of small errors across generations is a strong asset for kinship analysis. Mutations in the Y-chromosome enable rapid identification of family ties (Y-STRs), while slow mutations (Y-SNPs) reveal a deeper evolutionary history.

Sofie pioneered techniques for improved and accelerated Y-chromosome analysis in forensic investigations. Despite multiple successes abroad, practical implementation was long a challenge because of legislative barriers. Sofie's perseverance and collaborations with legislators however led to the implementation of a new DNA law in Belgium in 2024, allowing crime scene investigations via Y-DNA. This monumental achievement marks a significant milestone in crime scene investigation and underscores KU Leuven's commitment to pushing boundaries and achieving real-world impact through scientific innovation.

KU Leuven

Digital Data initiative helps to rebuild the Notre Dame.

Sorbonne University's Digital Data project, led by Dany Sandron at the University's Centre André Chastel, centres on the digital reconstruction of the Notre Dame cathedral in Paris. This digital ecosystem, comprised of an interactive 3D visualization, is designed to support the scientific study and restoration of the cathedral following the 2019 fire that damaged the important landmark.

To develop this digital information system, the research team is working on four key areas: the collection and integration of existing digital data, the production of new data, long-term data sharing and archiving, and structuring and semantic enrichment. Materially, the Digital Data project consists of a platform for the centralization and perpetuation of scientific data, in-situ acquisition and processing of 3D pre-and post-fire surveys, spatio-temporal tracing of the keystones in the ribs of collapsed vaults, and automatic classification of photographic images.

This project thus provides invaluable support to the restoration of the Notre Dame cathedral, and the many challenges that materialise during such a major reconstructive process.

Sorbonne University

KU LEUVEN

SORBONNE UNIVERSITÉ

About LERU

The League of European Research Universities, better known as LERU, is a network of 24 leading research-intensive universities based in 12 countries around Europe. LERU universities share the values of high-quality teaching within an environment of internationally competitive research and are committed to the advancement of knowledge and the promotion of research across a broad front.

LERU is a prominent advocate for the promotion of basic research at European research universities. We strongly believe that basic research plays an essential role in the innovation process and significantly contributes to the progress of society. LERU aims at furthering politicians', policymakers' and opinion leaders' understanding of the important role and activities of research-intensive universities.

Our 24 LERU members bring together representatives to work on LERU policy development and engage in mutual learning in many areas. To pursue its goals effectively, LERU also maintains contacts with institutions around the world that contribute to science policymaking and research funding, including European and global partner networks such as seven leading Central European Universities (CE7) and the Global Council of Research-Intensive Universities (GCRIUN).

842,489
Total number of students at LERU universities in 2022-2023

230,558
Total number of staff at LERU universities in 2022-2023

18,422
Number of doctoral degrees conferred by LERU universities in 2022-2023

2,767
Number of MSCA fellows in Horizon 2020 from LERU universities

20%
Of ERC grants awarded to researchers at LERU universities

11.6 billion euro
Total amount of research income in 2022-2023 at LERU universities

10,038
Number of research grants from Horizon 2020 awarded to LERU universities

5,384
Total number of start-ups and spin-out companies created at LERU universities

LERU Universities

UNIVERSITY OF AMSTERDAM

UNIVERSITAT DE BARCELONA

UNIVERSITY OF CAMBRIDGE

UNIVERSITY OF FREIBURG

UNIVERSITÉ DE GENÈVE

UNIVERSITÄT HEIDELBERG

IMPERIAL COLLEGE LONDON

UNIVERSITY COLLEGE LONDON

LUND UNIVERSITY

SORBONNE UNIVERSITY

UNIVERSITÉ PARIS-SACLAY

UNIVERSITY OF STRASBOURG

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- Next Generation Metrics for Scientific and Scholarly Research in Europe (2024)
- How to enhance education for sustainable development (2024)
- Key LERU messages on the European Health Data Space (EHDS) for the ongoing trialogue negotiations (2024)
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- Is university autonomy threatened by EU data policy and law? (2021)
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- They just don't want us there! (2021)
- ERA Conference: LERU expresses the need for "seats and votes" (2021)
- An ERA Transition Forum and Pact for R&I without direct involvement of universities? Please try again! (2021)
- The role of academic institutions in building resilient and sustainable societies (2021)
- Implementing open science (2021)
- Equality, diversity and inclusion at universities: the power of a systemic approach (2019)
- Delivering talent: Careers of researchers inside and outside academia (2018)
- Open Science and its role in universities: a roadmap for cultural change (2018)
- Future proofing European Research Excellence (2017)
- The new General Data Protection Regulation: why it worries universities and researchers (2016)
- LERU takes concrete steps towards ERA (2014)
- Women, research and universities: Excellence without gender bias (2012)
- Doctoral degrees beyond 2010: Training talented researchers for society (2010)

All LERU publications can be found on the LERU website.

PUSHING
THE FRONTIERS
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Université de Genève
Universität Heidelberg
University of Helsinki
Universiteit Leiden
KU Leuven
Imperial College London
University College London
Lund University
University of Milan
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