



European Research Council
Established by the European Commission



Mapping ERC Frontier Research

The European Research Council (ERC) encourages researchers and their teams to push the frontiers of knowledge. With the intention to map the breadth and diversity of the research it supports, the ERC analysed the content of the projects funded under the Horizon 2020 (H2020) framework programme (2014-2020) through an in-house developed, non-hierarchical classification system of almost 900 terms. This classification system allows the ERC to capture the scientific essence of funded projects, to highlight interdisciplinary areas and synergies, and to pinpoint the valuable contribution of ERC frontier research to help tackle global challenges.

The versatility and power of these data is at the centre of this package, which includes:

- > This overview fact sheet.
- > A collection of 25 fact sheets with data from the ERC evaluation panels in the Starting, Consolidator or Advanced Grant schemes.
- > A fact sheet focusing on projects funded under the Synergy Grant scheme.
- > A collection of three policy fact sheets.

The overview offers an introduction with general statistics about the ERC's H2020 project portfolio and includes highlights from all fact sheets to give a glimpse of the information they contain.

The panel-specific and Synergy Grant fact sheets provide a general overview of the projects funded in the 25 ERC evaluation panels in three scientific domains (Life Sciences, 9 panels; Physical Sciences and Engineering, 10 panels; Social Sciences and Humanities, 6 panels), and under the Synergy Grant scheme. Encompassing all scientific fields, these fact sheets give a unique insight in the frontier research landscape of the ERC project portfolio.


The policy fact sheets portray the contribution of the ERC's H2020 frontier research projects to three key policy areas of the European Union, namely the European Green Deal, a Europe fit for the digital age and the EU4Health programme. Even though the ERC does not set thematic or policy priorities for the research it funds, many ERC grantees contribute knowledge to address European and global challenges, often offering innovative and sustainable solutions.

Data as of December 2021

Overview of ERC Frontier Research in H2020

This fact sheet provides some general information about the projects funded by the ERC under the ERC Starting Grant (StG), Consolidator Grant (CoG), Advanced Grant (AdG) and Synergy Grant (SyG) schemes in the H2020 Framework Programme (2014–2020)*. It also includes highlights from the panel and policy fact sheets.


Over **54000** applications


6707 projects funded

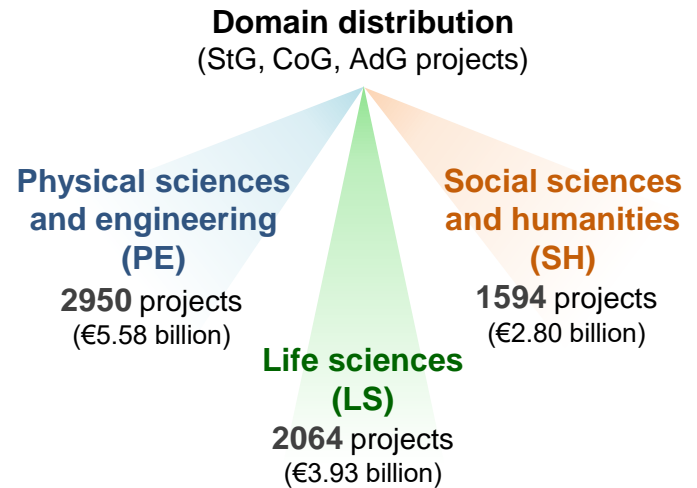

€13.3 billion budget

 **2771** projects
(€4.15 billion)

 **2253** projects
(€4.39 billion)

 **1584** projects
(€3.78 billion)

 **99** projects
(€0.98 billion)



Distribution of ERC-funded projects in EU Member States and Associated Countries (ACs) in H2020

The 6608 ERC projects funded under the single-investigator calls (ERC StG, CoG and AdG) are based in 24 EU Member States** and 7 ACs. When looking at the geographical distribution of projects funded in the 25 evaluation panels, there are some interesting patterns that emerge. Some of these patterns, together with the geographical share of the 6608 projects, are shown below:

Germany is particularly strong in the **LS** and **PE** domains, hosting the largest share of projects of all countries in 7 of the 9 LS panels and 6 of the 10 PE panels.

In the case of the **SH** domain, the **UK** and the **Netherlands** are the countries that have the largest share of projects, hosting 40% of these projects.
































Some countries do particularly well in specific fields. For example, 21% of all projects funded in the Mathematics (**PE1**) panel were hosted in **France**, while 16% of the projects funded in the Genetics, 'Omics', Bioinformatics and Systems Biology (**LS2**) panel were hosted in **Israel**.

In some countries, a large share of the project portfolio accumulates in a specific field. For example, 18% of the projects hosted in **Sweden** were in the Applied Medical Technologies, Diagnostics, Therapies and Public Health (**LS7**) panel. Likewise, in **Portugal**, 16% are in the Products and Processes Engineering (**PE8**) panel and 14% in the Neuroscience and Neural Disorders (**LS5**) panel.

Interesting patterns can also be discerned in countries that host a smaller share of projects. For example, 26% of the projects hosted in **Hungary** are in the Neuroscience and Neural Disorders (**LS5**) panel, while 31% of the projects hosted in **Poland** are in the Computer Science and Informatics (**PE6**) panel.

EU Member States

ACs

 United Kingdom 1200 (18%)	 Austria 209 (3%)	 Greece 21 (<1%)	 Switzerland 456 (7%)
 Germany 1114 (17%)	 Denmark 157 (2%)	 Luxembourg 13 (<1%)	 Israel 350 (5%)
 France 738 (11%)	 Finland 122 (2%)	 Slovenia 12 (<1%)	 Norway 101 (2%)
 Netherlands 602 (9%)	 Ireland 90 (1%)	 Romania 10 (<1%)	 Turkey 18 (<1%)
 Spain 370 (6%)	 Portugal 76 (1%)	 Estonia 7 (<1%)	 Iceland 4 (<1%)
 Italy 361 (5%)	 Czech Republic 35 (<1%)	 Cyprus 5 (<1%)	 Serbia 2 (<1%)
 Belgium 243 (4%)	 Hungary 27 (<1%)	 Croatia 3 (<1%)	 Ukraine 1 (<1%)
 Sweden 234 (4%)	 Poland 26 (<1%)	 Lithuania 1 (<1%)	

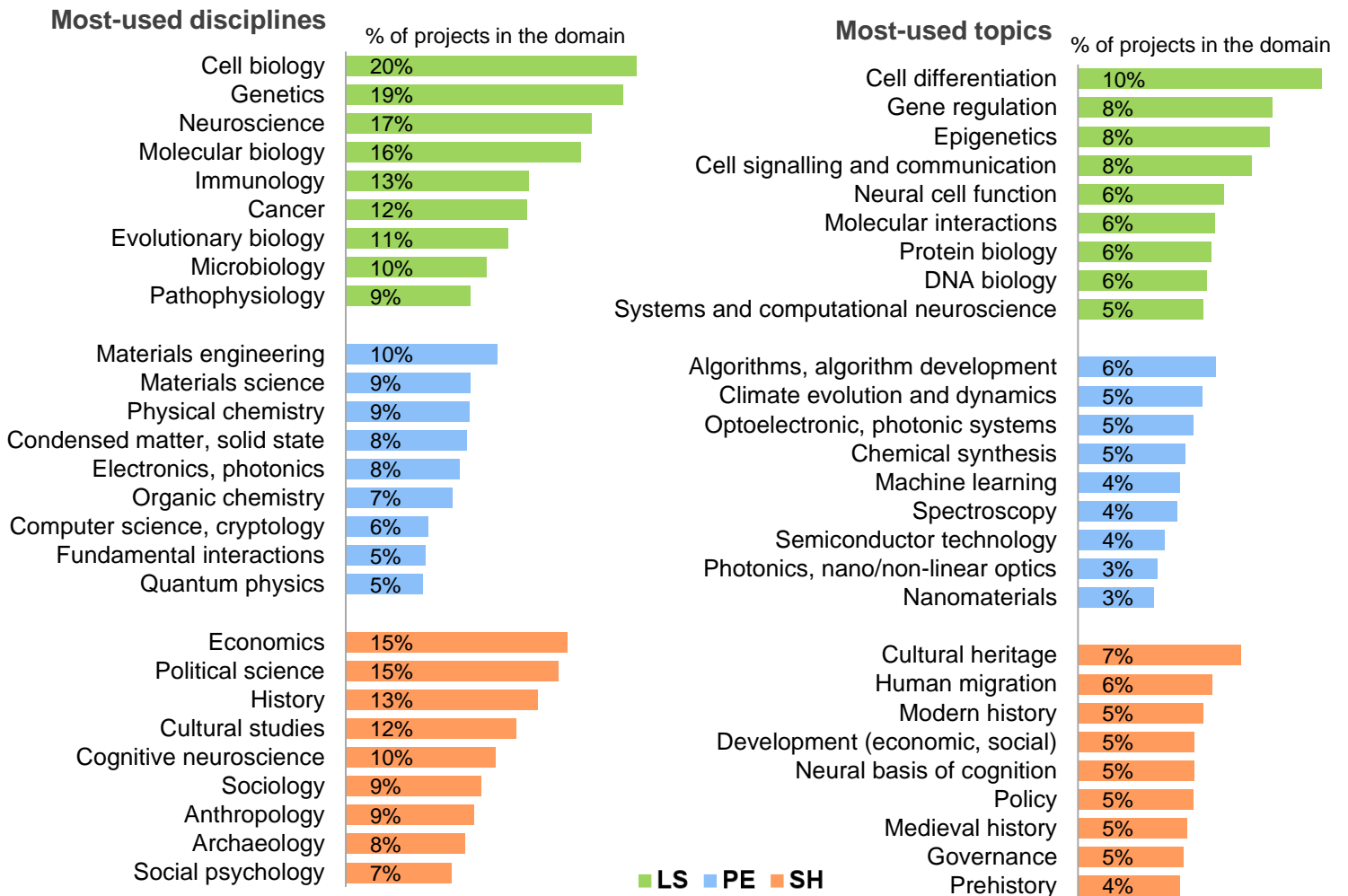
*Data as of December 2021

** United Kingdom: Member State until 31st January 2020

Overview of ERC Frontier Research in H2020

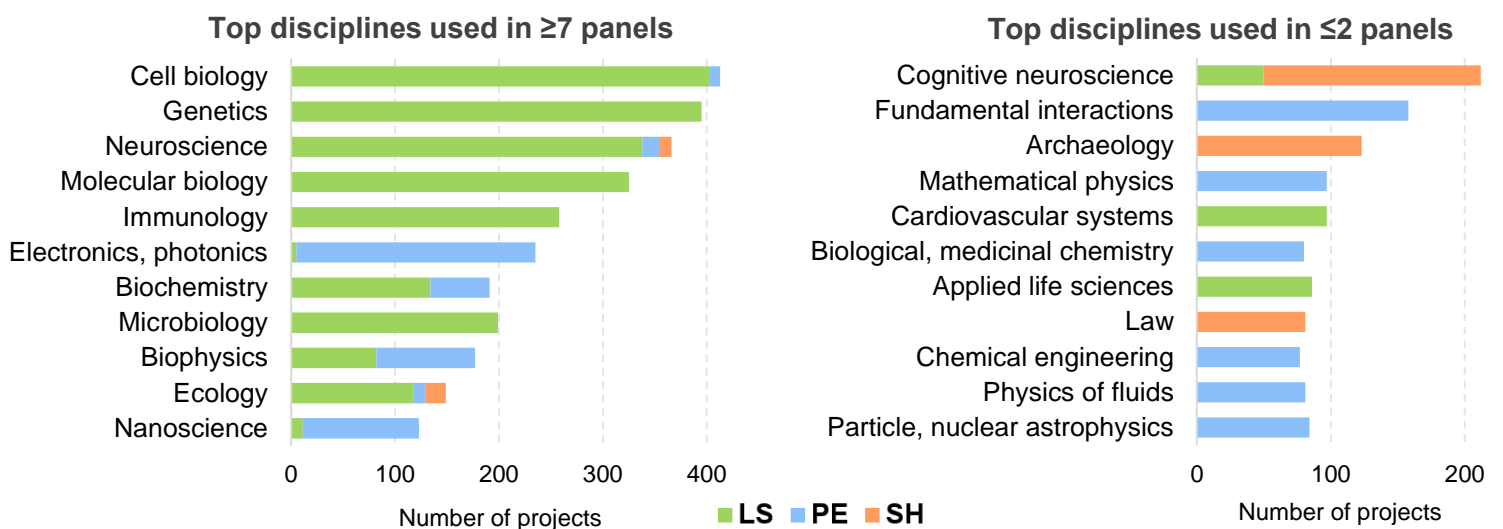
Scientific landscape of ERC-funded projects

(StG, CoG, AdG projects)



Scientific field use across the 25 panels*

(StG, CoG, AdG projects)



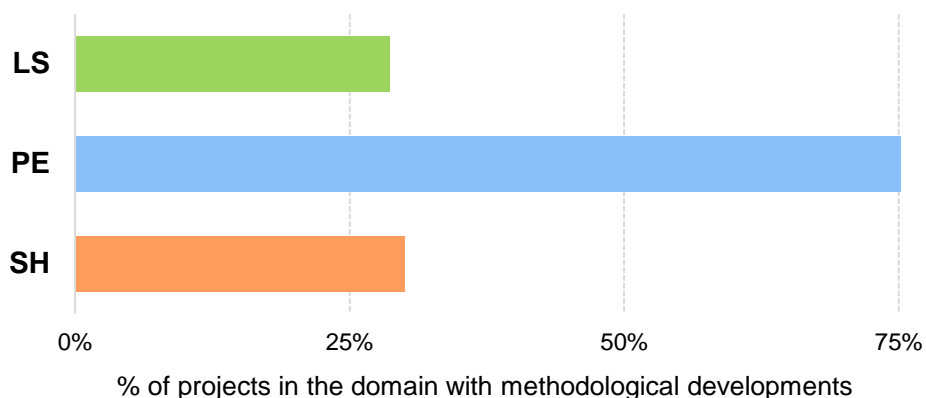
Broadly used disciplines, appearing in projects across several panels (≥ 7), generally correspond to fields in the life sciences (LS) domain. Cell biology and Neuroscience are the ones used in the largest number of panels (10).

Disciplines that tend to be more panel-specific, even if they are used by many projects, generally correspond to fields in physical sciences and engineering (PE) and social sciences and humanities (SH).

*Only panels where ≥ 5 projects had these disciplines were considered

Overview of ERC Frontier Research in H2020

Methodological developments in H2020 ERC-funded projects

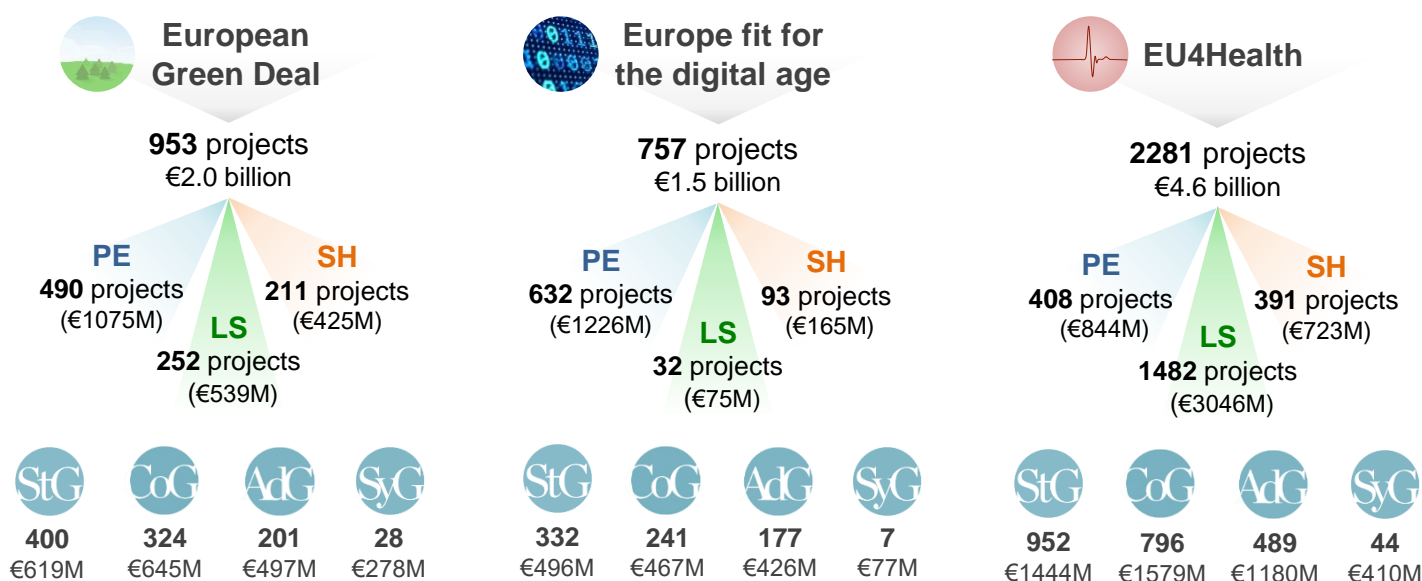


New methods and instrumentations are developed as part of the scope of various ERC-funded projects; the main methodological developments in the different domains are in the following areas:

- **LS domain:** *Computational modelling, simulations*, with a focus on demographic models and protein computational prediction, and *Animal models*, with humanized and engineered mouse models being the focus.
- **PE domain:** *Experimental methods*, with a focus on climate models, and *Computational modelling, simulations*, with neural networks being the focus; other methodological developments include *Theoretical, mathematical methods*, with a focus on field theory and algorithms, and *Synthetic methods*, with organic synthesis, chemistry and catalysis being the focus.
- **SH domain:** *Theoretical analysis*, with a focus on finance and economy, and *Computational modelling, simulations*, with cognitive and learning models being the focus.

ERC frontier research relevant for European Commission (EC) policy areas

While the ERC encourages grantees to follow their scientific curiosity without any thematic priorities, their cutting-edge research generates results that address a wide range of issues with significant socioeconomic, environmental and policy relevance. This is exemplified by the contribution of this rich and diverse frontier project portfolio to these three EC policy priorities



14% of H2020 ERC projects contribute to the European Green Deal. Of these projects, the largest proportion (9% of all funded projects) contributes to the Boosting climate action area.

10% of H2020 ERC projects contribute to a Europe fit for the digital age. Almost half of these projects are in the area of Artificial intelligence, constituting 4% of all funded projects.

34% of H2020 ERC projects contribute to EU4Health. Two of the largest areas related to health are Brain and human mind research and Cancer, with 9% and 8% of all funded projects, respectively.



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ERC Frontier Research in Life Sciences

This series of factsheets provides an overview of the projects funded by the European Research Council (ERC), in the Life Sciences domain, in the H2020 Framework Programme (2014–2020)

Molecular Biology, Biochemistry, Structural Biology
and Molecular Biophysics (LS1)

Genetics, 'Omics', Bioinformatics and Systems Biology (LS2)

Cellular and Developmental Biology (LS3)

Physiology, Pathophysiology and Endocrinology (LS4)

Neuroscience and Neural Disorders (LS5)

Immunity and Infection (LS6)

Applied Medical Technologies, Diagnostics,
Therapies and Public Health (LS7)

Ecology, Evolution and Environmental Biology (LS8)

Applied Life Sciences, Biotechnology
and Molecular and Biosystems Engineering (LS9)

Data as of December 2021

LS

Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics (LS1)

This fact sheet provides an overview of the projects funded in the 'Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1356 applications
(2.5% of total)



188 projects funded
(2.8% of total)



70 projects
(€108M)



62 projects
(€124M)



56 projects
(€120M)



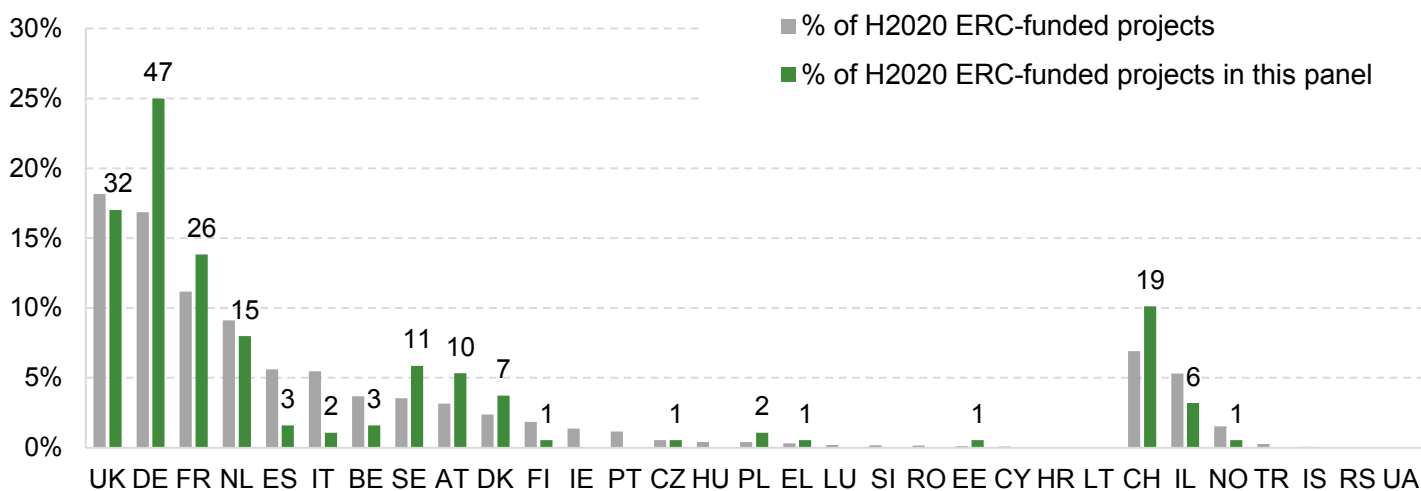
55 female grantees
(29% of grantees in this panel)



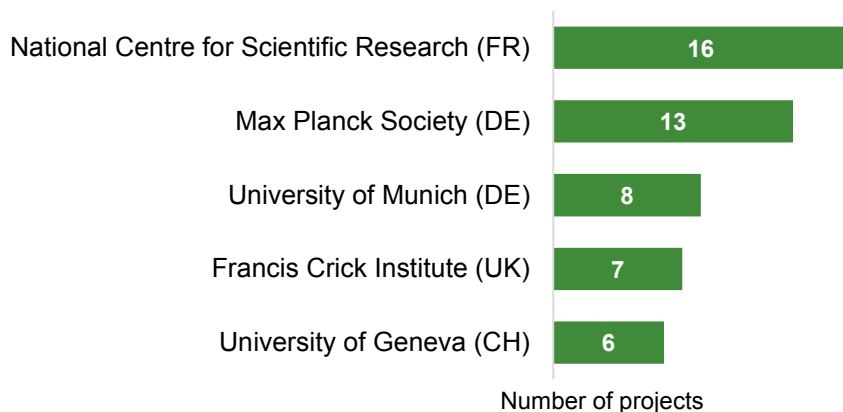
€352 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

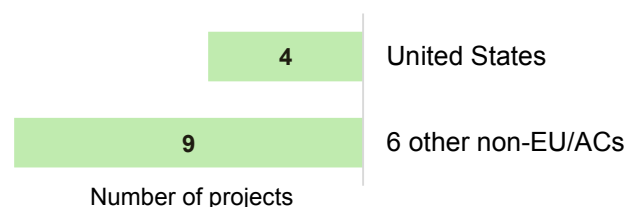
The 188 funded projects (numbers in the graph) are in 15 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥6 funded projects



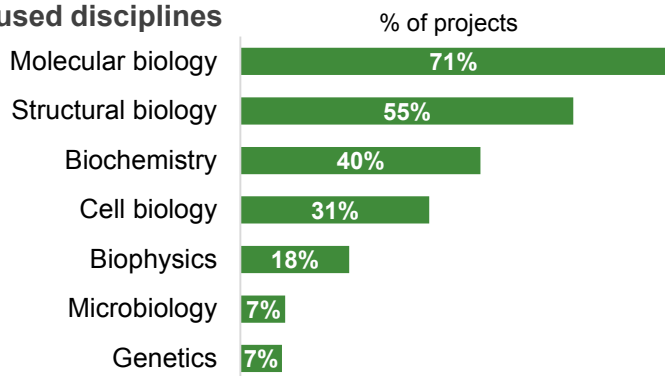
Country of origin of grantees other than EU or ACs (≤3 grouped together)



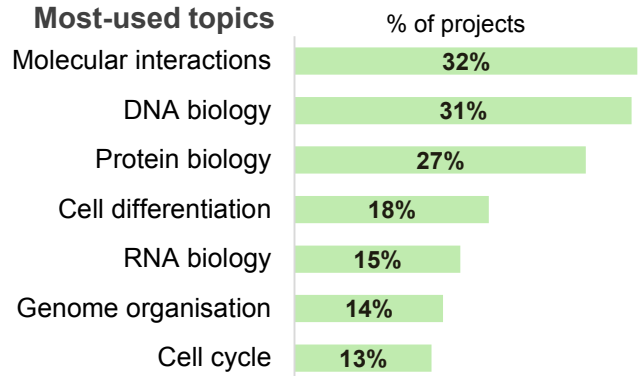
*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

Most-used disciplines



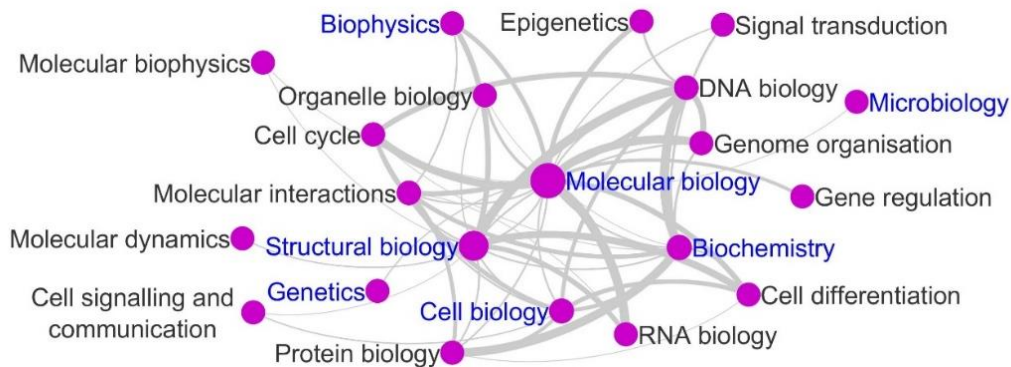
Most-used topics



- *Molecular biology*, *Cell biology*, *Cell signaling and communication*, and *Protein biology* grew in use from 2014 to 2020
- *Molecular biology*, *Biochemistry*, *Genome organisation* and *Cell cycle* were used more in StG projects compared to those funded in CoG and AdG schemes, while *DNA biology* was used more in AdG projects
- Around 1/4 of the projects in this panel generate methodological developments, *Biochemistry techniques*, *Single molecule approaches* and *Structural biology techniques* are the main ones

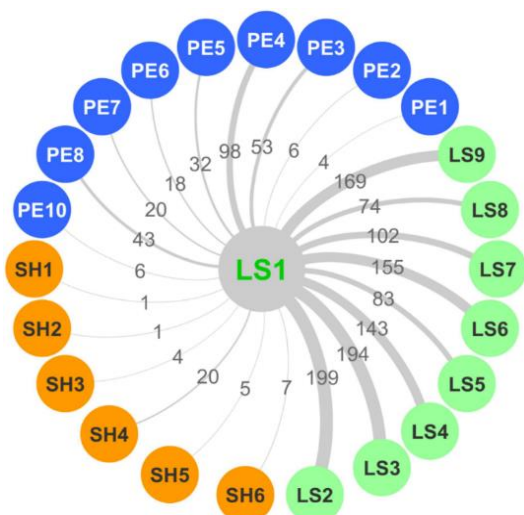
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), Cellular and Developmental Biology (LS3), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels through the disciplines *Cell biology*, *Molecular biology* and *Biophysics*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel
- **PE domain:** the main interactions are with the Physical and Analytical Chemical Sciences (PE4), Condensed Matter Physics (PE3), and Products and Processes Engineering (PE8) panels through the disciplines *Biochemistry*, *Biophysics* and *Structural biology*

Genetics, 'Omics', Bioinformatics and Systems Biology (LS2)

This fact sheet provides an overview of the projects funded in the 'Genetics, 'Omics', Bioinformatics and Systems Biology' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1466 applications
(2.7% of total)



192 projects funded
(2.9% of total)



84 projects
(€127M)



65 projects
(€132M)



43 projects
(€103M)



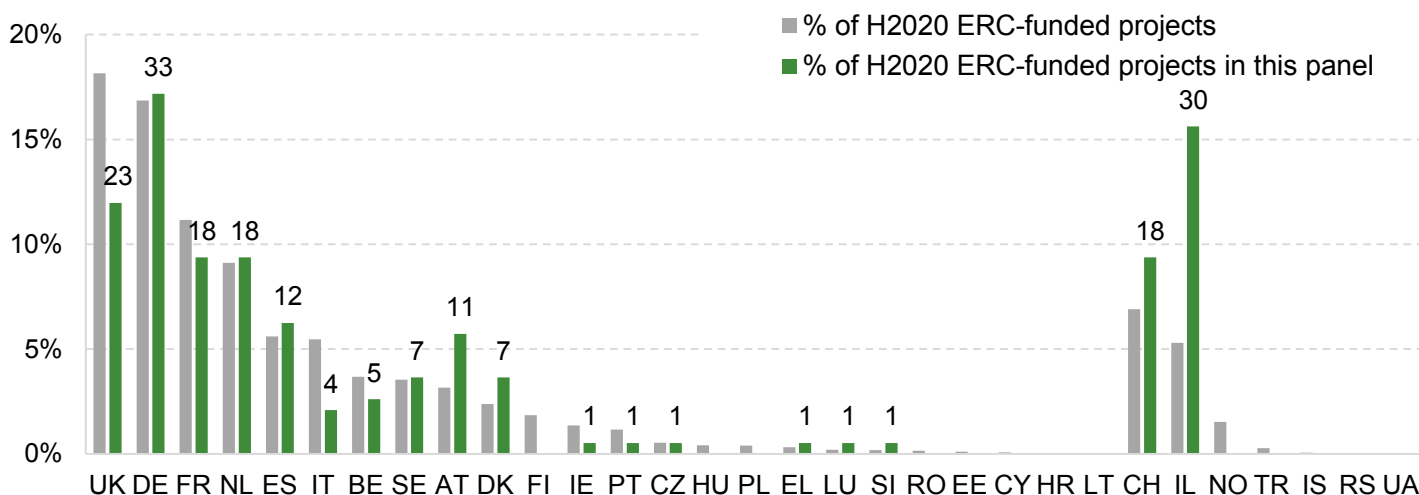
47 female grantees
(24% of grantees in this panel)



€362 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

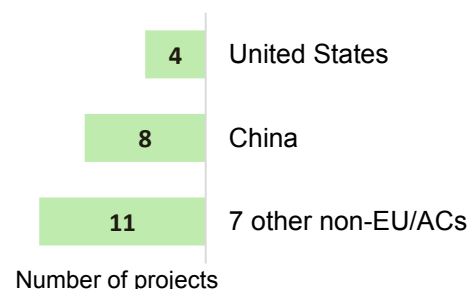
The 192 funded projects (numbers in the graph) are in 16 EU Member States and 2 Associated Countries (ACs)



Host institutions with ≥5 funded projects

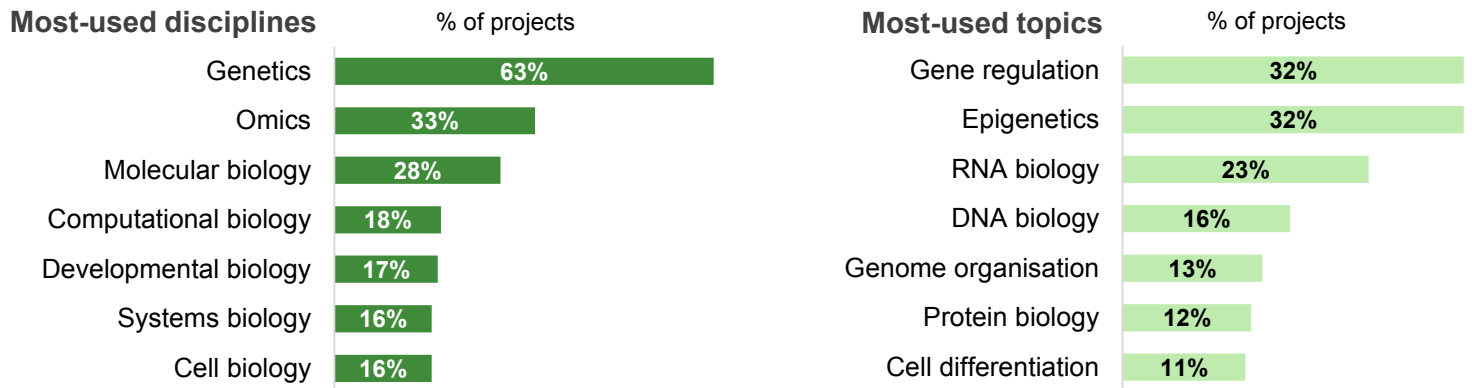


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

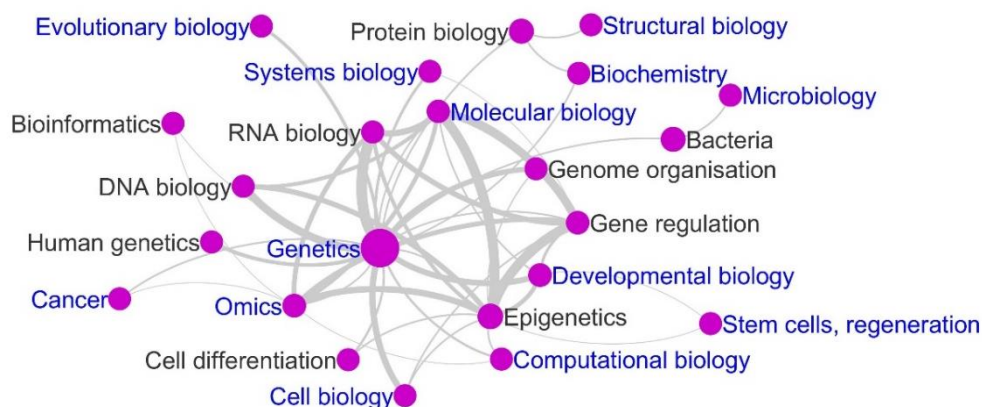
Scientific landscape of ERC-funded projects in this panel



- *Computational biology*, *Bioinformatics* and *Microbiota* grew in use from 2014 to 2020
- *Omics*, *Computational biology*, *Systems biology* and *Gene regulation* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Epigenetics*, *RNA biology* and *Protein biology* were used more in CoG projects
- Around 1/4 of the projects in this panel generate methodological developments. *Computational modelling*, *simulations*, *Omics*, and *DNA and RNA analysis* are the main ones

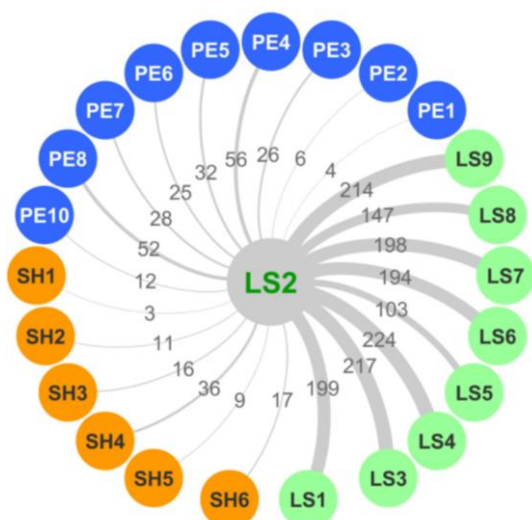
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Cellular and Developmental Biology (LS3), Physiology, Pathophysiology and Endocrinology (LS4), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels through the disciplines *Genetics*, *Molecular biology* and *Developmental biology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel through the disciplines *Neuroscience* and *Evolutionary biology*
- **PE domain:** the main interactions are with the Physical and Analytical Chemical Sciences (PE4), and Products and Processes Engineering (PE8) panels through the discipline *Biochemistry*

Cellular and Developmental Biology (LS3)

This fact sheet provides an overview of the projects funded in the ‘Cellular and Developmental Biology’ panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1300 applications
(2.4% of total)



177 projects funded
(2.7% of total)



70 projects
(€107M)



60 projects
(€122M)



47 projects
(€116M)



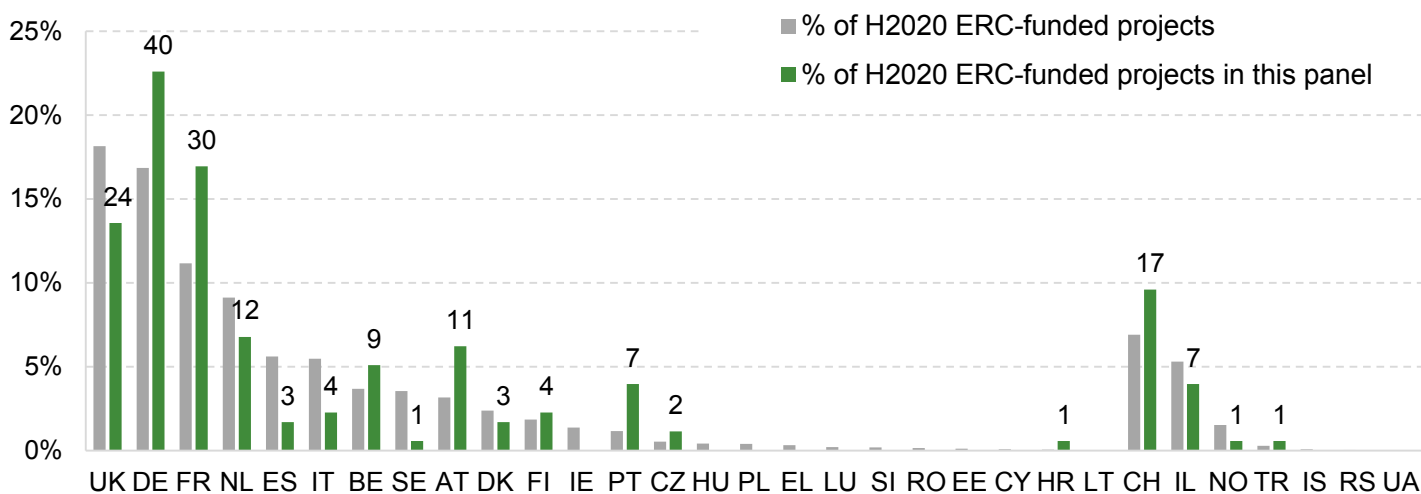
56 female grantees
(32% of grantees in this panel)



€345 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

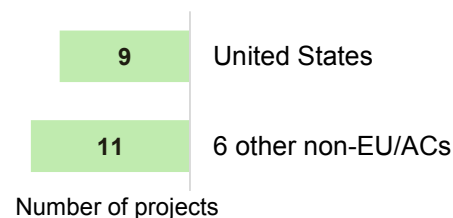
The 177 funded projects (numbers in the graph) are in 14 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥6 funded projects

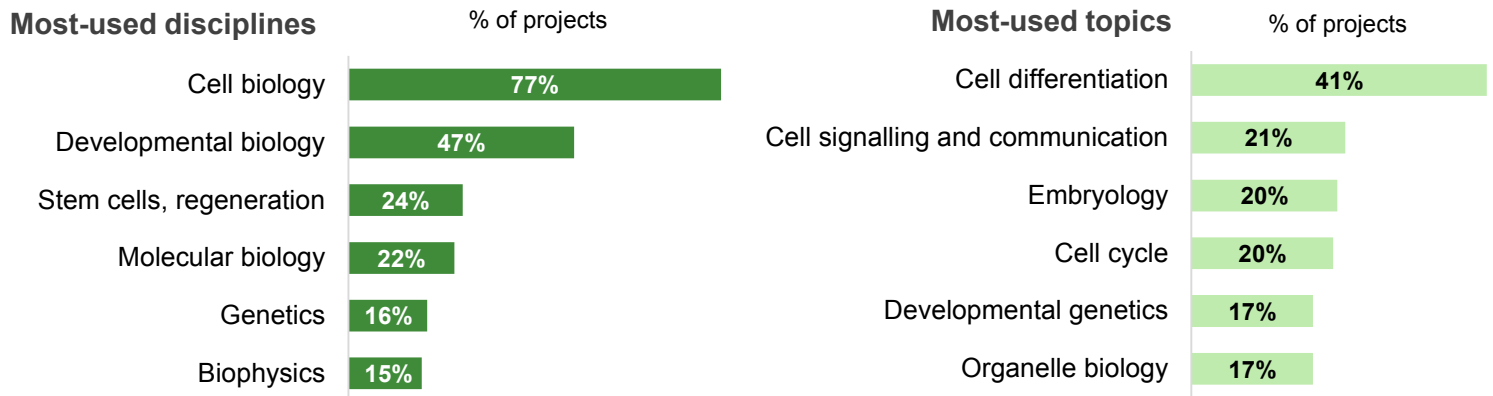


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

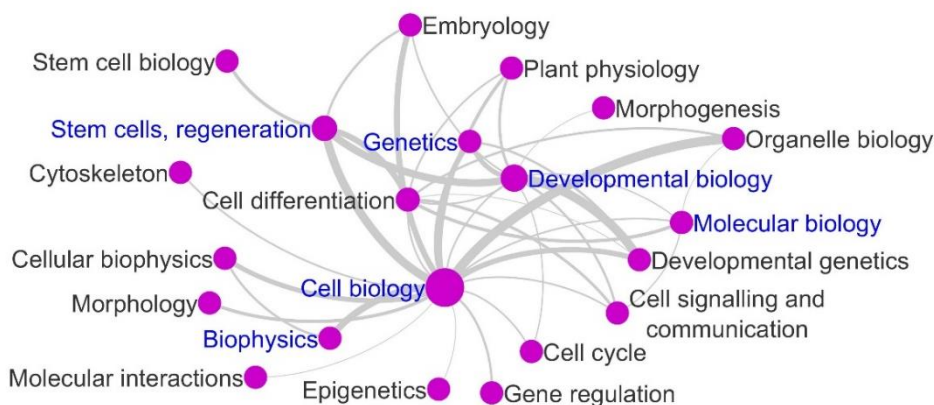
Scientific landscape of ERC-funded projects in this panel



- *Molecular biology, Biophysics, Cell signaling and communication, and Organelle biology* grew in use from 2014 to 2020
- *Cell biology, Cell differentiation* and *Cell cycle* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Developmental biology, Genetics, Embryology* and *Developmental genetics* were used more in AdG projects
- Around 1/3 of the projects in this panel generate methodological developments. *Mathematical modelling, Computational modelling, simulations, and Cell and tissue studies* are the main ones

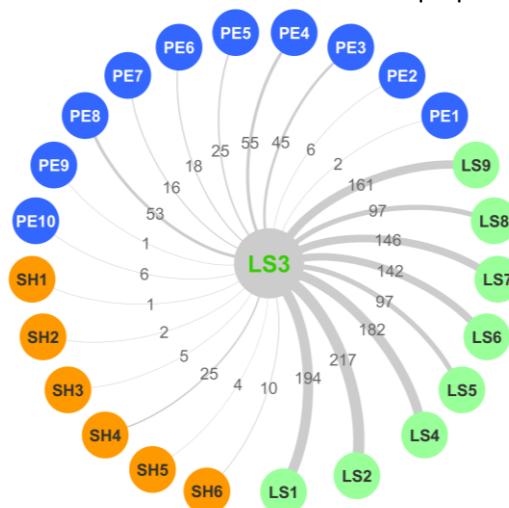
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics (LS1), and Physiology, Pathophysiology and Endocrinology (LS4) panels through the disciplines *Cell biology, Molecular biology* and *Developmental biology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel through the discipline *Evolutionary biology*
- **PE domain:** the main interactions are with Physical and Analytical Chemical Sciences (PE4), and Products and Processes Engineering (PE8) panels through the disciplines *Biophysics* and *Biochemistry*

Physiology, Pathophysiology and Endocrinology (LS4)

This fact sheet provides an overview of the projects funded in the 'Physiology, Pathophysiology and Endocrinology' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1882 applications
(3.5% of total)



238 projects funded
(3.6% of total)



95 projects
(€146M)



83 projects
(€165M)



60 projects
(€148M)



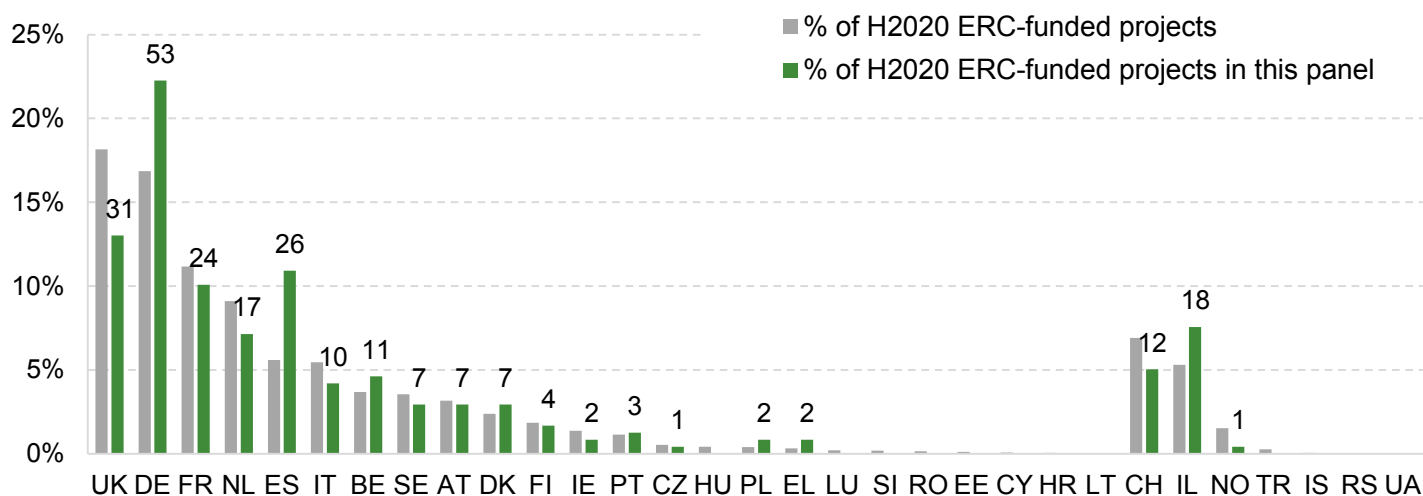
74 female grantees
(31% of grantees in this panel)



€459 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

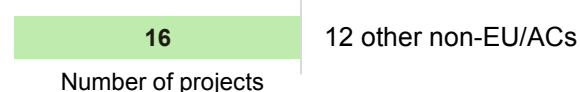
The 238 funded projects (numbers in the graph) are in 16 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥6 funded projects



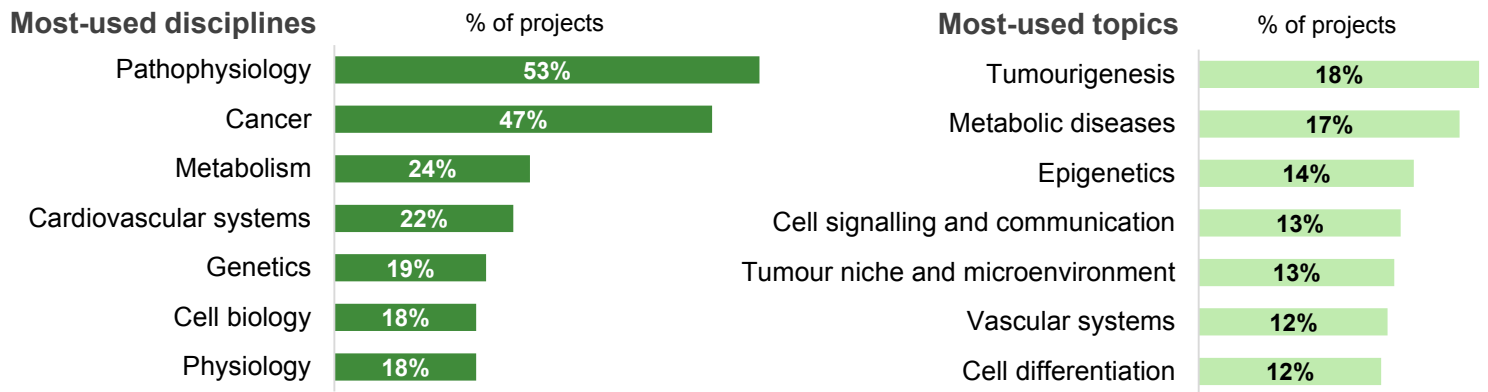
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

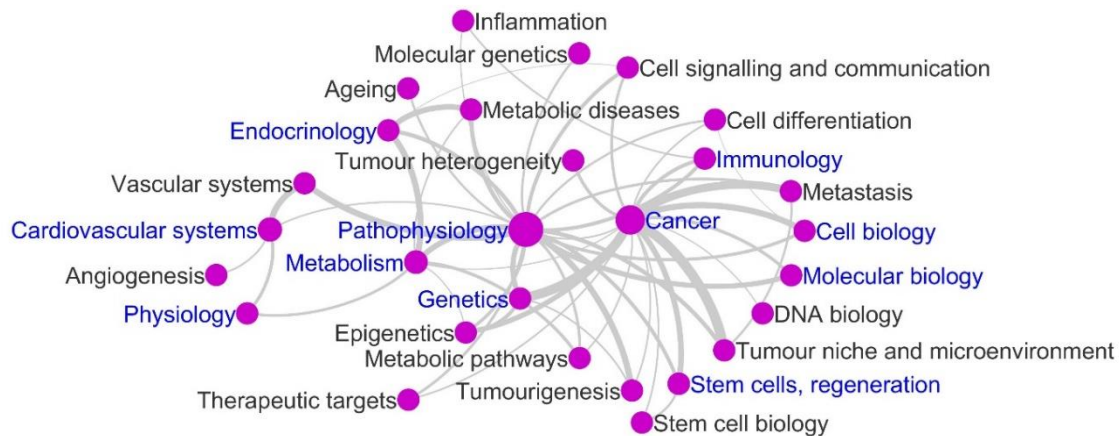
Scientific landscape of ERC-funded projects in this panel



- *Genetics*, *Cell biology*, and *Cell signalling and communication* grew in use from 2014 to 2020
- *Physiology* was used more in StG projects compared to those funded in CoG and AdG schemes, while *Tumourigenesis* and *Vascular systems* were used more in CoG projects and *Cell biology* and *Cell differentiation* were used more in AdG projects
- Around 1/5 of the projects in this panel generate methodological developments. *Animal models for cancer* and *Biostatistics* are the main ones

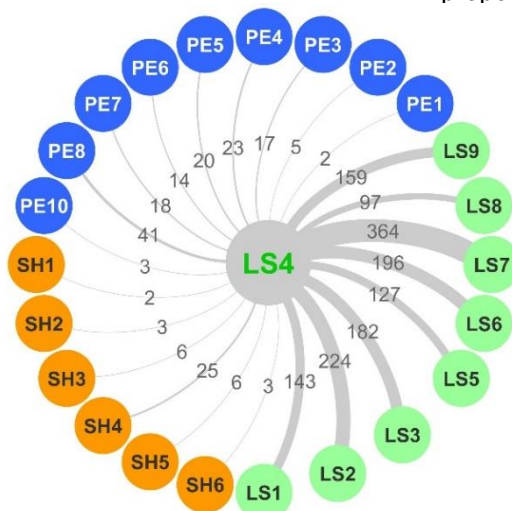
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7), Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), and Immunity and Infection (LS6) panels through the disciplines *Cancer*, *Genetics*, *Cardiovascular systems* and *Cell biology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel through the discipline *Neuroscience*
- **PE domain:** the interaction is not very strong, but there is some connection with the Products and Processes Engineering (PE8) panel

Neuroscience and Neural Disorders (LS5)

This fact sheet provides an overview of the projects funded in the 'Neuroscience and Neural Disorders' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2093 applications
(3.9% of total)



284 projects funded
(4.3% of total)



122 projects
(€181M)



92 projects
(€179M)



70 projects
(€169M)



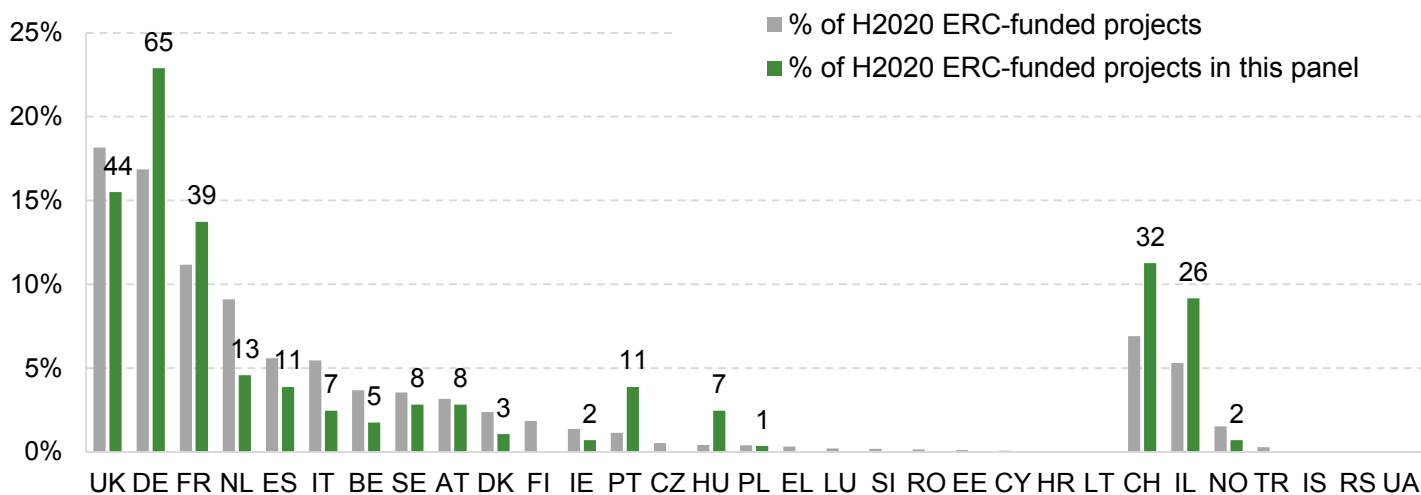
92 female grantees
(32% of grantees in this panel)



€529 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

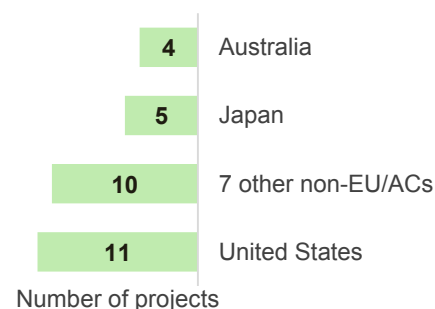
The 284 funded projects (numbers in the graph) are in 14 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥9 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)

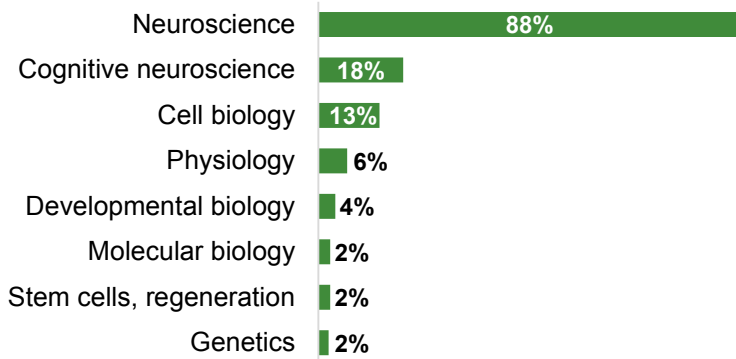


*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

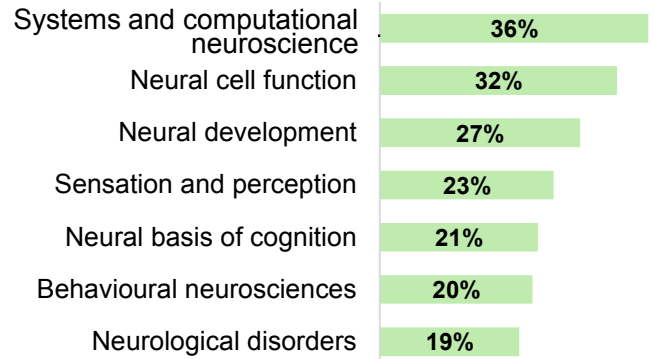
Most-used disciplines

% of projects



Most-used topics

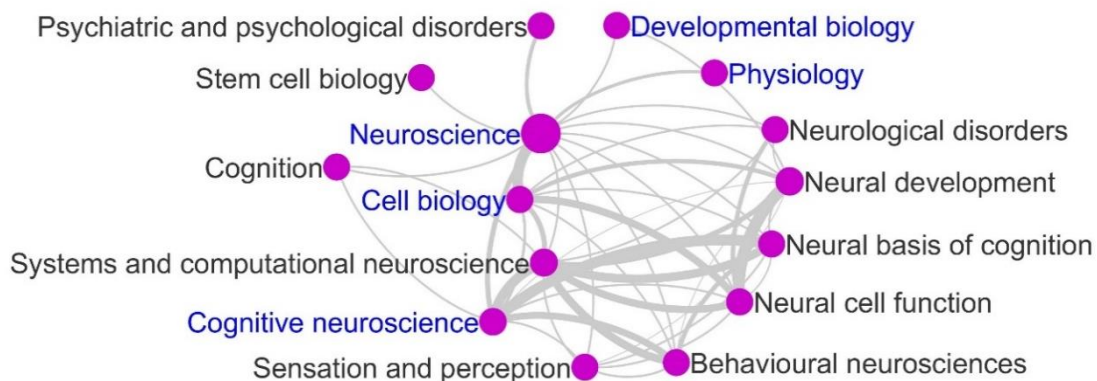
% of projects



- *Cognitive neuroscience* and *Neural cell function* grew in use from 2014 to 2020
- *Cognitive neuroscience*, *Cell biology*, *Molecular biology*, *Sensation and perception*, *Behavioural neurosciences* and *Neurological disorders* were used more in CoG projects compared to those funded in StG and AdG schemes, while *Neural cell function* was used more in AdG projects
- Around 1/5 of the projects in this panel generate methodological developments. *Animal models*, and *DNA*, *RNA* and *protein delivery* are the main ones

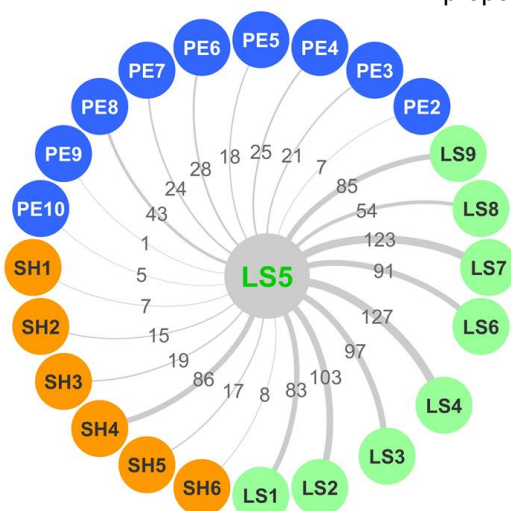
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Physiology, Pathophysiology and Endocrinology (LS4), Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7), and Genetics, 'Omics', Bioinformatics and Systems Biology (LS2) panels through the disciplines *Cell biology*, *Neuroscience* and *Physiology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel through the discipline *Cognitive neuroscience*
- **PE domain:** the interaction is not very strong, but there is some connection with the Products and Processes Engineering (PE8) panel

Immunity and Infection (LS6)

This fact sheet provides an overview of the projects funded in the 'Immunity and Infection' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1442 applications
(2.7% of total)



187 projects funded
(2.8% of total)



73 projects
(€111M)



63 projects
(€130M)



51 projects
(€121M)



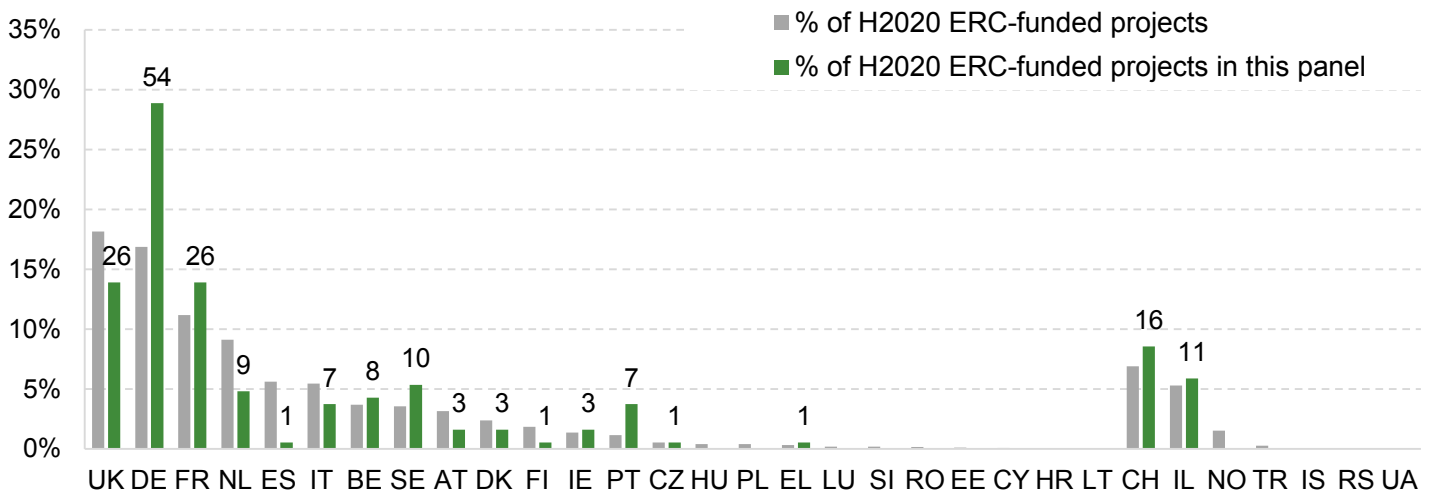
55 female grantees
(29% of grantees in this panel)



€362 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

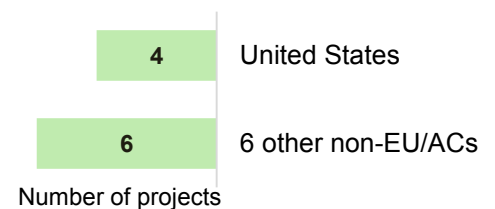
The 187 funded projects (numbers in the graph) are in 15 EU Member States and 2 Associated Countries (ACs)



Host institutions with ≥5 funded projects

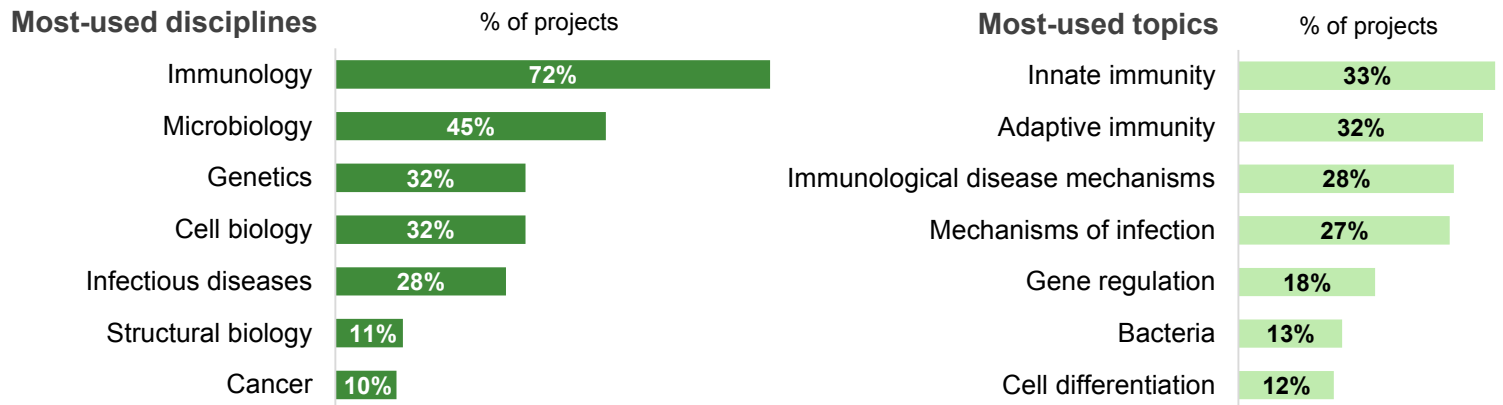


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

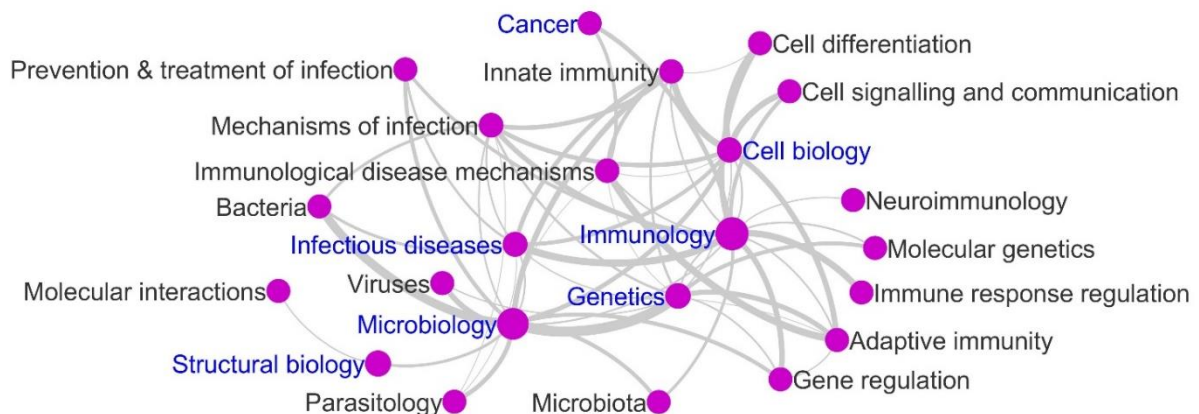
Scientific landscape of ERC-funded projects in this panel



- *Structural biology* and *Immune response regulation* grew in use from 2014 to 2020
- *Microbiology*, *Genetics*, *Cell biology* and *Gene regulation* were used more in StG and CoG projects compared to those funded in AdG scheme, while *Cancer* and *Immunological disease mechanisms* were used more in AdG projects
- Around 1/5 of the projects in this panel generate methodological developments. *Animal models* and *Cell and tissue studies* are the main ones

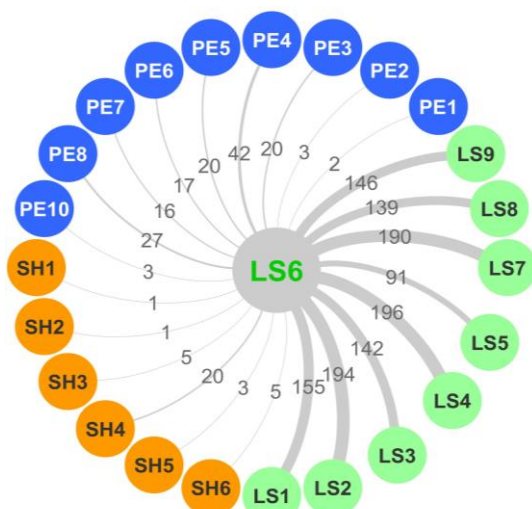
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains based on shared disciplines

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Physiology, Pathophysiology and Endocrinology (LS4), Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), and Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panels through the disciplines *Genetics*, *Immunology* and *Cell biology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Human Mind and Its Complexity (SH4) panel through the discipline *Neuroscience*
- **PE domain:** the interaction is not very strong, but there is some connection with the Physical and Analytical Chemical Sciences (PE4) panel through the discipline *Structural biology*

Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7)

This fact sheet provides an overview of the projects funded in the 'Applied Medical Technologies, Diagnostics, Therapies and Public Health' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



3015 applications
(5.6% of total)



345 projects funded
(5.2% of total)



143 projects
(€219M)



118 projects
(€236M)



84 projects
(€207M)



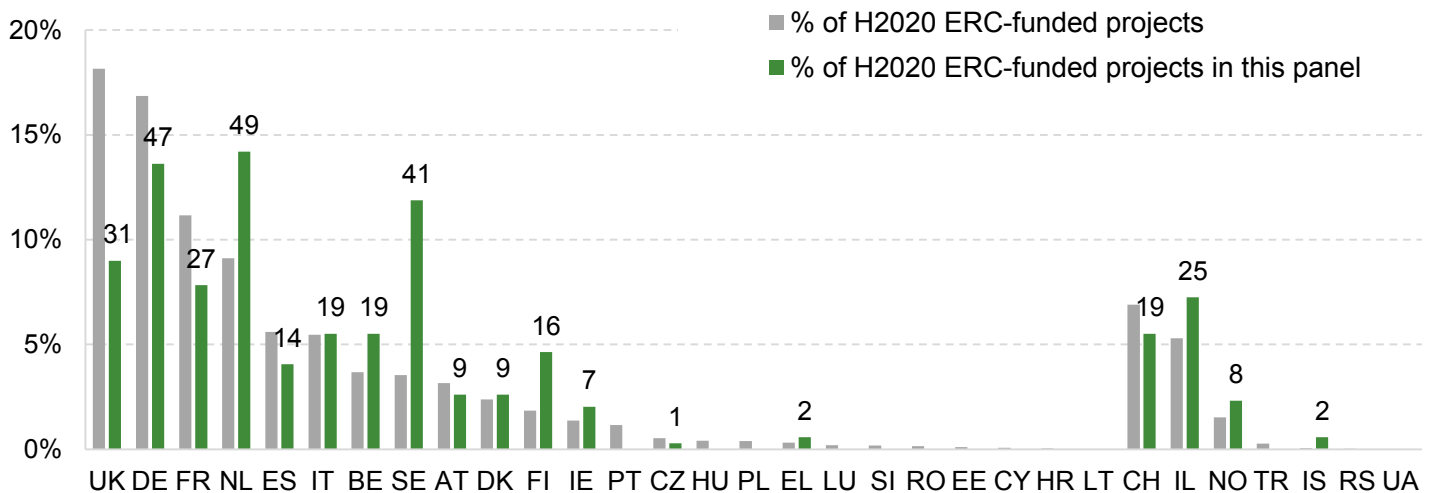
104 female grantees
(30% of grantees in this panel)



€662 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

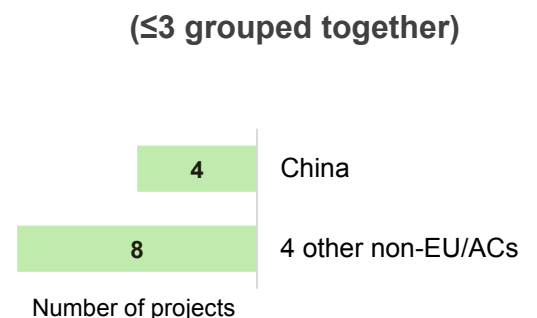
The 345 funded projects (numbers in the graph) are in 14 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥9 funded projects

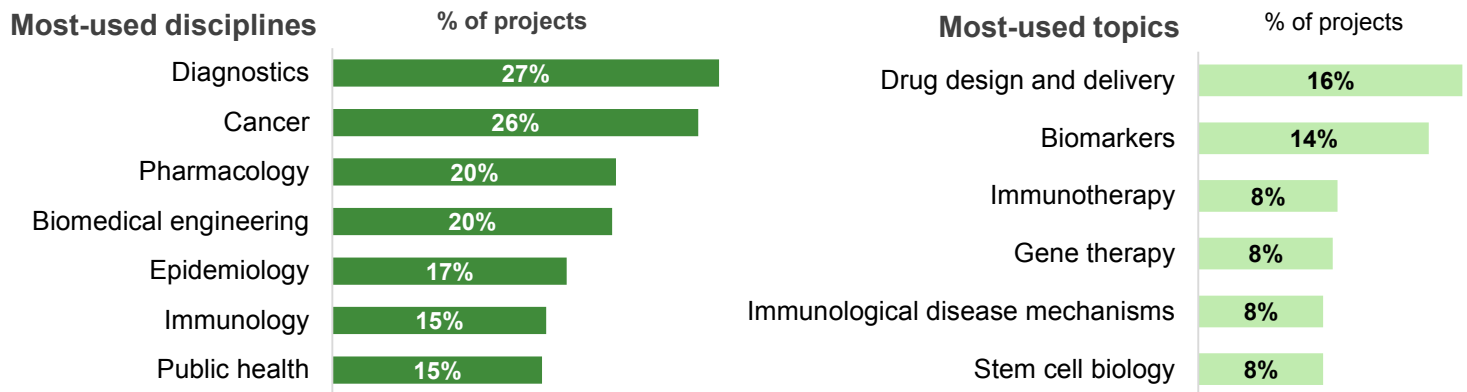


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

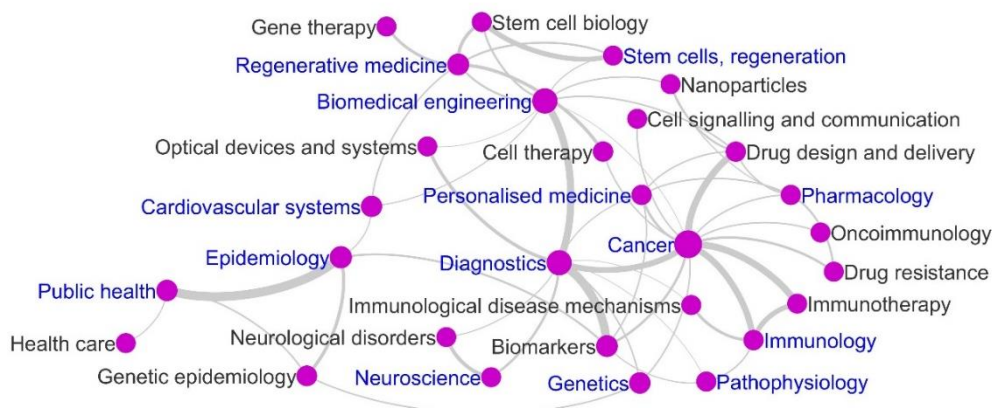
Scientific landscape of ERC-funded projects in this panel



- *Immunology, Immunotherapy and Cell therapy* grew in use from 2014 to 2020
- *Biomedical engineering, Public health and Biomarkers* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Cancer, Pharmacology, Immunology, Immunotherapy and Gene therapy* were used more in AdG projects
- Around half of the projects in this panel generate methodological developments. *Animal models for developing and testing therapies, and Whole organism imaging* are the main ones

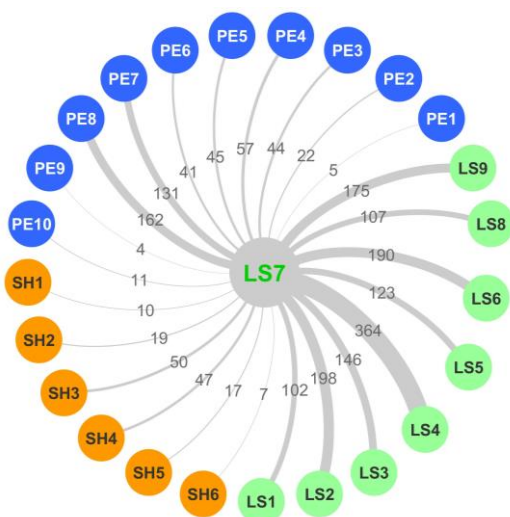
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Physiology, Pathophysiology and Endocrinology (LS4), Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), and Immunity and Infection (LS6) panels through the disciplines *Cancer, Immunology, Cardiovascular systems* and *Genetics*
- **SH domain:** the interaction is not very strong, but there is some connection with The Social World, Diversity, Population (SH3), and The Human Mind and Its Complexity (SH4) panels through the disciplines *Public health* and *Neuroscience*
- **PE domain:** the main interactions are with the Products and Processes Engineering (PE8), and Systems and Communication Engineering (PE7) panels through the discipline *Biomedical engineering*

Ecology, Evolution and Environmental Biology (LS8)

This fact sheet provides an overview of the projects funded in the 'Ecology, Evolution and Environmental Biology' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2014 applications
(3.7% of total)



259 projects funded
(3.9% of total)



110 projects
(€167M)



91 projects
(€183M)



58 projects
(€143M)



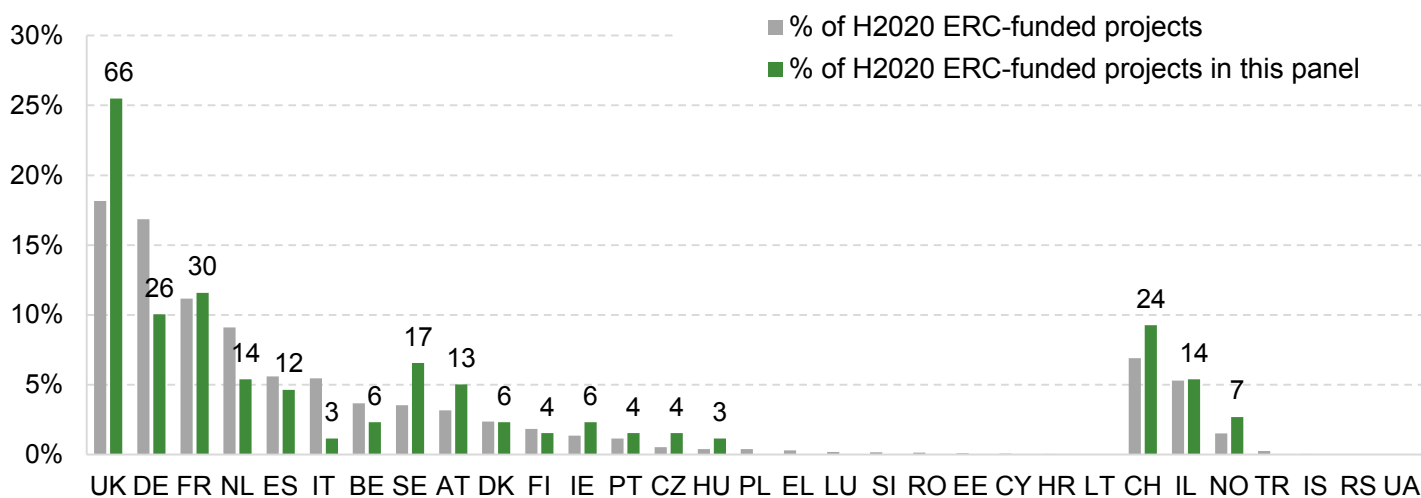
97 female grantees
(37% of grantees in this panel)



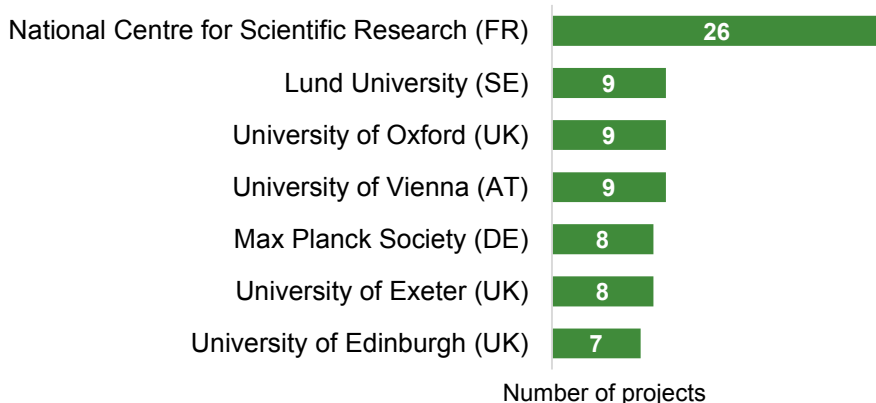
€493 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

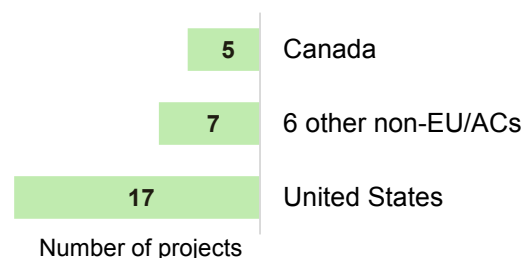
The 259 funded projects (numbers in the graph) are in 15 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥7 funded projects

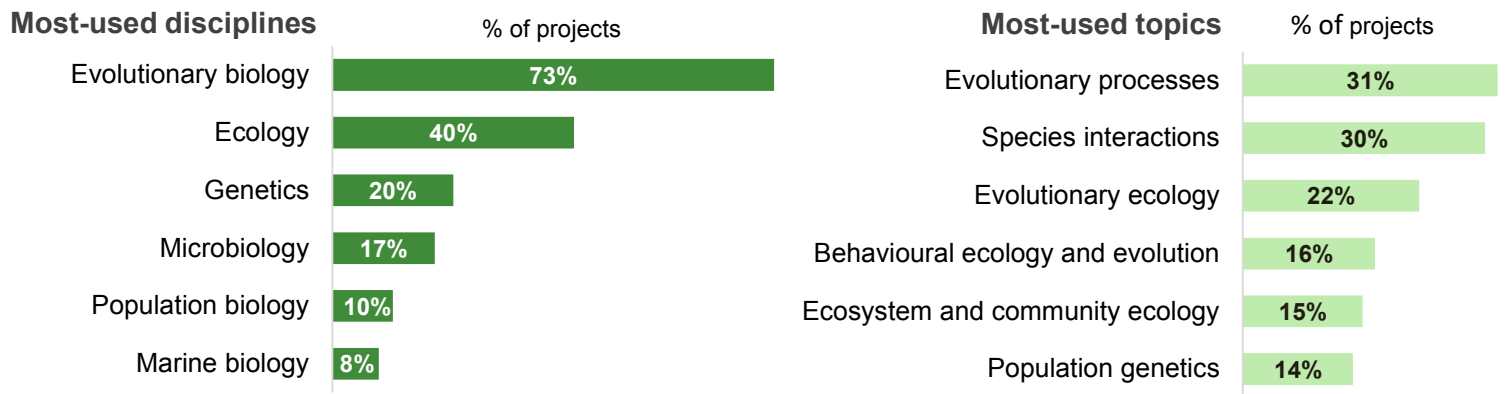


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

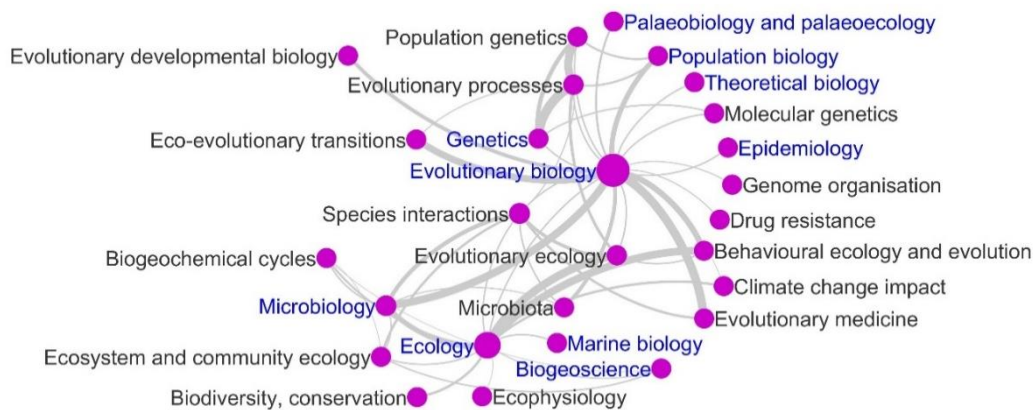
Scientific landscape of ERC-funded projects in this panel



- Population biology, Microbiology and Evolutionary processes grew in use from 2014 to 2020
- Ecology, Population biology, and Ecosystem and community ecology were used more in StG projects compared to those funded in CoG and AdG schemes, while Evolutionary processes and Population genetics were used more in CoG projects and Microbiology, Marine biology and Evolutionary ecology were used more in AdG projects
- Around 1/3 of the projects in this panel generate methodological developments. Computational modelling, simulations and Statistical methods are the main ones

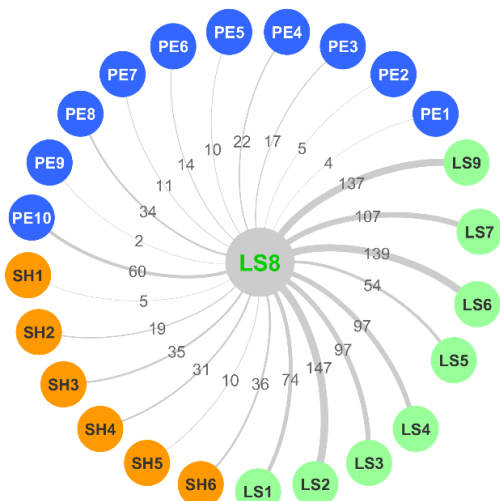
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- LS domain:** the main interactions are with the Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), Immunity and Infection (LS6), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels through the disciplines *Genetics*, *Microbiology* and *Evolutionary biology*
- SH domain:** the interaction is not very strong, but there are some connections with The Study of the Human Past (SH6) and The Social World, Diversity, Population (SH3) panels through the disciplines *Palaeobiology and palaeoecology*, and *Ecology*
- PE domain:** the interaction is not very strong, but there is some connection with the Earth System Science (PE10) panel through the disciplines *Biogeoscience*, and *Palaeobiology and palaeoecology*

Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9)

This fact sheet provides an overview of the projects funded in the 'Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering' panel in the Life Sciences (LS) domain (see [ERC panel structure](#)).

The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1460 applications
(2.7% of total)



194 projects funded
(2.9% of total)



85 projects
(€131M)



68 projects
(€135M)



41 projects
(€104M)



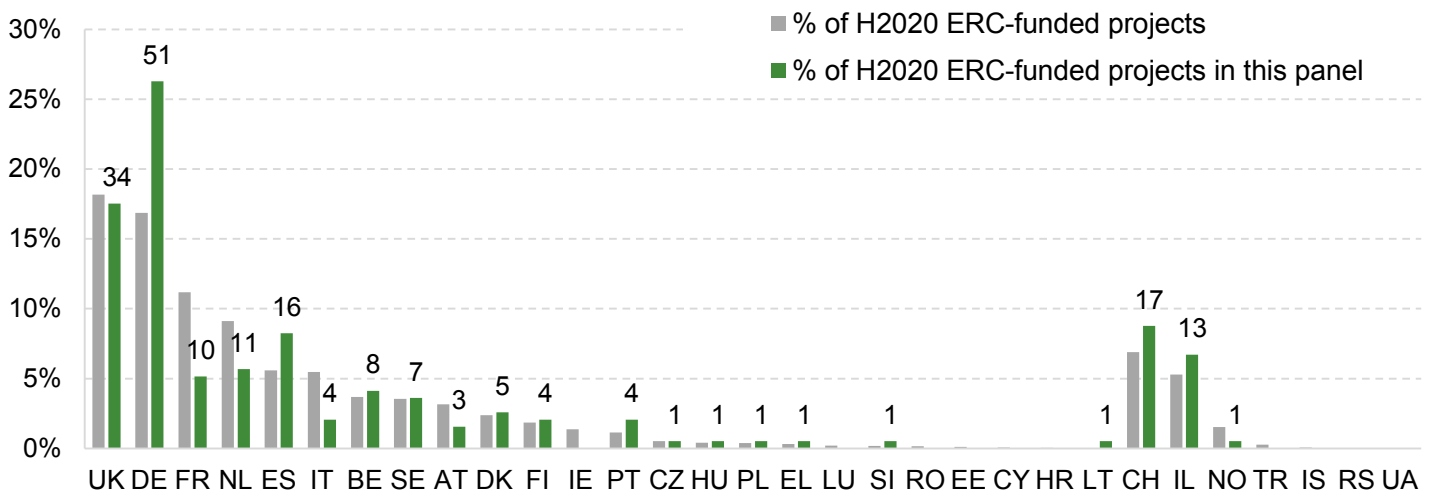
64 female grantees
(33% of grantees in this panel)



€370 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

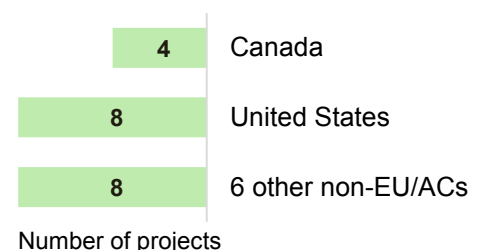
The 194 funded projects (numbers in the graph) are in 18 EU Member States and 3 Associated Countries (ACs)



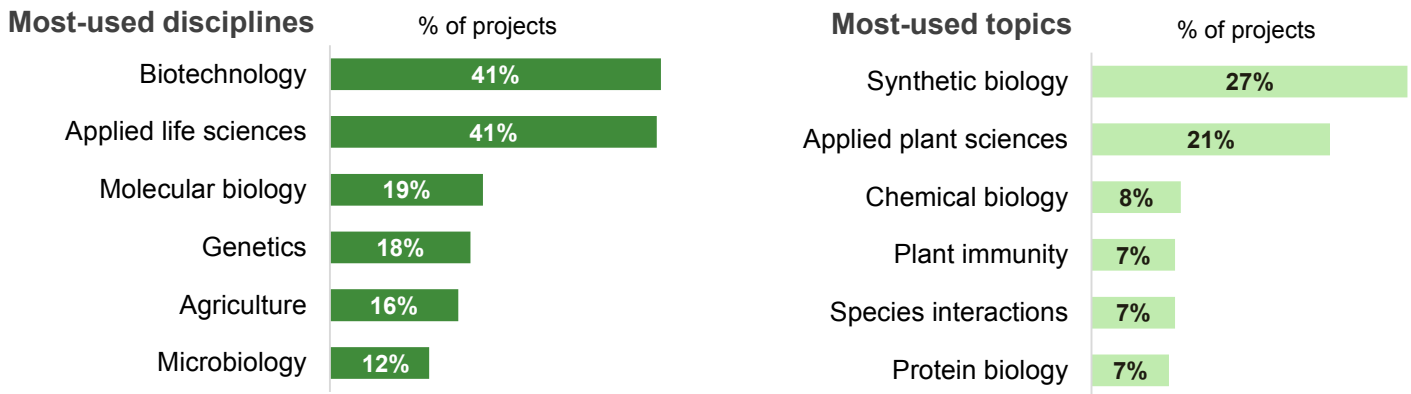
Host institutions with ≥5 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)



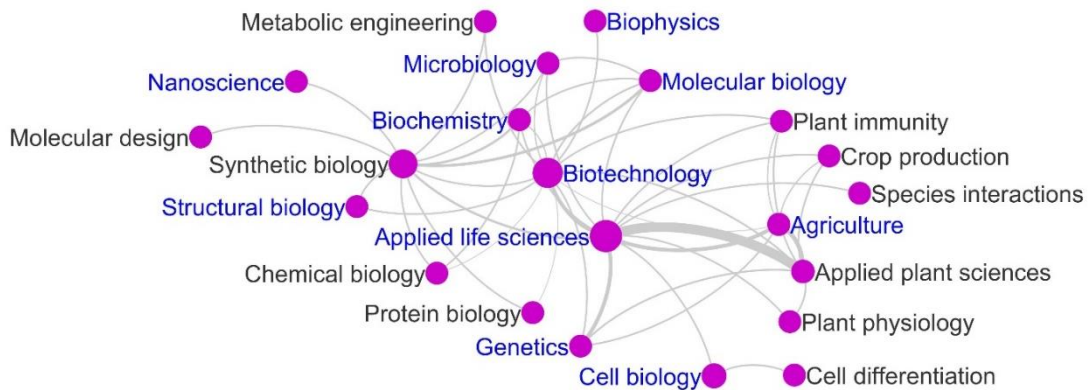
Scientific landscape of ERC-funded projects in this panel



- *Applied life sciences, Agriculture and Molecular interactions* grew in use from 2014 to 2020
- *Genetics, Microbiology and Species interactions* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Protein biology* were used more in CoG projects and *Agriculture, Applied plant sciences and Chemical biology* in AdG projects
- Around 1/3 of the projects in this panel generate methodological developments. *Computational modelling, simulations and Biochemistry techniques* are the main ones

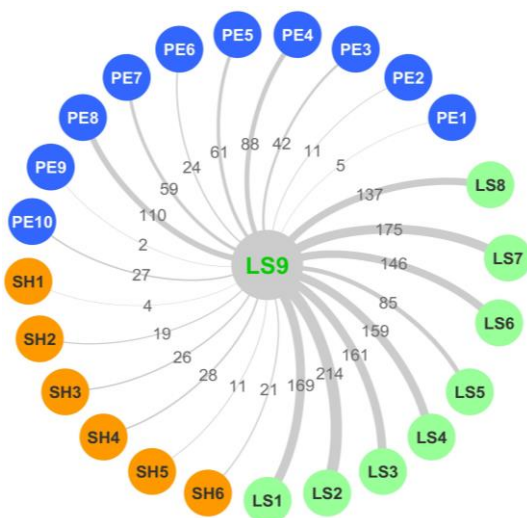
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **LS domain:** the main interactions are with the Genetics, 'Omics', Bioinformatics and Systems Biology (LS2), Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7), and Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics (LS1) panels through the disciplines *Molecular biology, Genetics, Biochemistry and Cell biology*
- **SH domain:** the interaction is not very strong, but there are some connections with The Human Mind and Its Complexity (SH4), and The Social World, Diversity, Population (SH3) panels
- **PE domain:** the main interactions are with the Products and Processes Engineering (PE8), and Physical and Analytical Chemical Sciences (PE4) panels through the disciplines *Biochemistry and Biotechnology*



European Research Council

Established by the European Commission





European Research Council
Established by the European Commission



ERC Frontier Research in Physical Sciences and Engineering

This series of factsheets provides an overview of the projects funded by the European Research Council (ERC), in the Physical Sciences and Engineering domain, in the H2020 Framework Programme (2014–2020)

Mathematics (PE1)

Fundamental Constituents of Matter (PE2)

Condensed Matter Physics (PE3)

Physical and Analytical Chemical Sciences (PE4)

Synthetic Chemistry and Materials (PE5)

Computer Science and Informatics (PE6)

Systems and Communication Engineering (PE7)

Products and Processes Engineering (PE8)

Universe Sciences (PE9)

Earth System Science (PE10)

Data as of December 2021

PE

Mathematics (PE1)

This fact sheet provides an overview of the projects funded in the 'Mathematics' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1836 applications
(3.4% of total)



231 projects funded
(3.5% of total)



92 projects
(€115M)



76 projects
(€118M)



63 projects
(€120M)



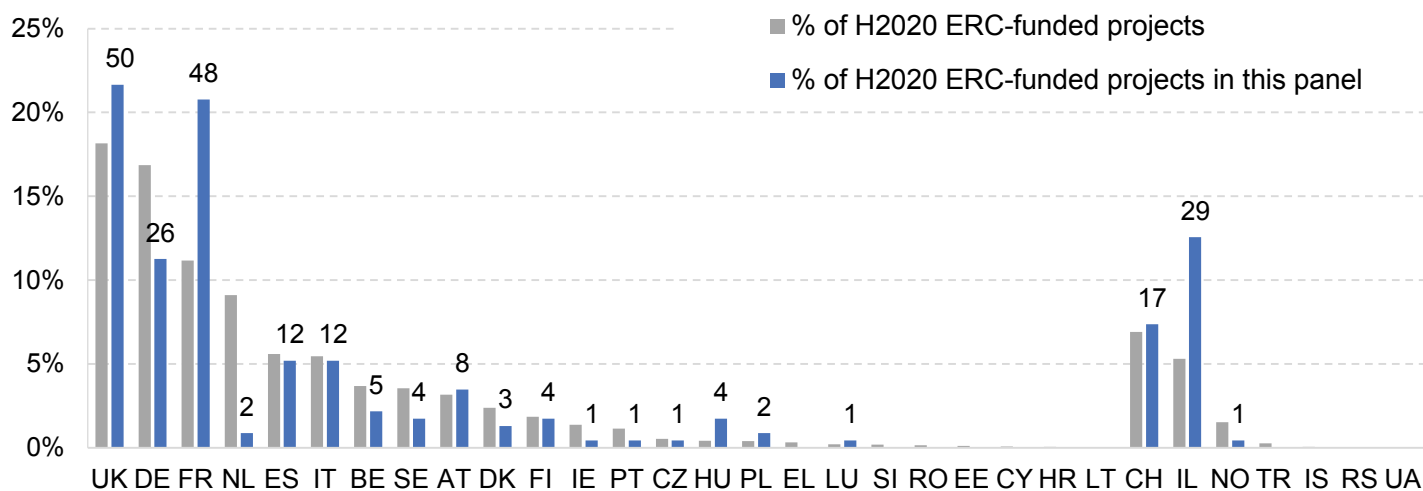
29 female grantees
(13% of grantees in this panel)



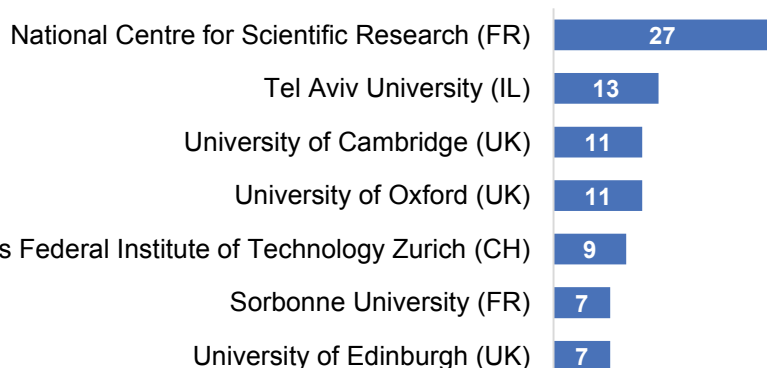
€353 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

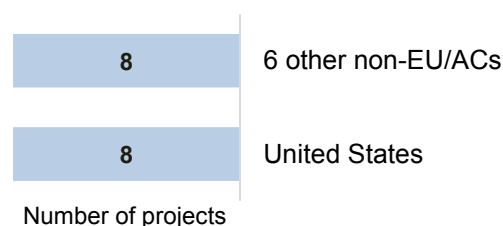
The 231 funded projects (numbers in the graph) are in 17 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥7 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)

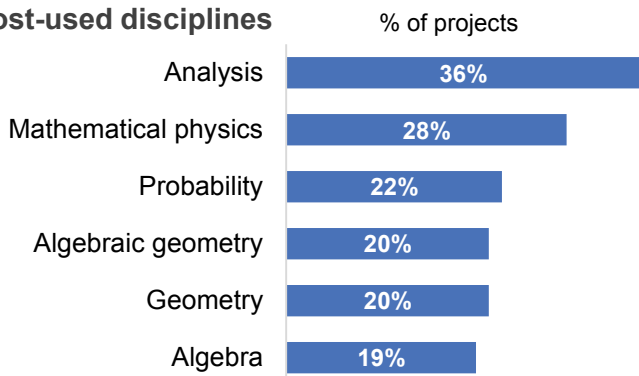


Number of projects

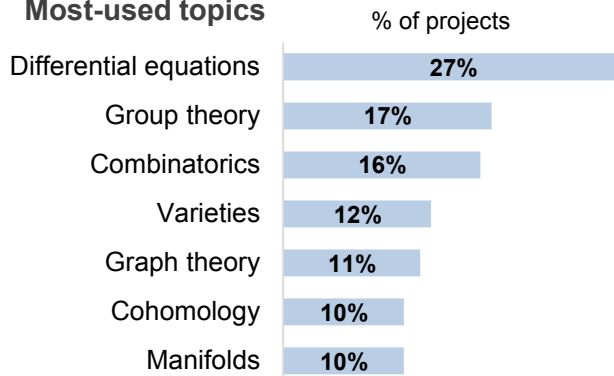
*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

Most-used disciplines



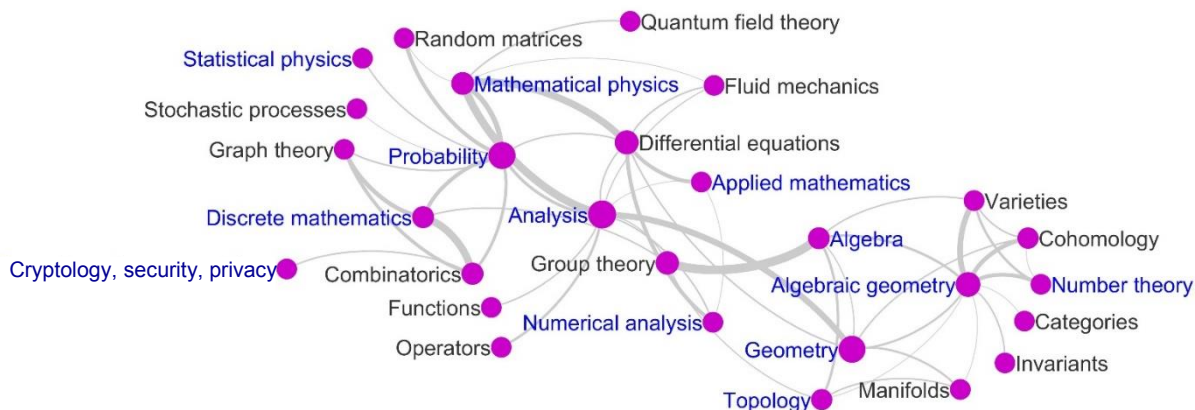
Most-used topics



- *Algebraic geometry* and *Varieties* grew in use from 2014 to 2020
- *Geometry*, *Mathematical Physics*, *Differential equations* and *Graph theory* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Discrete mathematics* and *Stochastic Processes* were used more in CoG projects and *Number theory*, *Applied mathematics* and *Quantum Field Theory* in AdG projects
- A high number of projects in this panel generate methodological developments. *Analytic methods*, *Geometric methods* and *Probabilistic methods* are the main ones

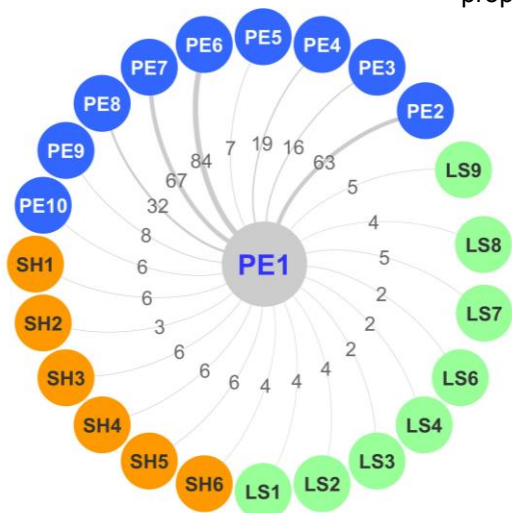
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Computer Science and Informatics (PE6), Systems and Communication Engineering (PE7), and Fundamental Constituents of Matter (PE2) panels through the disciplines *Mathematical physics*, *Applied mathematics* and *Discrete mathematics*
- **LS domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy
- **SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Fundamental Constituents of Matter (PE2)

This fact sheet provides an overview of the projects funded in the 'Fundamental Constituents of Matter' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2561 applications
(4.7% of total)



326 projects funded
(4.9% of total)



129 projects
(€190M)



114 projects
(€216M)



83 projects
(€197M)



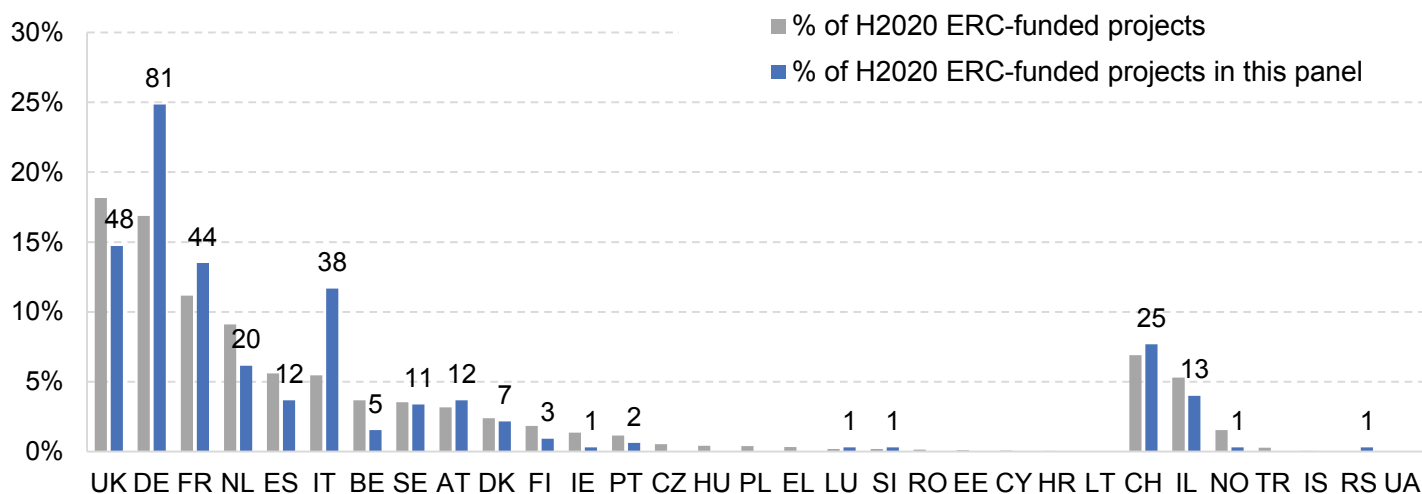
60 female grantees
(18% of grantees in this panel)



€603 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

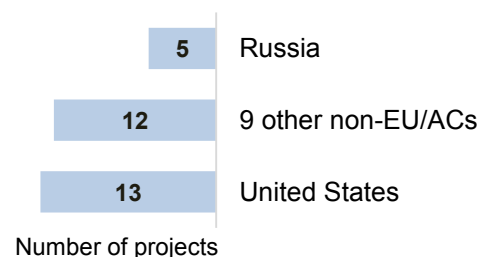
The 326 funded projects (numbers in the graph) are in 15 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥7 funded projects



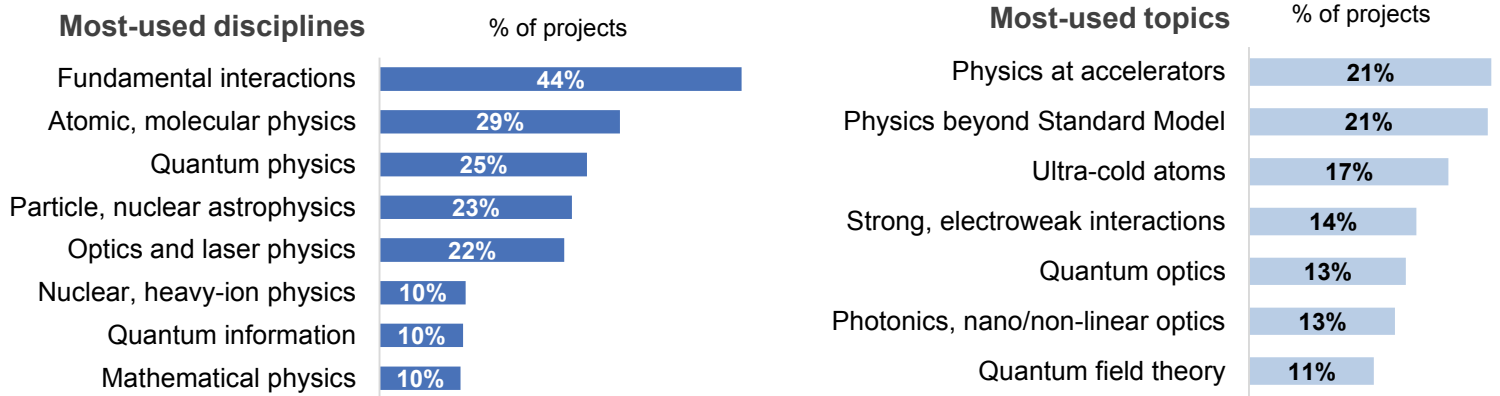
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

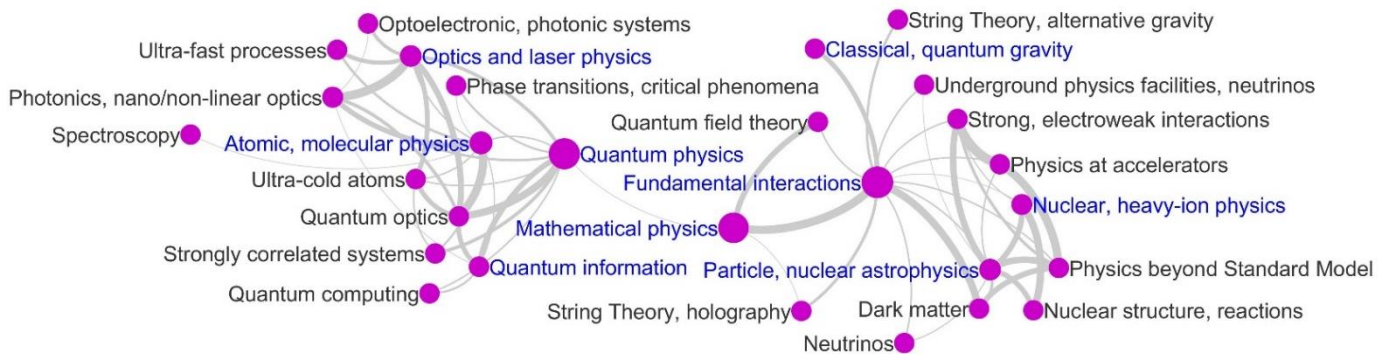
Scientific landscape of ERC-funded projects in this panel



- *Quantum physics*, *Physics at accelerators* and *Physics beyond Standard Model* grew in use from 2014 to 2020
- *Mathematical physics* and *Strong, electroweak interactions* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Particle, nuclear astrophysics*, *Optics and laser physics*, and *Quantum optics* were used more in AdG projects
- A high number of projects in this panel generate methodological developments. *Experimental methods in physics*, *Theoretical, mathematical methods* and *Quantum methods* are the main ones

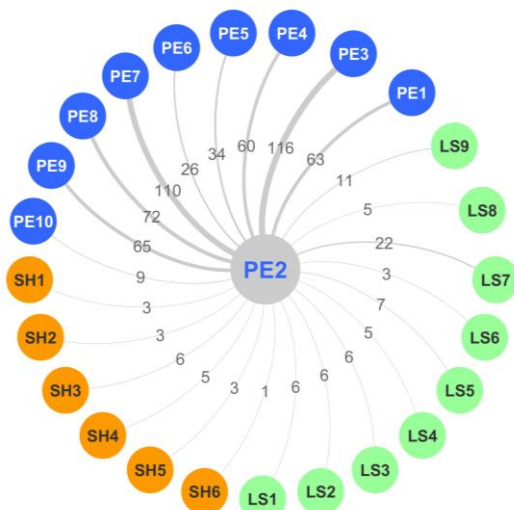
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Condensed Matter Physics (PE3), and Systems and Communication Engineering (PE7) panels through the disciplines *Optics and laser physics*, and *Quantum physics*
- **LS domain:** the interaction is not very strong, but there is some connection with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panel
- **SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Condensed Matter Physics (PE3)

This fact sheet provides an overview of the projects funded in the 'Condensed Matter Physics' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2369 applications
(4.4% of total)



294 projects funded
(4.4% of total)



120 projects
(€190M)



103 projects
(€209M)



71 projects
(€171M)



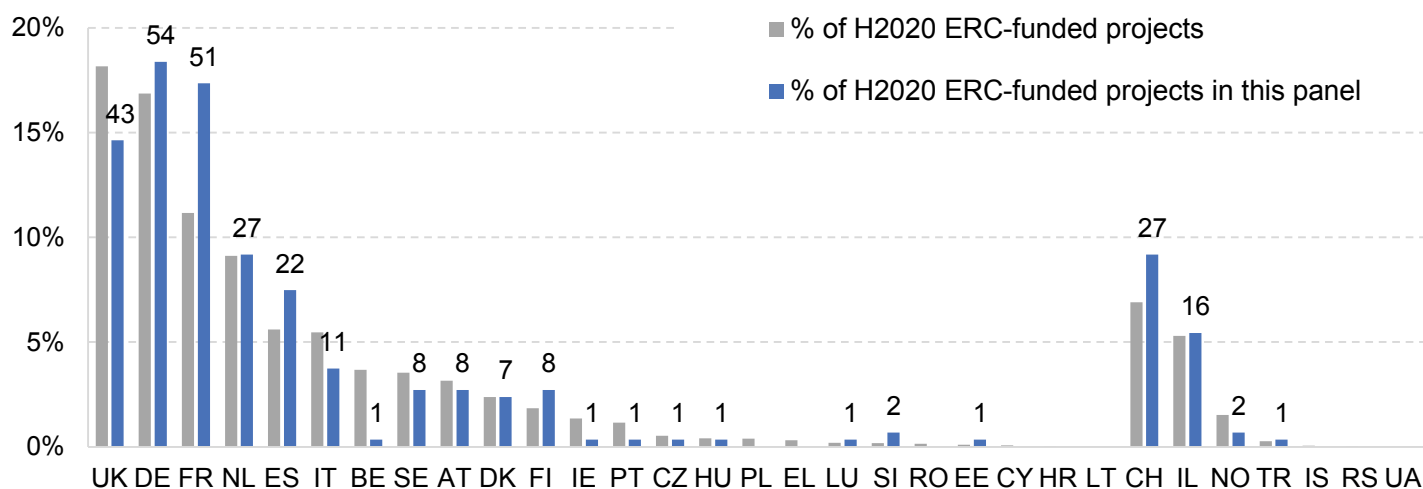
51 female grantees
(17% of grantees in this panel)



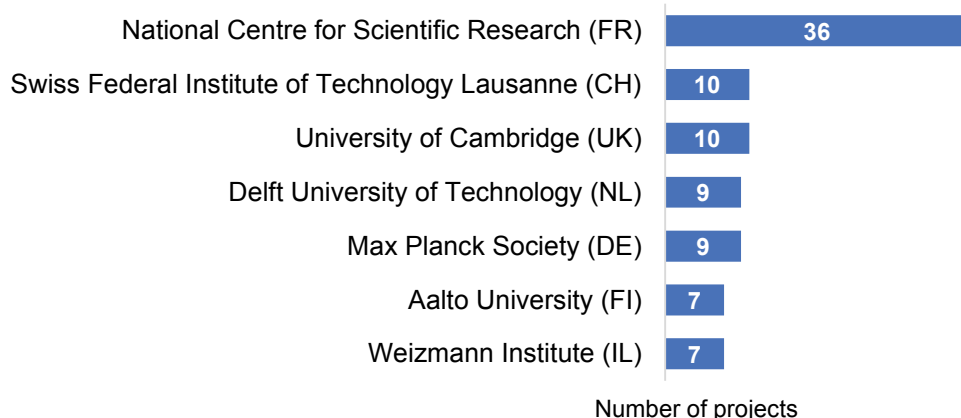
€570 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

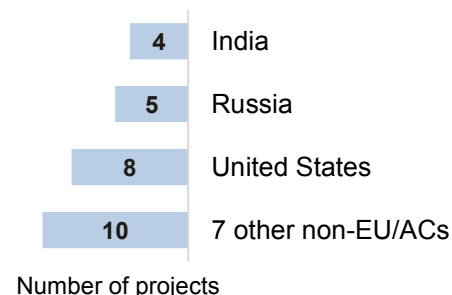
The 294 funded projects (numbers in the graph) are in 18 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥7 funded projects



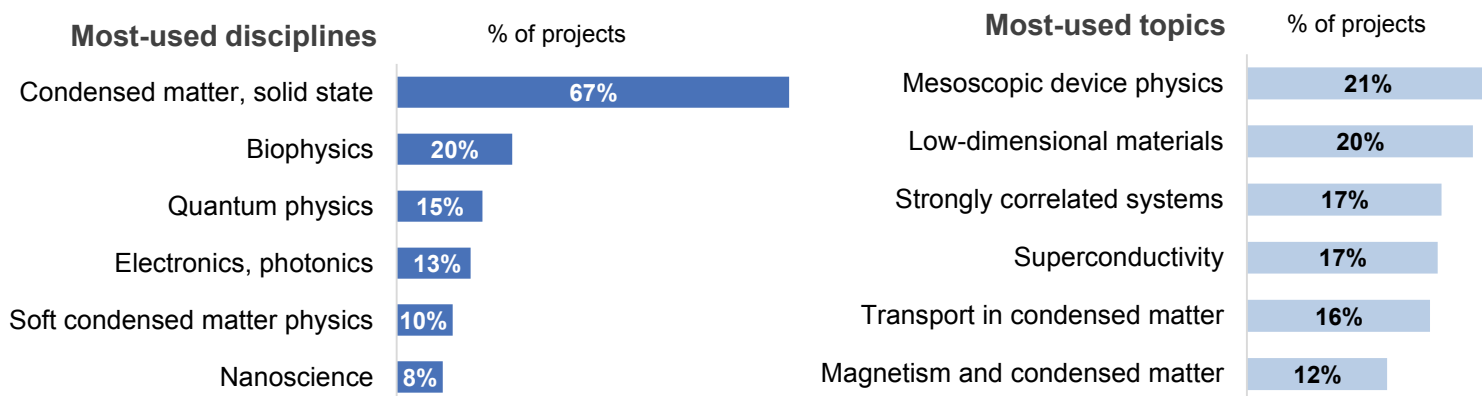
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

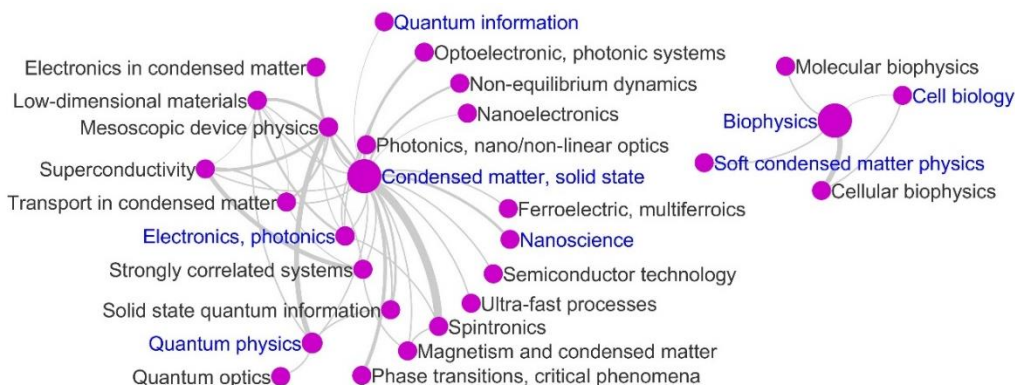
Scientific landscape of ERC-funded projects in this panel



- *Quantum physics, Soft condensed matter physics and Non-equilibrium dynamics* grew in use from 2014 to 2020
- *Condensed matter, solid state, Strongly correlated systems, and Magnetism and condensed matter* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Biophysics, Low-dimensional materials and Transport in condensed matter* were used more in CoG projects
- Around 1/5 of projects in this panel generate methodological developments. *Microscopy and Computational modelling, simulations* are the main ones

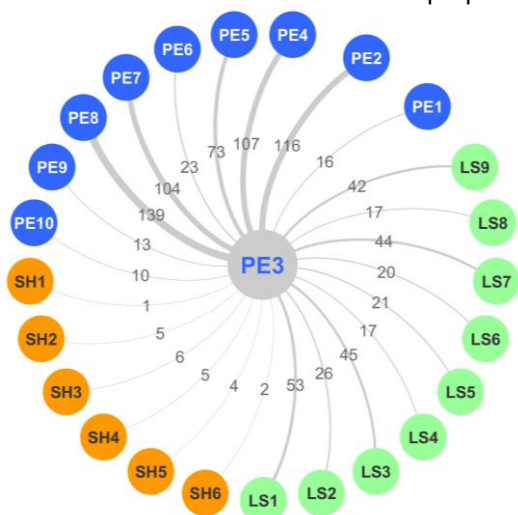
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Products and Processes Engineering (PE8), Fundamental Constituents of Matter (PE2), and Physical and Analytical Chemical Sciences (PE4) panels through the disciplines *Quantum physics, Electronics, photonics* and *Biophysics*
- **LS domain:** the main interactions are with the Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics (LS1), Cellular and Developmental Biology (LS3), and Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panels through the disciplines *Biophysics* and *Cell biology*
- **SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Physical and Analytical Chemical Sciences (PE4)

This fact sheet provides an overview of the projects funded in the 'Physical and Analytical Chemical Sciences' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2192 applications
(4.1% of total)



267 projects funded
(4.0% of total)



104 projects
(€167M)



100 projects
(€203M)



63 projects
(€158M)



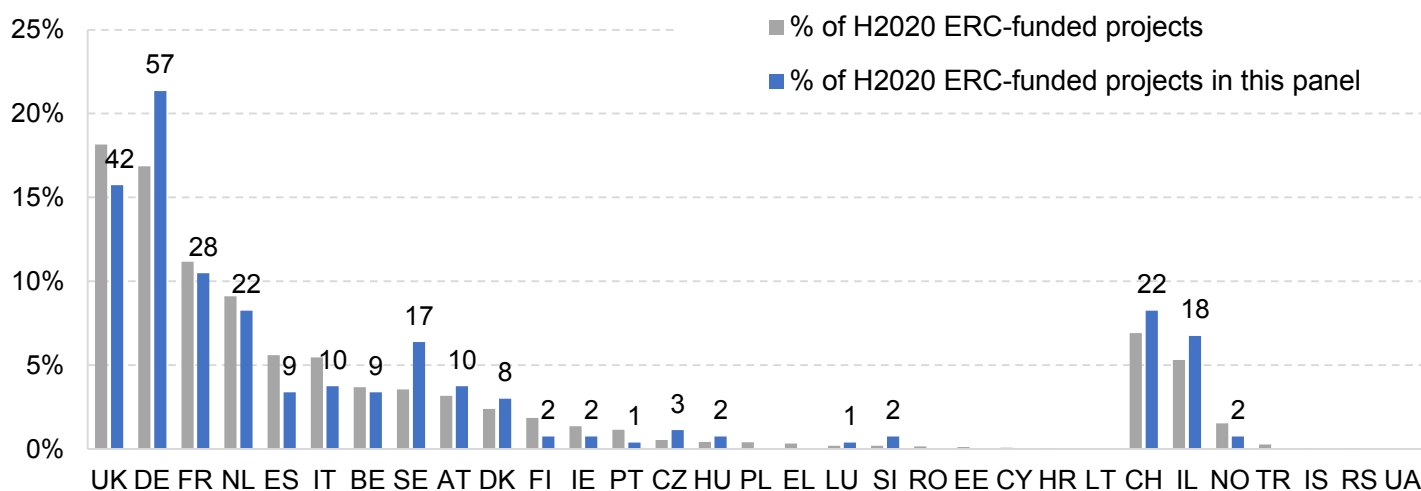
59 female grantees
(22% of grantees in this panel)



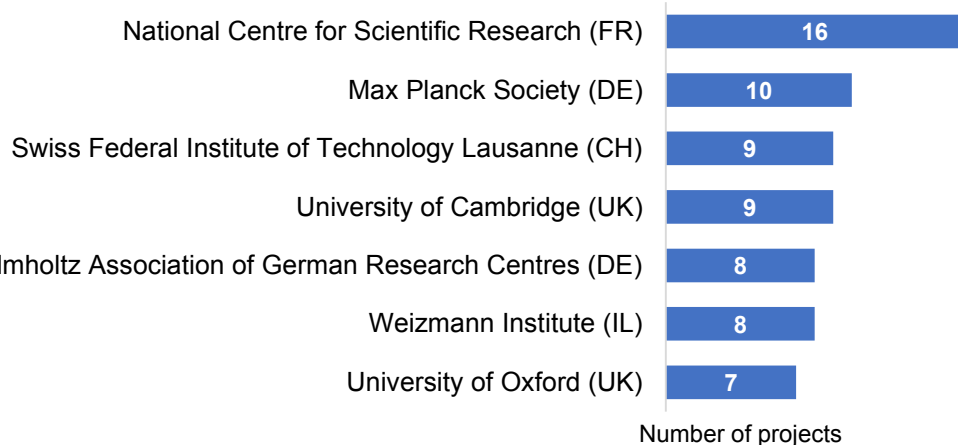
€528 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

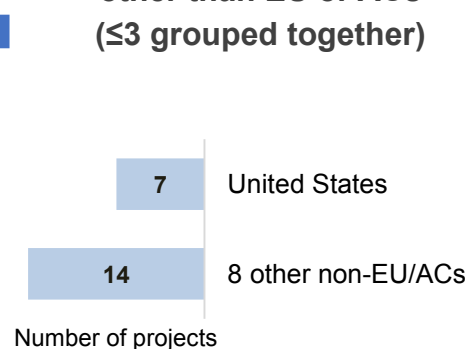
The 267 funded projects (numbers in the graph) are in 17 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥7 funded projects

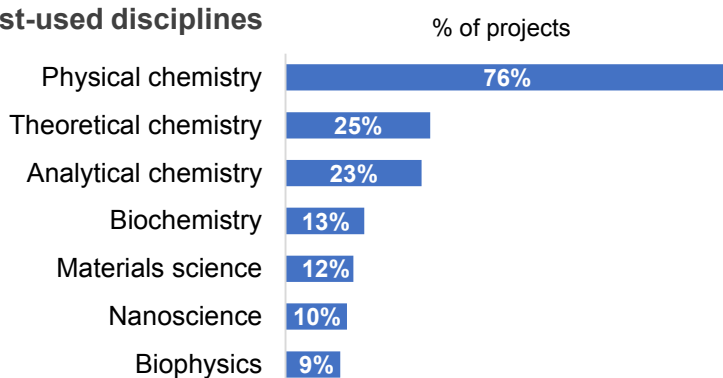


Country of origin of grantees other than EU or ACs (≤3 grouped together)

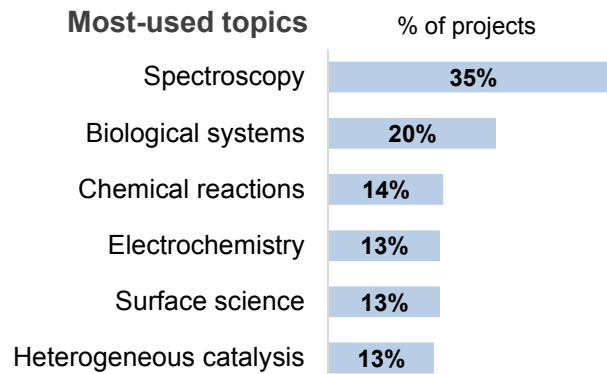


Scientific landscape of ERC-funded projects in this panel

Most-used disciplines



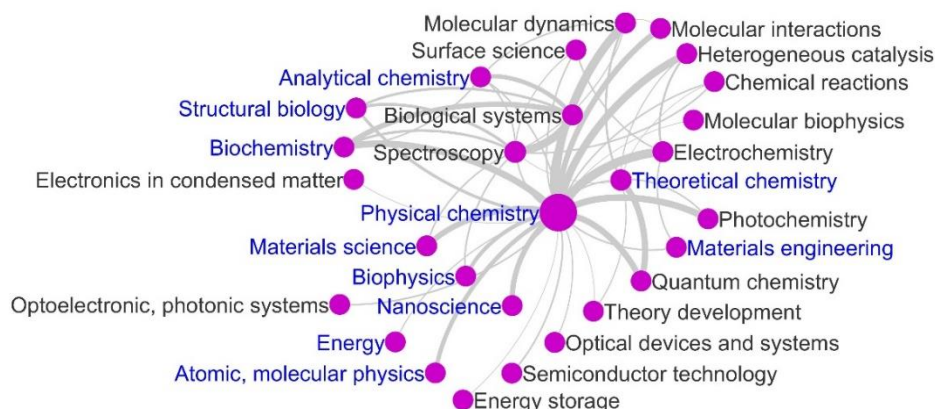
Most-used topics



- *Biochemistry, Biophysics* and *Chemical reactions* grew in use from 2014 to 2020
- *Theoretical chemistry, Heterogeneous catalysis* and *Electrochemistry* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Biochemistry, Spectroscopy* and *Surface science* were used more in AdG projects
- A high number of projects in this panel aim at generating methodological developments. *Spectroscopic techniques, Experimental methods in chemistry* and *Computational modelling, simulations* are the main ones

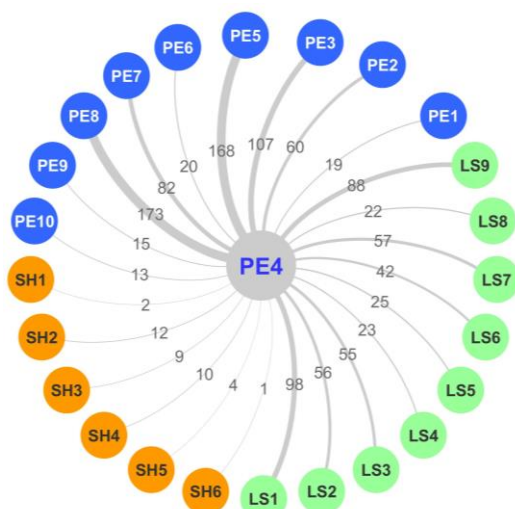
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Products and Processes Engineering (PE8), Synthetic Chemistry and Materials (PE5), and Condensed Matter Physics (PE3) panels through the disciplines *Materials science, Nanoscience, Physical chemistry* and *Biophysics*
- **LS domain:** the main interactions are with the Molecular Biology, Biochemistry, Structural Biology and Molecular Biophysics (LS1), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels through the discipline *Biochemistry*
- **SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Synthetic Chemistry and Materials (PE5)

This fact sheet provides an overview of the projects funded in the 'Synthetic Chemistry and Materials' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2653 applications
(4.9% of total)



335 projects funded
(5.1% of total)



143 projects
(€218M)



115 projects
(€228M)



77 projects
(€190M)



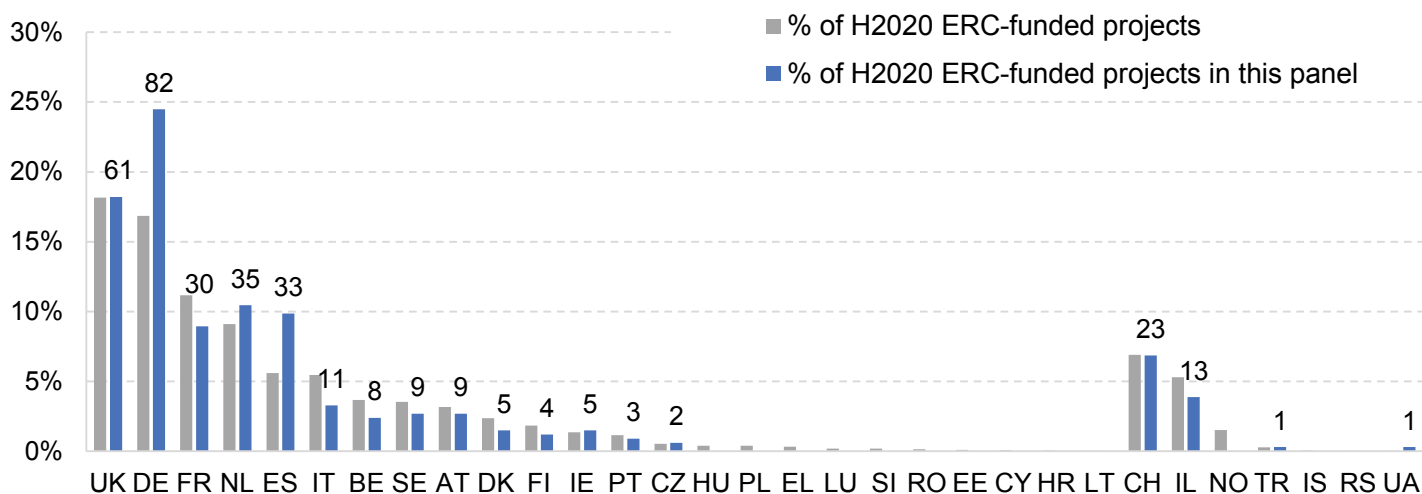
70 female grantees
(21% of grantees in this panel)



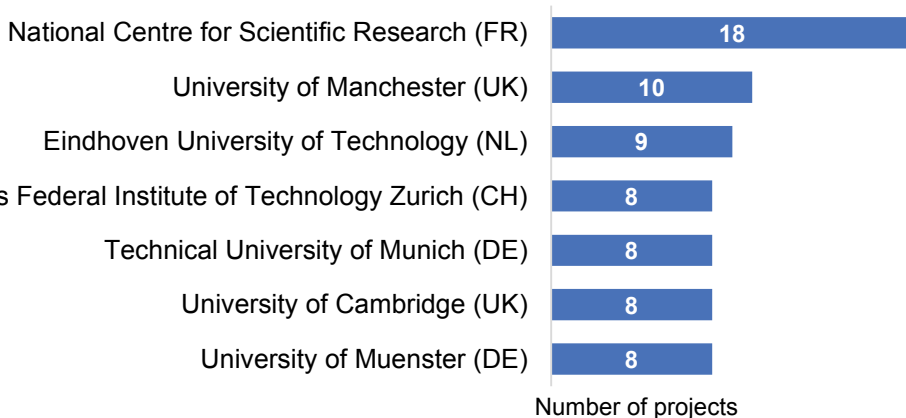
€636 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

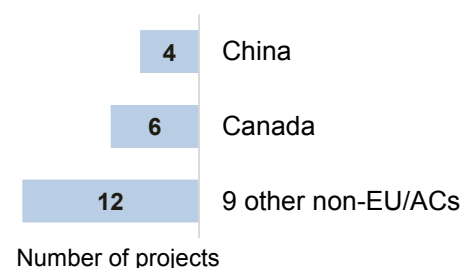
The 335 funded projects (numbers in the graph) are in 14 EU Member States and 4 Associated Countries (ACs)



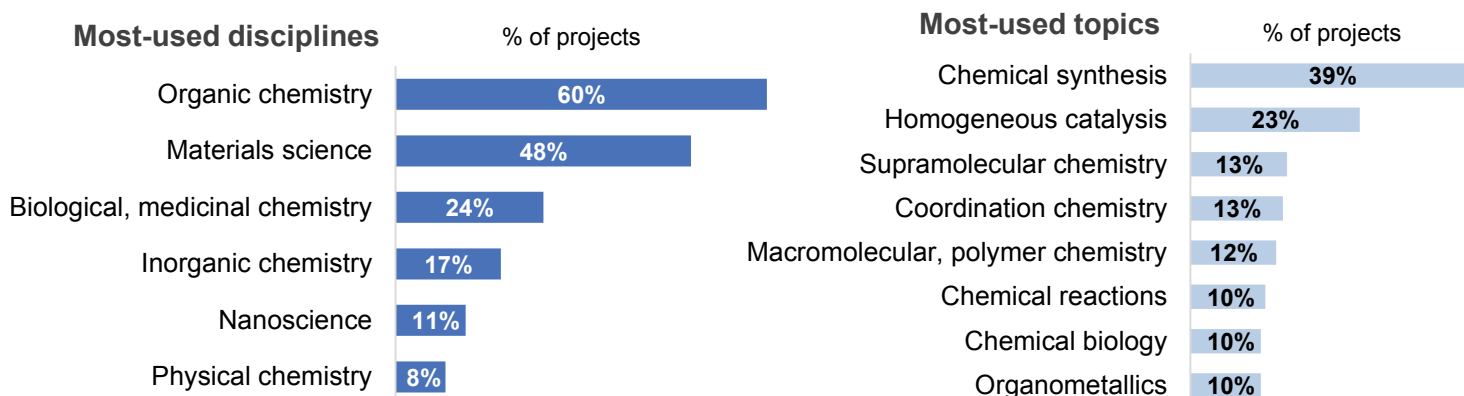
Host institutions with ≥8 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)



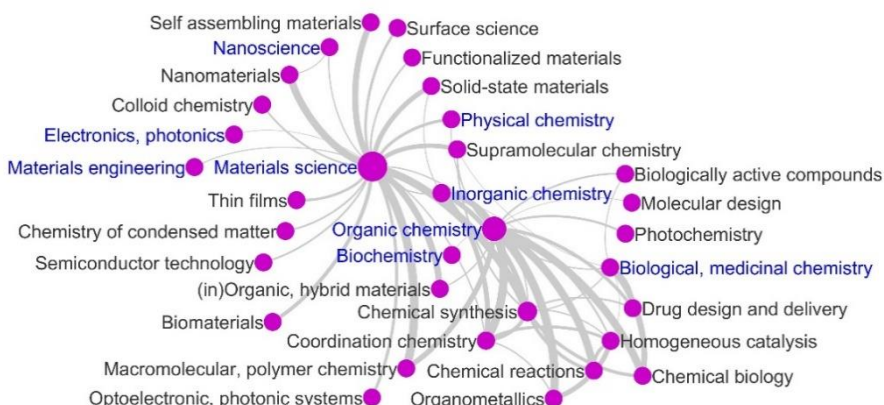
Scientific landscape of ERC-funded projects in this panel



- *Homogeneous catalysis* and *Chemical biology* grew in use from 2014 to 2020
- *Biological, medicinal chemistry* was used more in CoG projects compared to those funded in StG and AdG schemes while *Chemical synthesis*, *Supramolecular chemistry*, *Chemical biology* and *Organic chemistry* were used more in AdG projects
- More than half of the projects in this panel generate methodological developments. *Synthetic methods* and *Experimental methods in chemistry* are the main ones

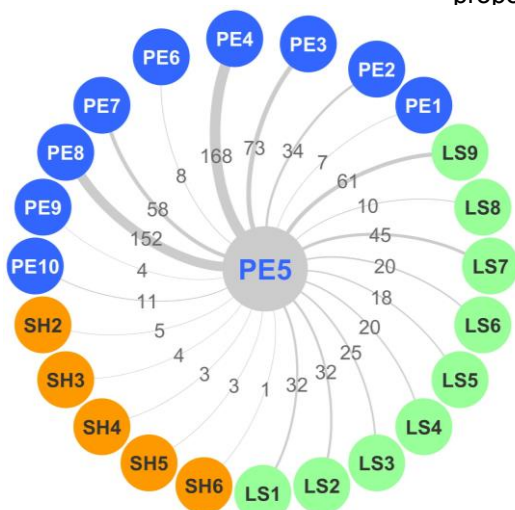
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Physical and Analytical Chemical Sciences (PE4), and Products and Processes Engineering (PE8) panels through the disciplines *Materials science*, *Nanoscience* and *Physical chemistry*
- **LS domain:** the main interactions are with the Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9), and Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panels through the disciplines *Biochemistry* and *Biotechnology*
- **SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Computer Science and Informatics (PE6)

This fact sheet provides an overview of the projects funded in the 'Computer Science and Informatics' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2789 applications
(5.2% of total)



348 projects funded
(5.3% of total)



160 projects
(€234M)



114 projects
(€215M)



74 projects
(€177M)



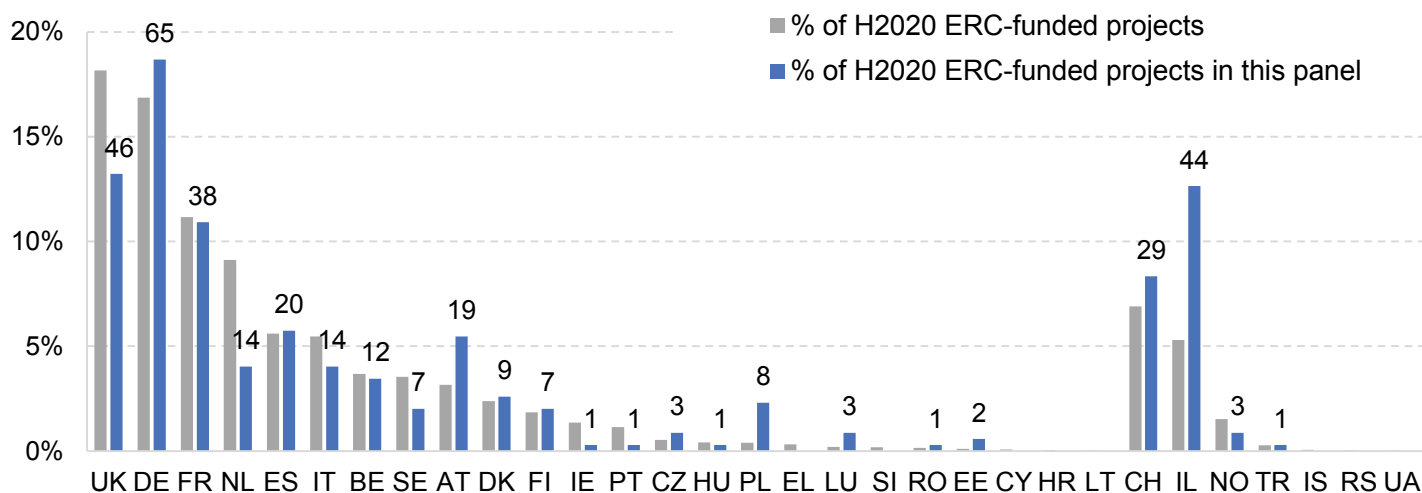
55 female grantees
(16% of grantees in this panel)



€626 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

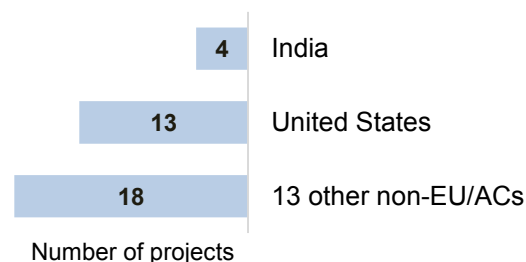
The 348 funded projects (numbers in the graph) are in 19 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥9 funded projects



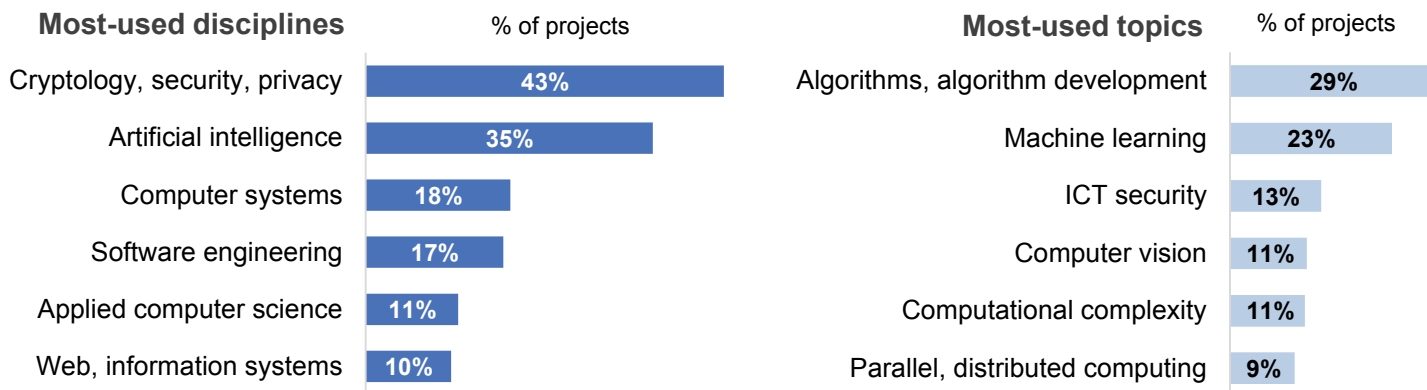
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

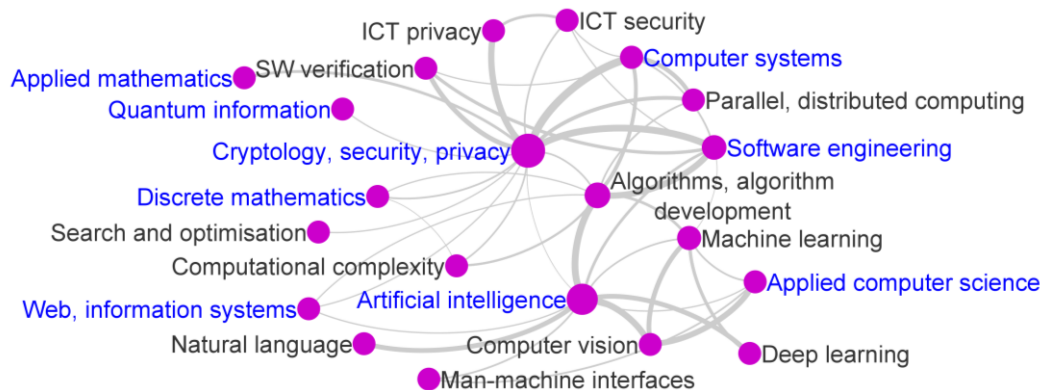
Scientific landscape of ERC-funded projects in this panel



- *Applied computer science, Algorithms, algorithm development and Machine learning* grew in use from 2014 to 2020
- *Applied mathematics, Machine learning and Parallel, distributed computing* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Software engineering and ICT security* were used more in AdG projects
- More than half of the projects in this panel generate methodological developments. *Theoretical, mathematical methods and Computational modelling, simulations* are the main ones

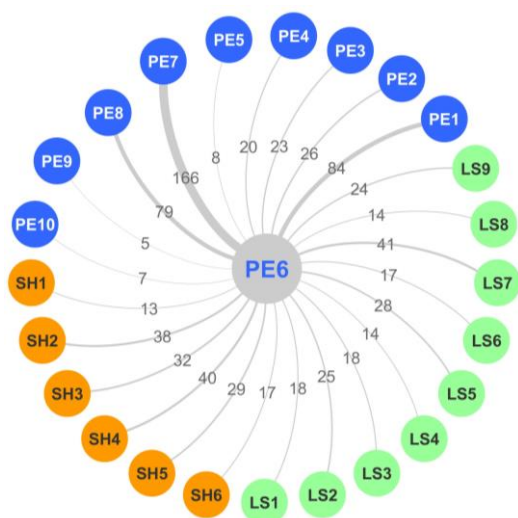
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interaction is with the Systems and Communication Engineering (PE7) panel and to a lesser extent with the Mathematics (PE1), and Products and Processes Engineering (PE8) panels through the disciplines *Applied mathematics, Applied computer science and Software engineering*
- **LS domain:** the interaction is not very strong, but there is some connection with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panel
- **SH domain:** the interaction is not very strong, but there are some connections with The Human Mind and Its Complexity (SH4), and Institutions, Values, Environment and Space (SH2) panels

Systems and Communication Engineering (PE7)

This fact sheet provides an overview of the projects funded in the 'Systems and Communication Engineering' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2226 applications
(4.1% of total)



276 projects funded
(4.2% of total)



122 projects
(€193M)



91 projects
(€188M)



63 projects
(€160M)



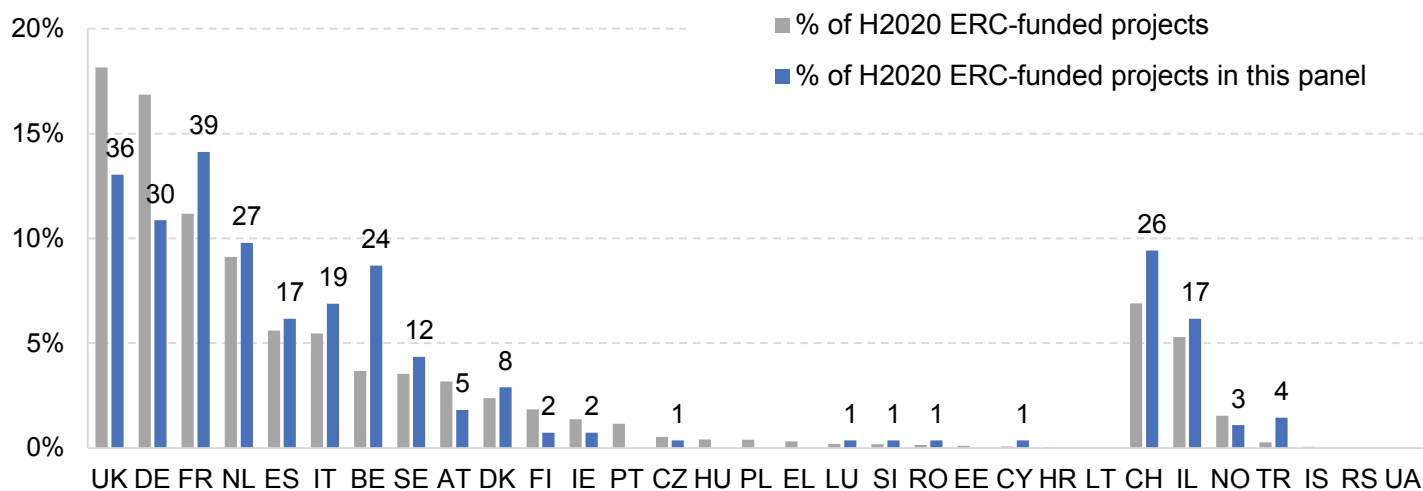
54 female grantees
(20% of grantees in this panel)



€541 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

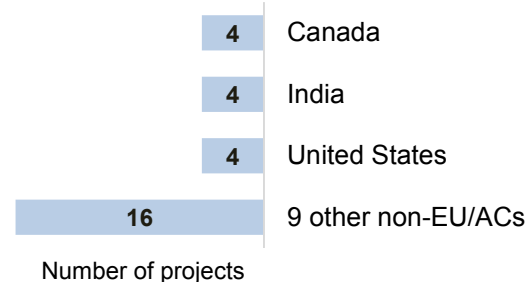
The 276 funded projects (numbers in the graph) are in 17 EU Member States and 4 Associated Countries (ACs)



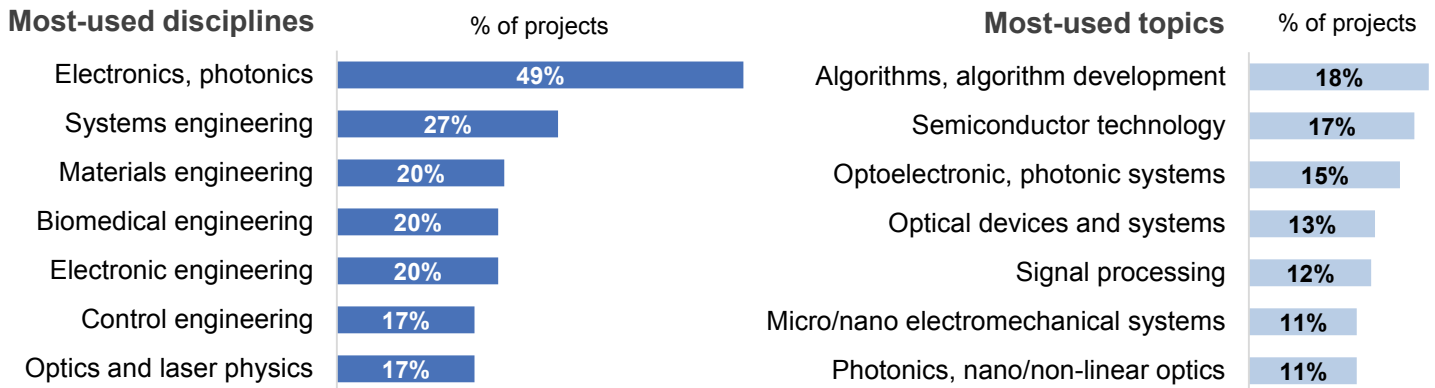
Host institutions with ≥7 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)



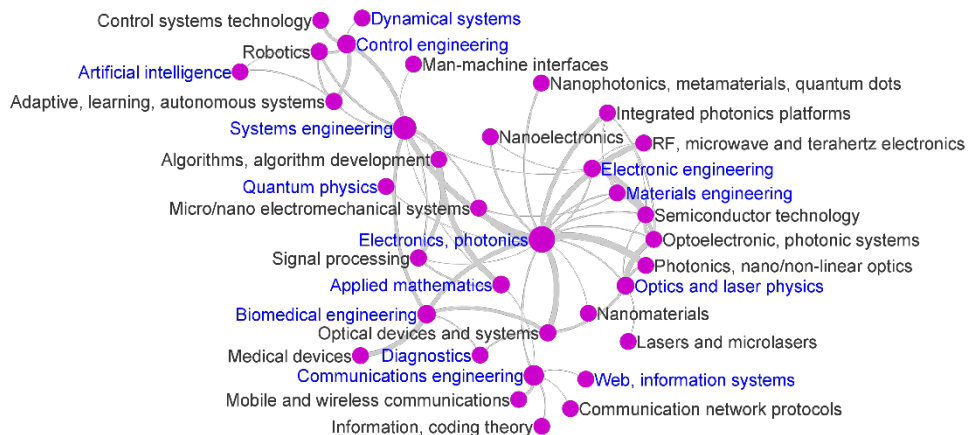
Scientific landscape of ERC-funded projects in this panel



- Control engineering and Adaptive, learning, autonomous systems grew in use from 2014 to 2020
- Electronics, photonics, Biomedical engineering, Photonics, nano/non-linear optics, and Optical devices and systems were used more in StG and CoG projects compared to those funded in AdG scheme, while Control engineering was used more in AdG projects
- A high number of projects in this panel generate methodological developments. Experimental methods in engineering, Computational modelling, simulations and Validation, demonstration, prototyping are the main ones

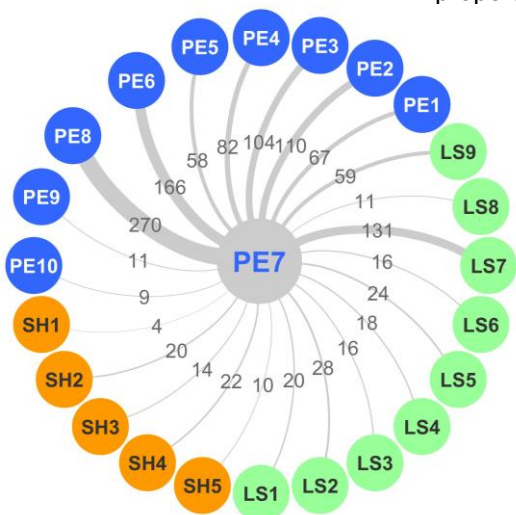
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- PE domain:** the main interactions are with the Products and Processes Engineering (PE8), Computer Science and Informatics (PE6), and Fundamental Constituents of Matter (PE2) panels through the disciplines *Materials engineering, Biomedical engineering, Optics and laser physics, Electronics, photonics* and *Applied mathematics*
- LS domain:** the main interaction is with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panel through the discipline *Biomedical engineering*
- SH domain:** the interaction is not very strong, but there are some connections with The Human Mind and Its Complexity (SH4), and the Institutions, Values, Environment and Space (SH2) panels through the disciplines *Artificial intelligence* and *Neuroscience*

Products and Processes Engineering (PE8)

This fact sheet provides an overview of the projects funded in the 'Products and Processes Engineering' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



3148 applications
(5.8% of total)



369 projects funded
(5.6% of total)



157 projects
(€246M)



121 projects
(€243M)



91 projects
(€227M)



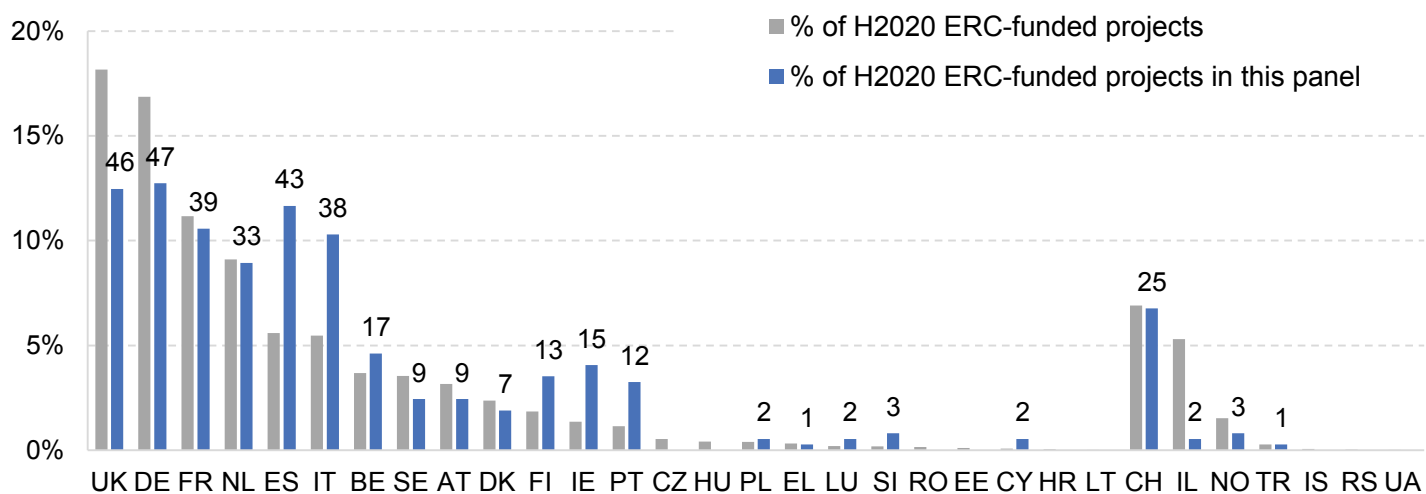
91 female grantees
(25% of grantees in this panel)



€716 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

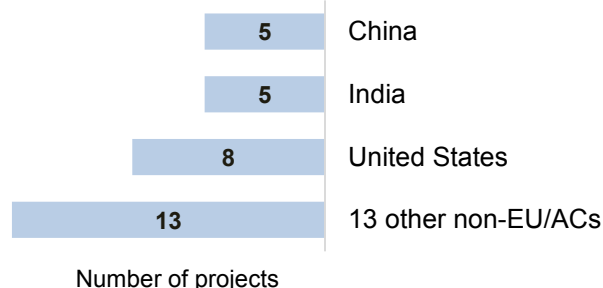
The 369 funded projects (numbers in the graph) are in 18 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥10 funded projects



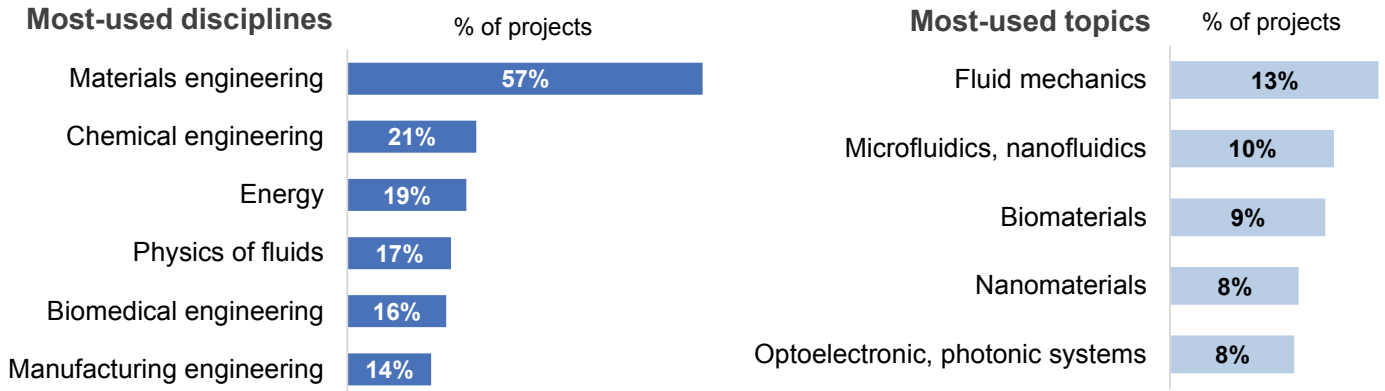
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

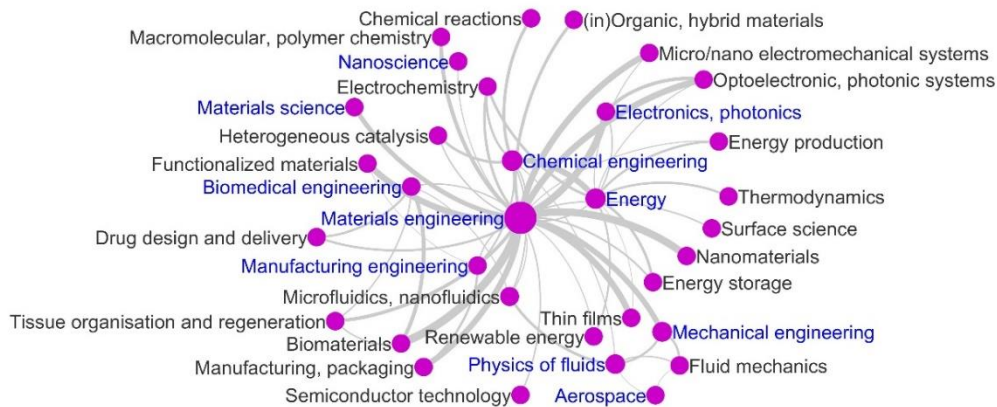
Scientific landscape of ERC-funded projects in this panel



- *Materials science* and *Fluid mechanics* grew in use from 2014 to 2020
- *Energy* was used more in StG and CoG projects compared to those funded in AdG scheme, while *Chemical engineering*, *Physics of fluids*, *Manufacturing engineering*, *Fluid mechanics* and *Microfluidics, nanofluidics* were used more in AdG projects
- A high number of projects in this panel generate methodological developments. *Computational modelling, simulations* and *Micro/nanoengineering* are the main ones

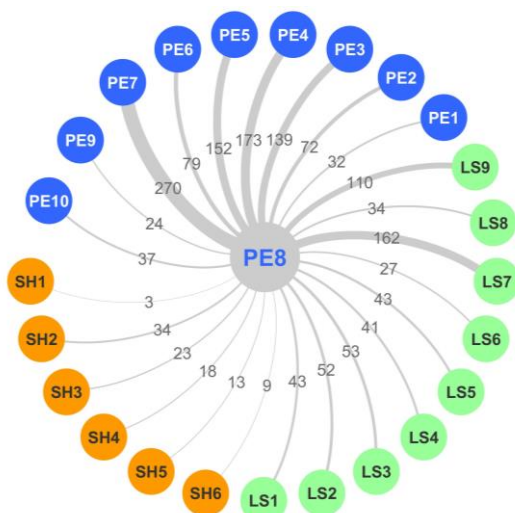
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **PE domain:** the main interactions are with the Systems and Communication Engineering (PE7), Physical and Analytical Chemical Sciences (PE4), and Synthetic Chemistry and Materials (PE5) panels through the disciplines *Materials engineering*, *Biomedical engineering*, and *Materials science*
- **LS domain:** the main interactions are with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels through the disciplines *Biomedical engineering* and *Biotechnology*
- **SH domain:** the interaction is not very strong, but there is some connection with the Institutions, Values, Environment and Space (SH2) panel through the discipline *Energy*

Universe Sciences (PE9)

This fact sheet provides an overview of the projects funded in the 'Universe Sciences' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2049 applications
(3.8% of total)



242 projects funded
(3.7% of total)



87 projects
(€131M)



92 projects
(€181M)



63 projects
(€159M)



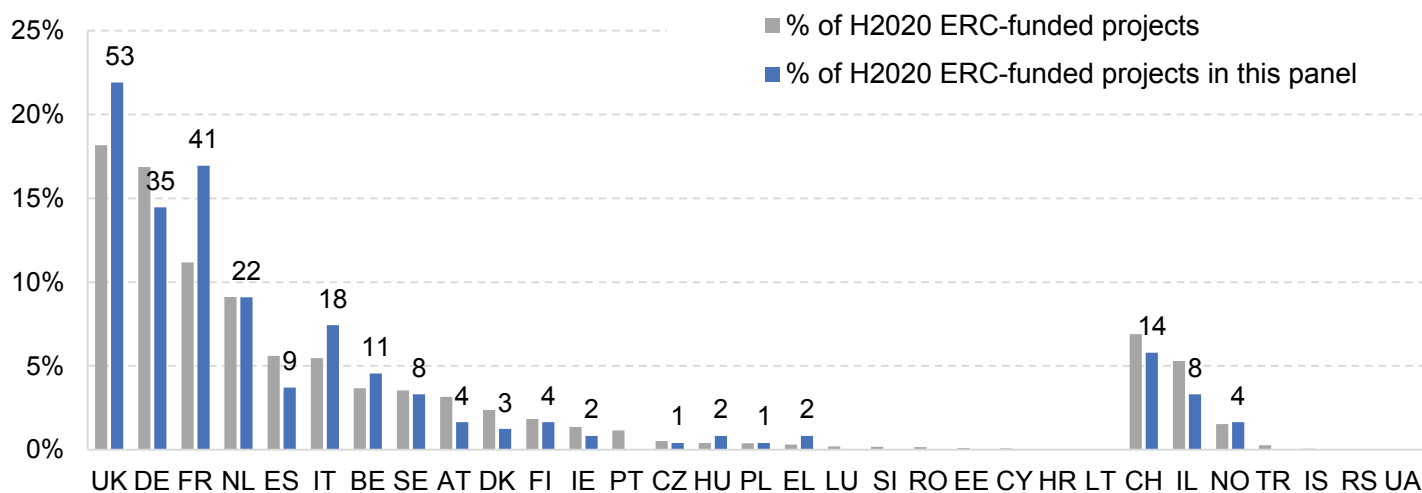
73 female grantees
(30% of grantees in this panel)



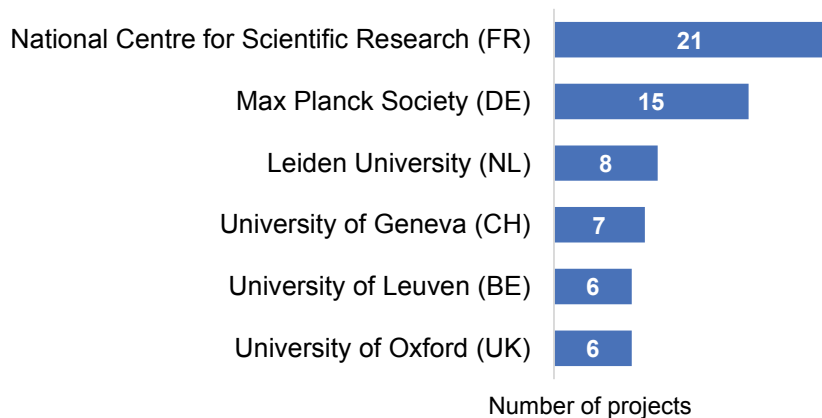
€471 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

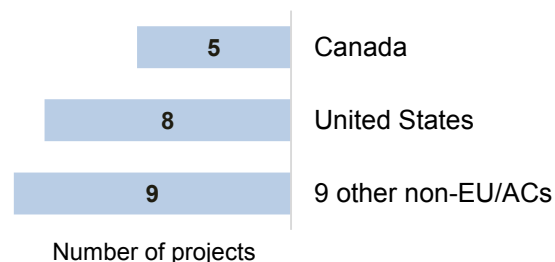
The 242 funded projects (numbers in the graph) are in 16 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥6 funded projects

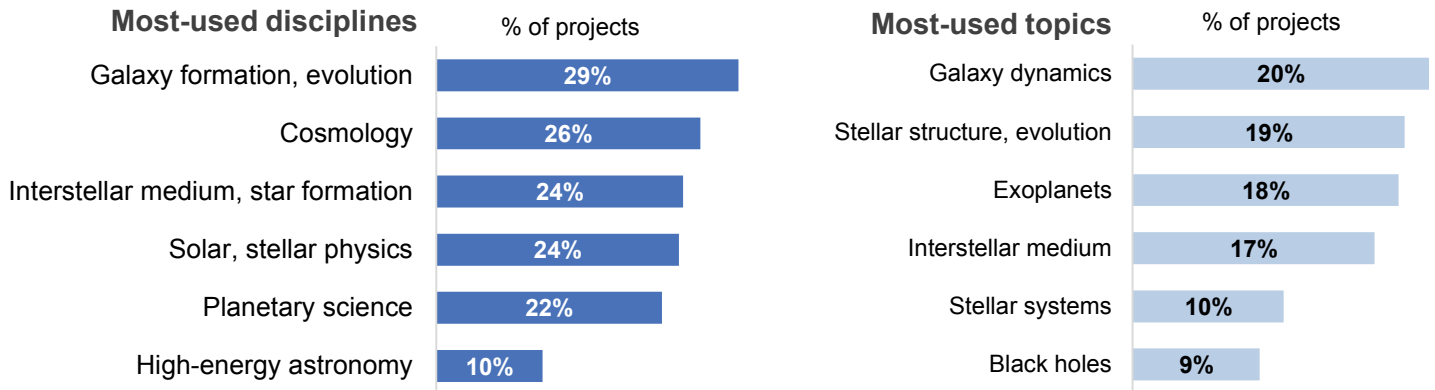


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

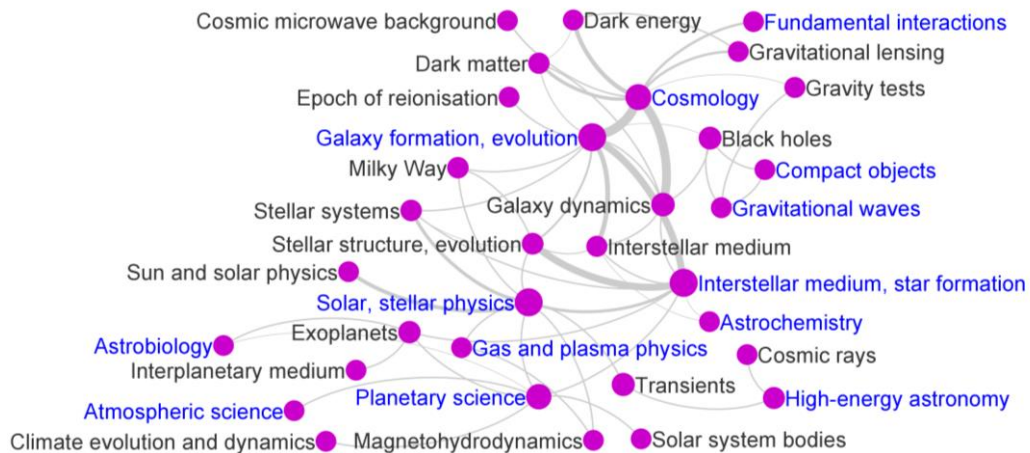
Scientific landscape of ERC-funded projects in this panel



- Planetary science and Exoplanets grew in use from 2014 to 2020. Noteworthy is the increase of projects studying the atmospheres and climates of (exo)planets, analysing their habitability and searching for signatures of life beyond Earth
- Cosmology, High-energy astronomy and Stellar systems were used more in StG projects compared to those funded in CoG and AdG schemes, while Solar, stellar physics and Stellar structure, evolution were used more in CoG projects and Galaxy formation, evolution and Galaxy dynamics in AdG projects
- Around 3/4 of projects in this panel generate methodological developments. Computational modelling and Observations are the main ones

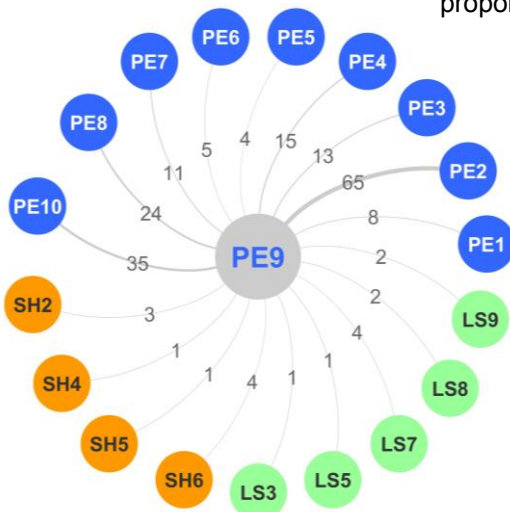
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- PE domain:** the main interaction is with the Fundamental Constituents of Matter (PE2) panel and to a lesser extent with the Earth System Science (PE10) panel through the disciplines *Fundamental interactions*, *Gas and plasma physics*, *Atmospheric science* and *Interstellar medium, star formation*
- LS domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy
- SH domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Earth System Science (PE10)

This fact sheet provides an overview of the projects funded in the 'Earth System Science' panel in the Physical Sciences and Engineering (PE) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2324 applications
(4.3% of total)



262 projects funded
(4.0% of total)



99 projects
(€162M)



96 projects
(€199M)



67 projects
(€184M)



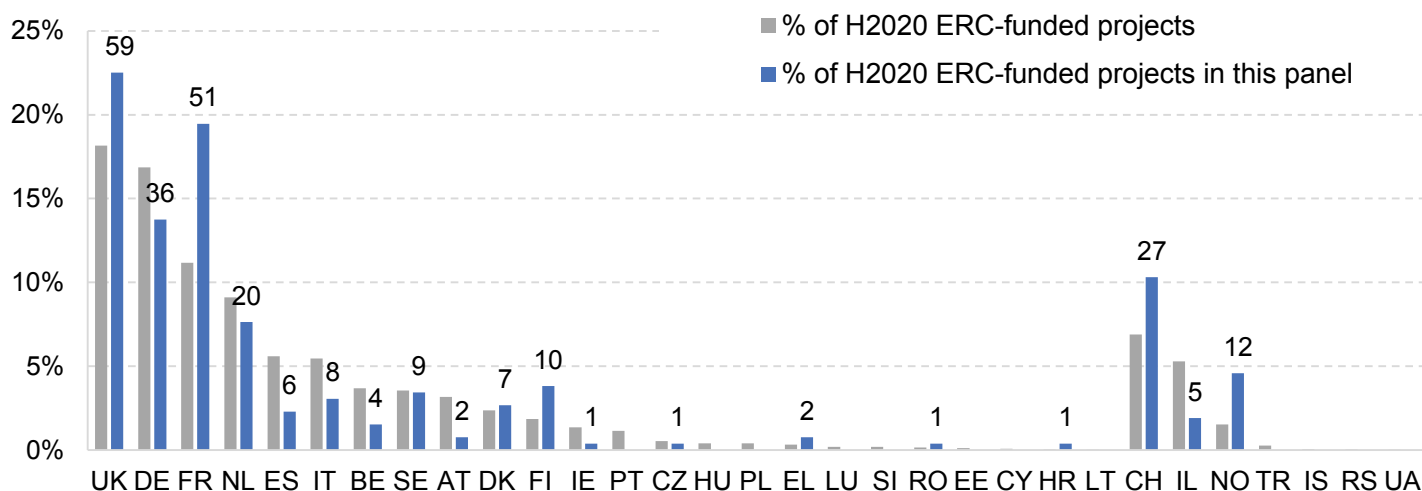
87 female grantees
(33% of grantees in this panel)



€545 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

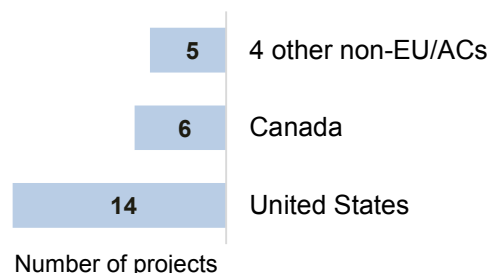
The 262 funded projects (numbers in the graph) are in 16 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥6 funded projects



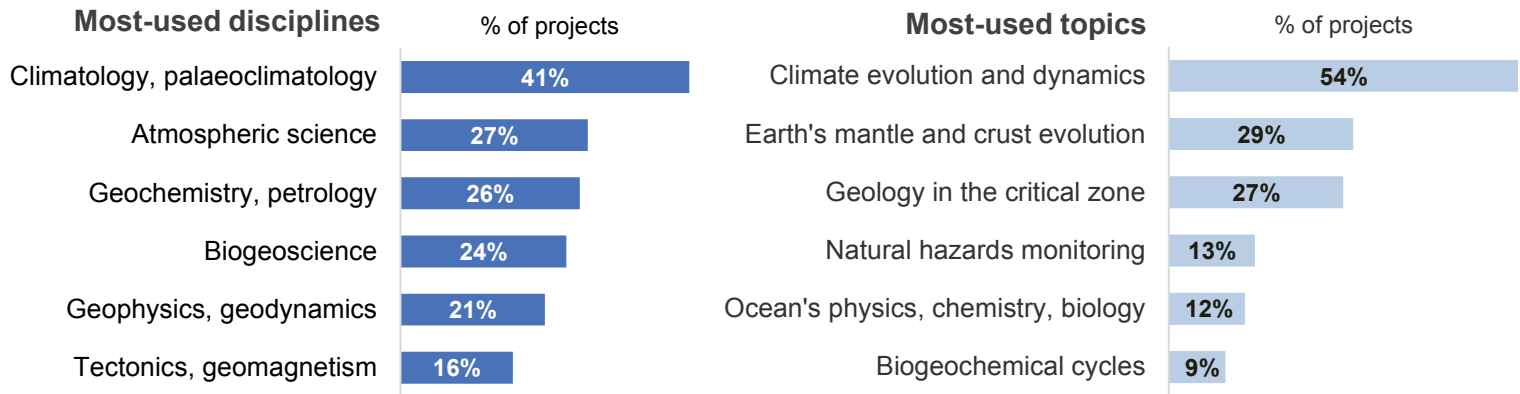
Country of origin of grantees other than EU or ACs (≤3 grouped together)



Number of projects

*Data as of December 2021

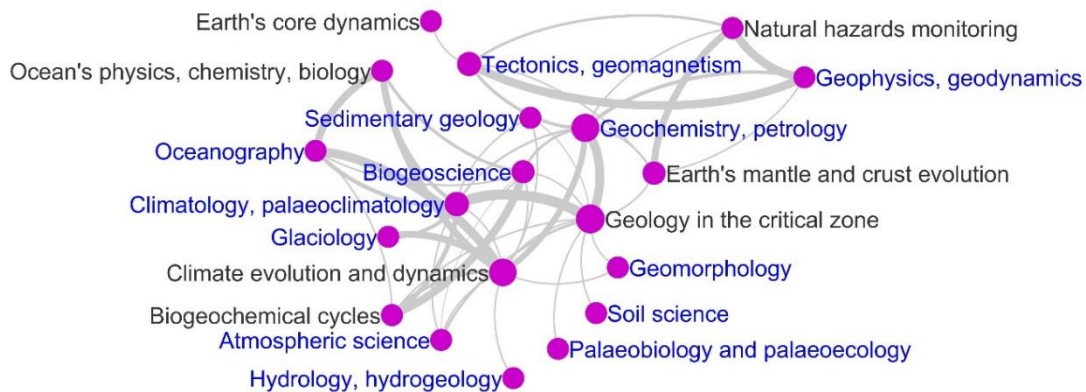
Scientific landscape of ERC-funded projects in this panel



- *Geophysics, geodynamics, Tectonics, geomagnetism, Earth's mantle and crust evolution, and Natural hazards monitoring* grew in use from 2014 to 2020
- *Atmospheric science, Geochemistry, petrology, Tectonics, geomagnetism and Natural hazards monitoring* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Geology in the critical zone* was used more in CoG projects and *Geophysics, geodynamics* was used more in AdG projects
- A high number of projects in this panel generate methodological developments. *Computational modelling and Experimental methods in earth system research* are the main ones

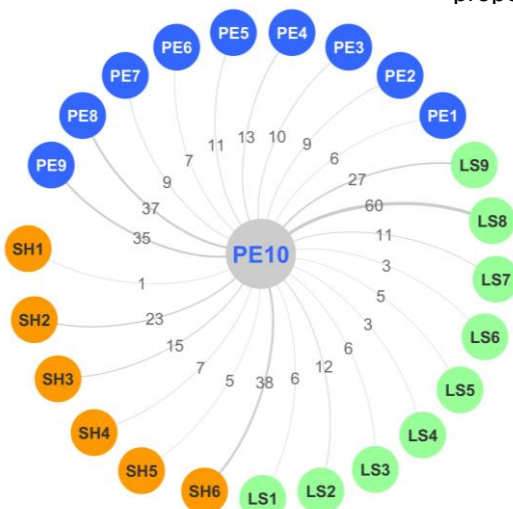
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



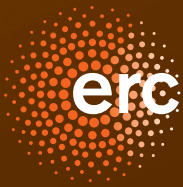
- **PE domain:** the interaction is not very strong, but there are some connections with the Products and Processes Engineering (PE8), and Universe Sciences (PE9) panels
- **LS domain:** the interaction is not very strong, but there is some connection with the Ecology, Evolution and Environmental Biology (LS8) panel through the disciplines *Biogeoscience*, and *Palaeobiology and palaeoecology*
- **SH domain:** the interaction is not very strong, but there is some connection with The Study of the Human Past (SH6) panel through the discipline *Palaeobiology and palaeoecology*



European Research Council

Established by the European Commission





European Research Council
Established by the European Commission



ERC Frontier Research in Social Sciences and Humanities

This series of factsheets provides an overview of the projects funded by the European Research Council (ERC), in the Social Sciences and Humanities domain, in the H2020 Framework Programme (2014–2020)

Individuals,
Markets and Organisations (SH1)

Institutions, Values,
Environment and Space (SH2)

The Social World,
Diversity, Population (SH3)

The Human Mind
and Its Complexity (SH4)

Cultures
and Cultural Production (SH5)

The Study
of the Human Past (SH6)

Data as of December 2021

SH

Individuals, Markets and Organisations (SH1)

This fact sheet provides an overview of the projects funded in 'Individuals, Markets and Organisations' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



1404 applications
(2.6% of total)



193 projects funded
(2.9% of total)



76 projects
(€95M)



66 projects
(€97M)



51 projects
(€84M)



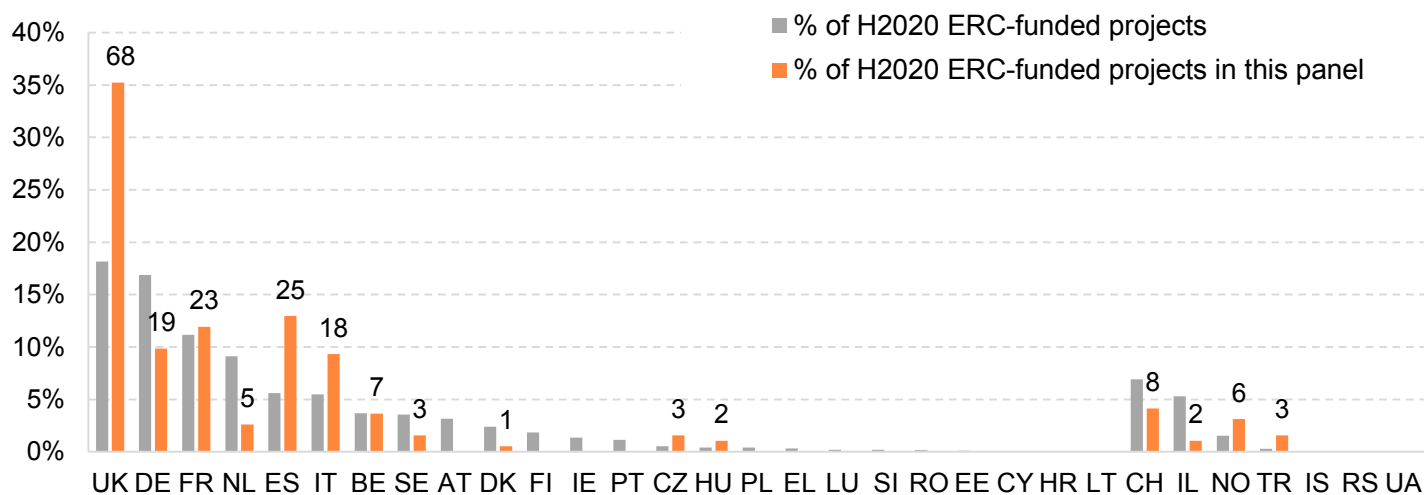
47 female grantees
(24% of grantees in this panel)



€276 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

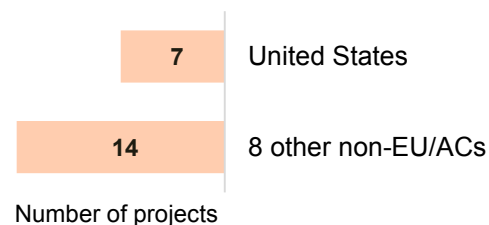
The 193 funded projects (numbers in the graph) are in 11 EU Member States and 4 Associated Countries (ACs)



Host institutions with ≥8 funded projects



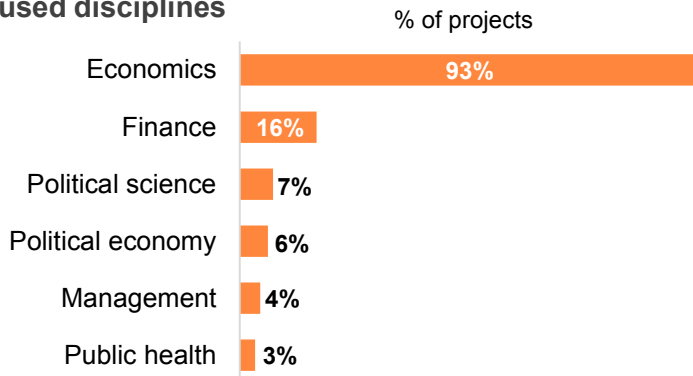
Country of origin of grantees other than EU or ACs (≤3 grouped together)



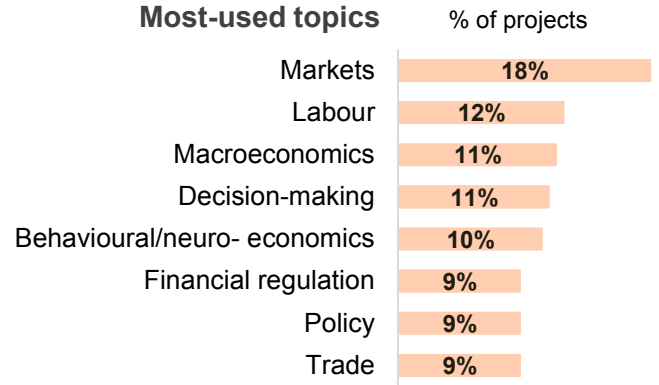
*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

Most-used disciplines



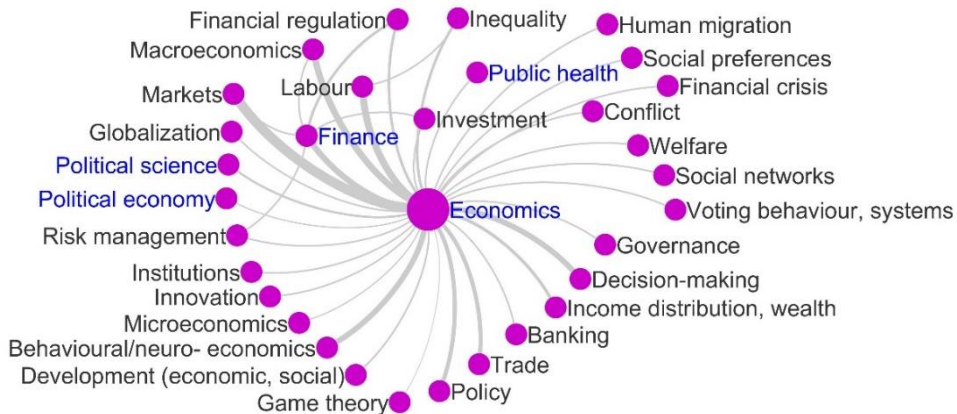
Most-used topics



- *Political economy*, *Markets*, *Labour* and *Behavioural/neuro-economics* grew in use from 2014 to 2020
- *Behavioural/neuro-economics* and *Decision-making* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Macroeconomics* was used more in CoG projects and *Political science* and *Management Financial regulation* in AdG projects
- Around half of the projects in this panel generate methodological developments. *Theoretical analysis*, *Econometrics* and *Computational modelling, simulations* are the main ones

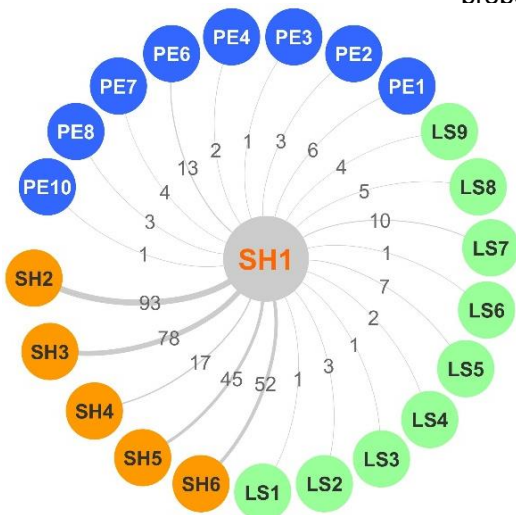
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with the Institutions, Values, Environment and Space (SH2), The Social World, Diversity, Population (SH3) and The Study of the Human Past (SH6) panels through the disciplines *Economics*, *Political science* and *Political economy*
- **PE domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy
- **LS domain:** the interaction is not very strong, there are no particular panels or disciplines highlighting any synergy

Institutions, Values, Environment and Space (SH2)

This fact sheet provides an overview of the projects funded in the 'Institutions, Values, Environment and Space' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2975 applications
(5.5% of total)



310 projects funded
(4.7% of total)



150 projects
(€216M)



101 projects
(€189M)



59 projects
(€138M)



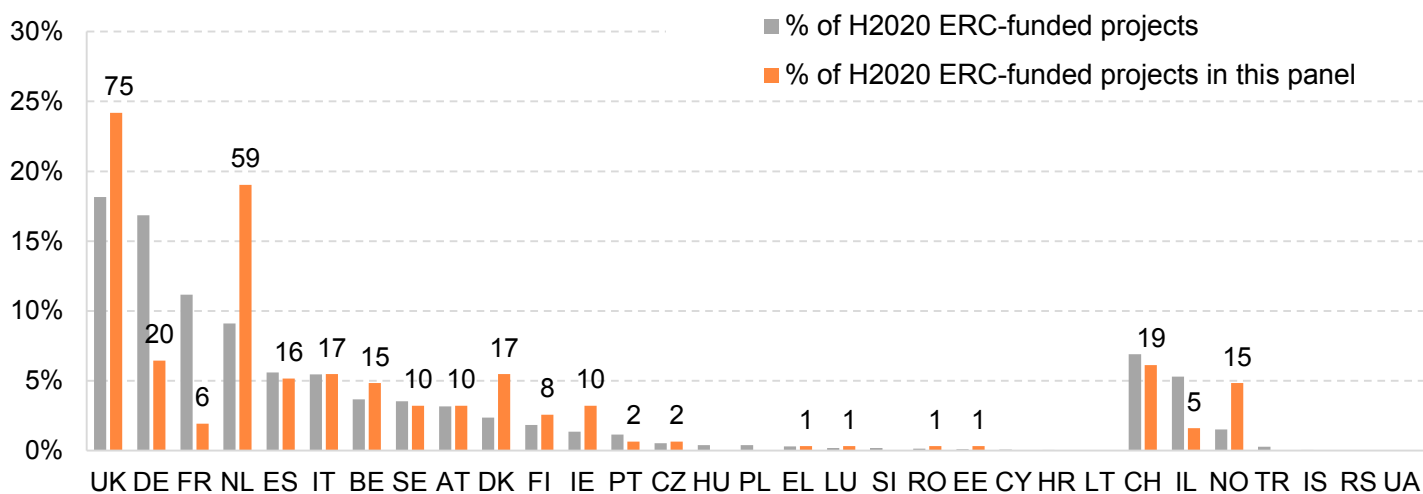
144 female grantees
(46% of grantees in this panel)



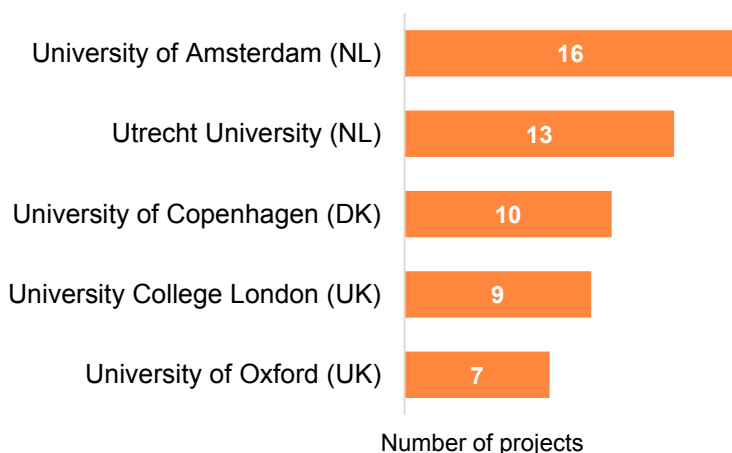
€543 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

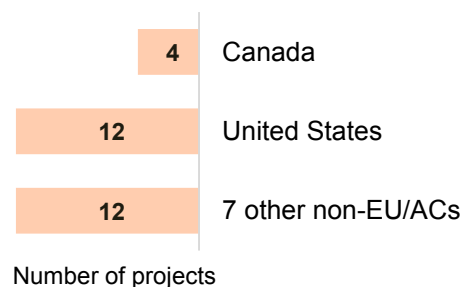
The 310 funded projects (numbers in the graph) are in 18 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥7 funded projects



Country of origin of grantees other than EU or ACs (≤3 grouped together)

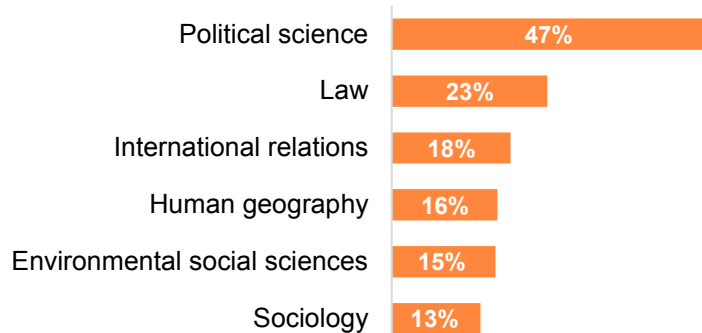


*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

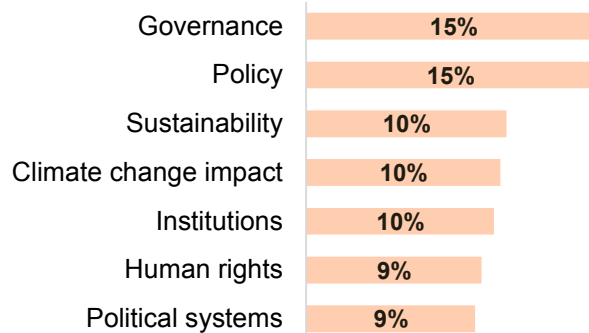
Most-used disciplines

% of projects



Most-used topics

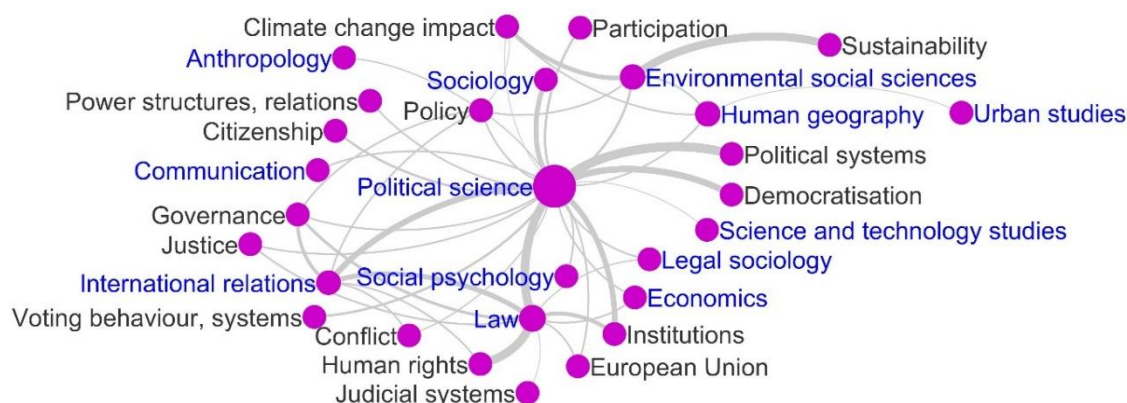
% of projects



- *Human geography*, *Climate change impact* and *Institutions* grew in use from 2014 to 2020
- *Law* and *International relations* were used more in StG projects compared to those funded in CoG and AdG schemes, while *Political science* and *Governance* were used more in AdG projects
- Around 1/4 of the projects in this panel generate methodological developments. *Theoretical analysis*, *Data collection* and *Empirical methods* are the main ones

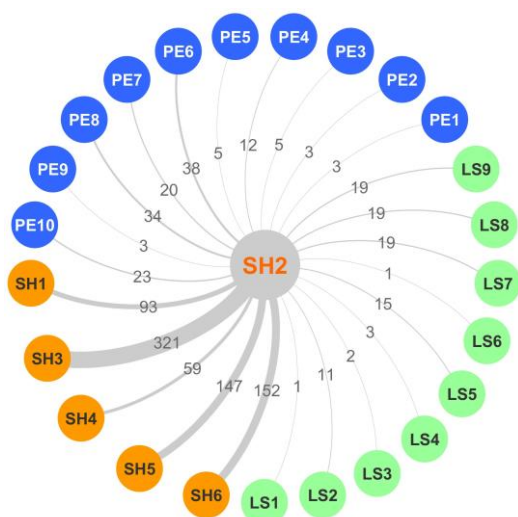
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with The Social World, Diversity, Population (SH3), The Study of the Human Past (SH6), and Cultures and Cultural Production (SH5) panels through the disciplines *Political science*, *Sociology*, *Human geography* and *Anthropology*
- **PE domain:** the interaction is not very strong, but there are some connections with the Computer Science and Informatics (PE6), and Products and Processes Engineering (PE8) panels through the disciplines *Artificial intelligence* and *Energy*
- **LS domain:** the interaction is not very strong, but there are some connections with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7), Ecology, Evolution and Environmental Biology (LS8), and Applied Life Sciences, Biotechnology, and Molecular and Biosystems Engineering (LS9) panels

The Social World, Diversity, Population (SH3)

This fact sheet provides an overview of the projects funded in the 'The Social World, Diversity, Population' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2010 applications
(3.7% of total)



245 projects funded
(3.7% of total)



125 projects
(€181M)



76 projects
(€143M)



44 projects
(€103M)



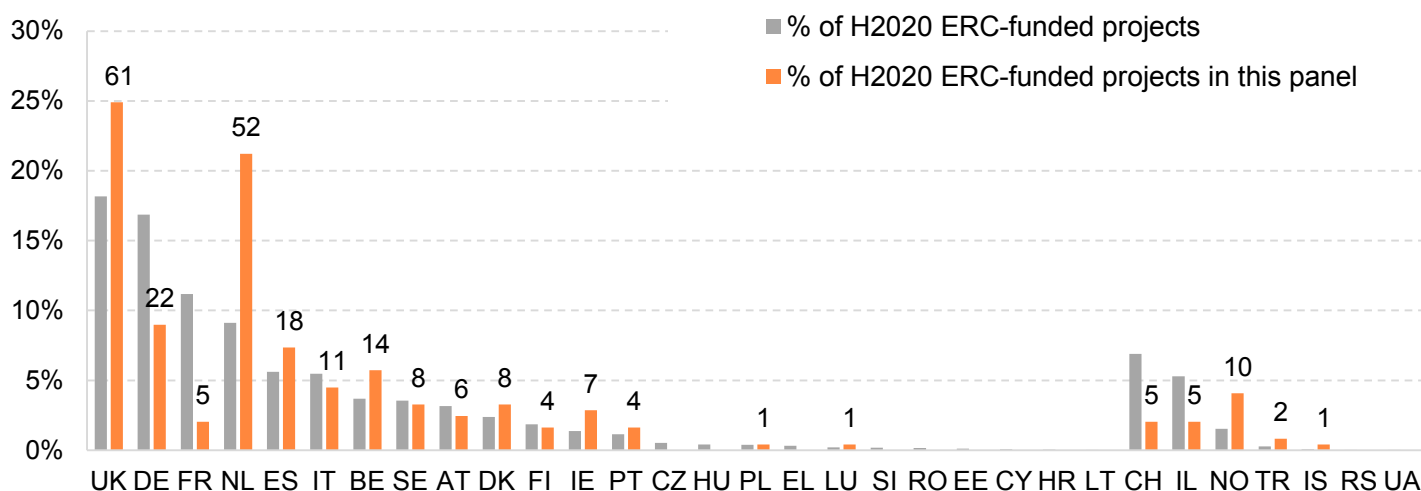
128 female grantees
(52% of grantees in this panel)



€427 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

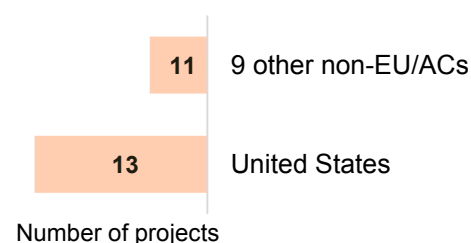
The 245 funded projects (numbers in the graph) are in 15 EU Member States and 5 Associated Countries (ACs)



Host institutions with ≥6 funded projects

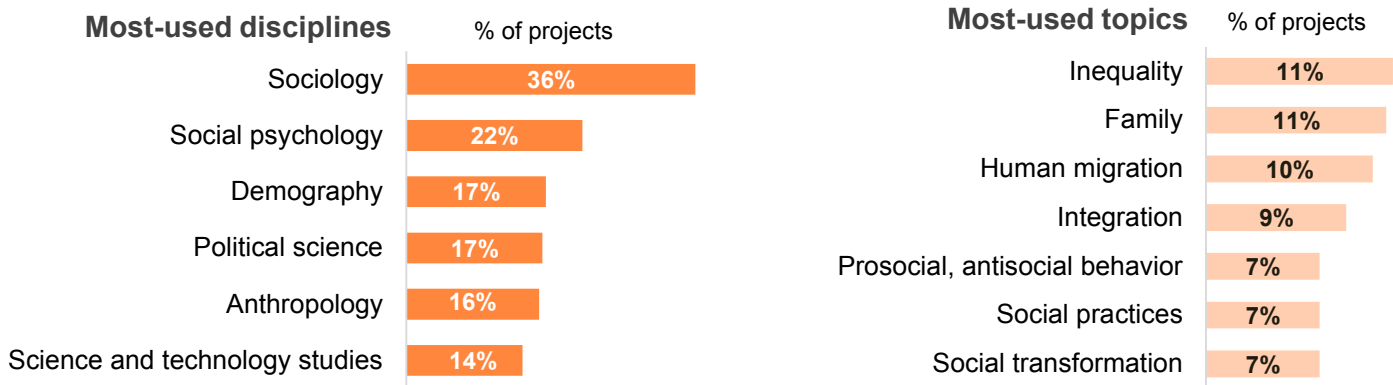


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

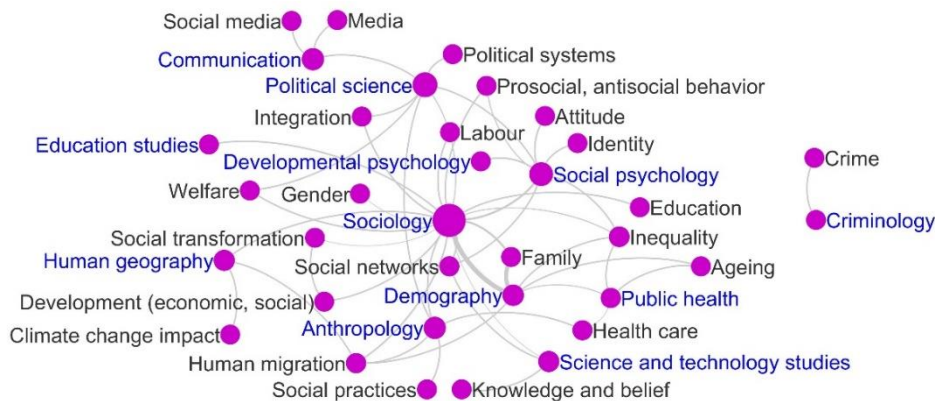
Scientific landscape of ERC-funded projects in this panel



- *Social psychology, Anthropology, and Knowledge and belief* grew in use from 2014 to 2020
- *Science and technology studies* was used more in StG projects compared to those funded in AdG and CoG schemes, while *Family* and *Human migration* were used more in CoG projects and *Sociology* and *Integration* were used more in AdG projects
- Around 1/5 of projects in this panel generate methodological developments. *Digital participatory methods* and *Statistical methods* are the main ones

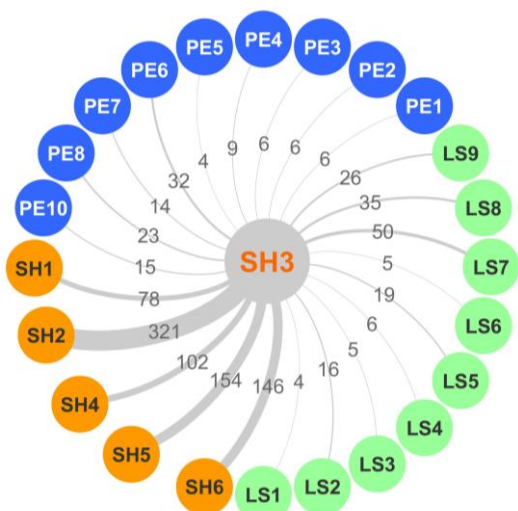
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with Institutions, Values, Environment and Space (SH2), Cultures and Cultural Production (SH5), and The Study of the Human Past (SH6) panels through the disciplines *Political science, Sociology* and *Anthropology*
- **PE domain:** the interaction is not very strong, but there is some connection with the Computer Science and Informatics (PE6) panel
- **LS domain:** the interaction is not very strong, but there is some connection with the Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panel through the discipline *Public health*

The Human Mind and Its Complexity (SH4)

This fact sheet provides an overview of the projects funded in the 'The Human Mind and Its Complexity' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2583 applications
(4.8% of total)



299 projects funded
(4.5% of total)



139 projects
(€208M)



95 projects
(€185M)



65 projects
(€153M)



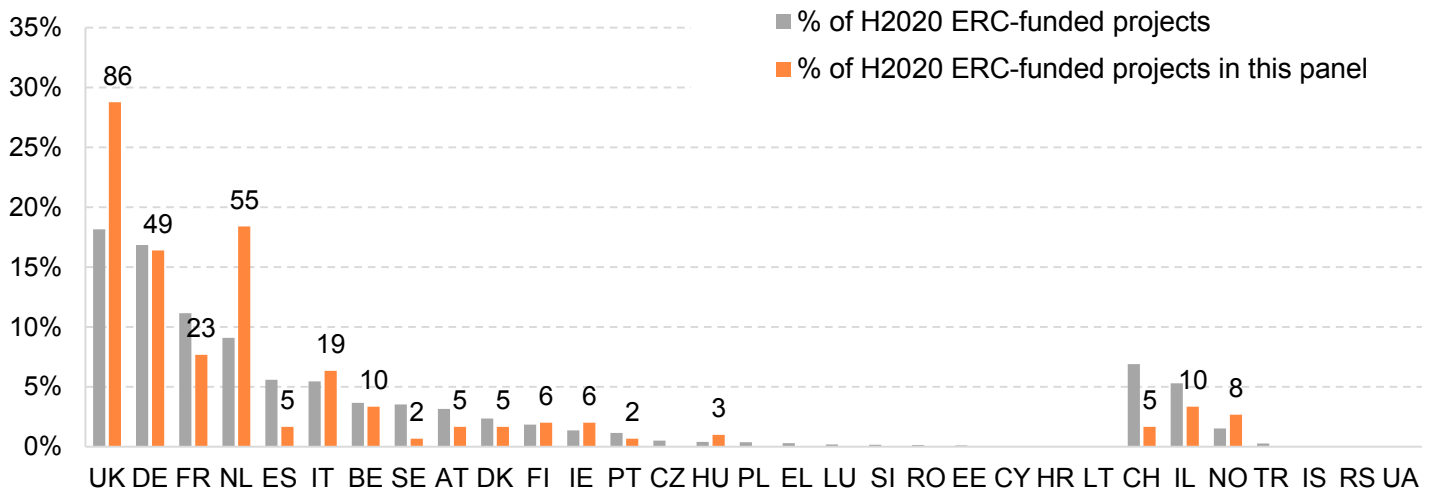
109 female grantees
(36% of grantees in this panel)



€546 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

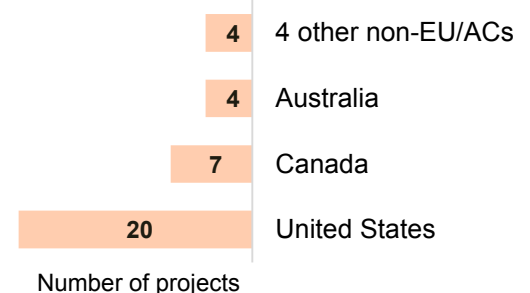
The 299 funded projects (numbers in the graph) are in 14 EU Member States and 3 Associated Countries (ACs)



Host institutions with ≥7 funded projects

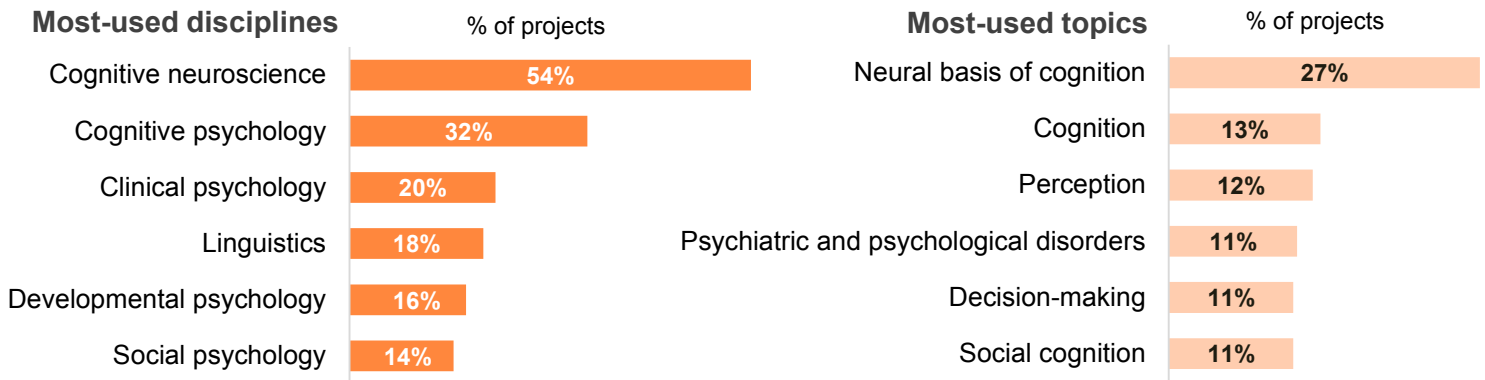


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

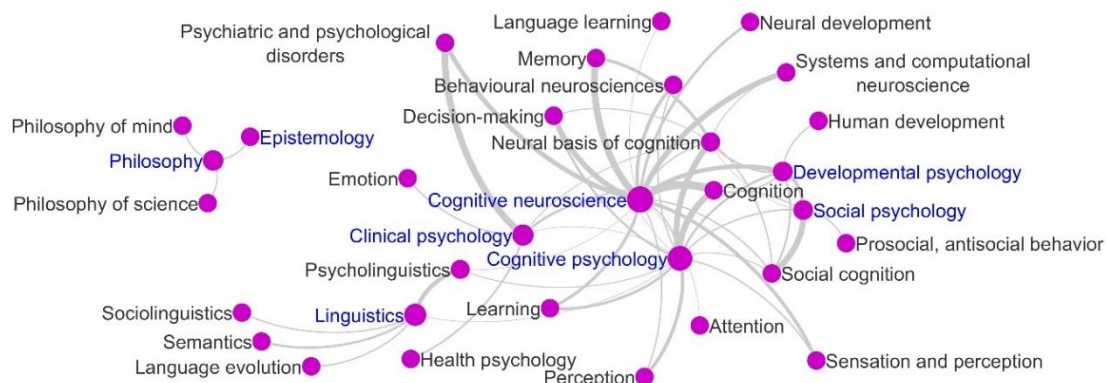
Scientific landscape of ERC-funded projects in this panel



- *Cognitive neuroscience*, *Cognitive psychology* and *Cognition* grew in use from 2014 to 2020
- *Cognitive psychology*, *Clinical psychology*, *Perception* and *Decision-making* were used more in StG and CoG projects compared to those funded in AdG scheme, while *Linguistics* was used more in AdG projects
- Around 1/4 of the projects in this panel generate methodological developments. *Computational modelling*, *simulations*, and *Experimental methods in behavior and psychology* are the main ones

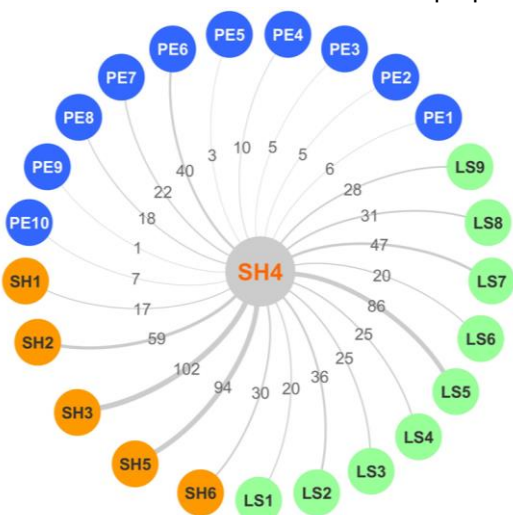
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with The Social World, Diversity, Population (SH3), and Cultures and Cultural Production (SH5) panels, and to a lesser extent with the Institutions, Values, Environment and Space (SH2) panel through the disciplines *Social psychology*, *Philosophy* and *Linguistics*
- **PE domain:** the interaction is not very strong, but there is some connection with the Computer Science and Informatics (PE6) panel
- **LS domain:** the main interaction is with the Neuroscience and Neural Disorders (LS5) panel through the discipline *Cognitive neuroscience*

Cultures and Cultural Production (SH5)

This fact sheet provides an overview of the projects funded in the 'Cultures and Cultural Production' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2421 applications
(4.5% of total)



274 projects funded
(4.1% of total)



109 projects
(€153M)



97 projects
(€185M)



68 projects
(€157M)



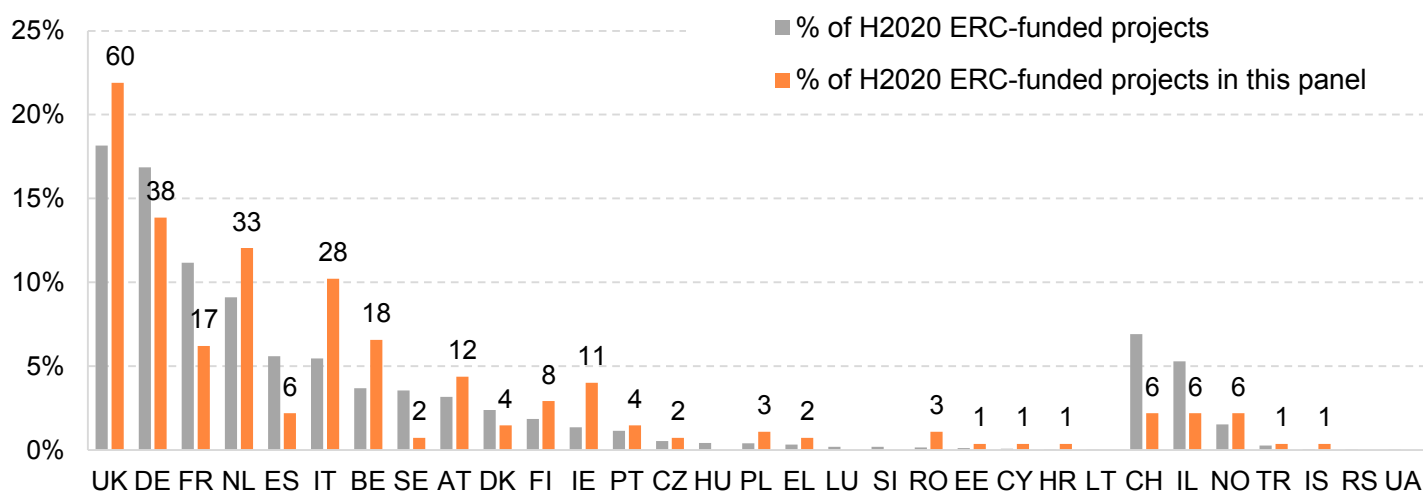
140 female grantees
(51% of grantees in this panel)



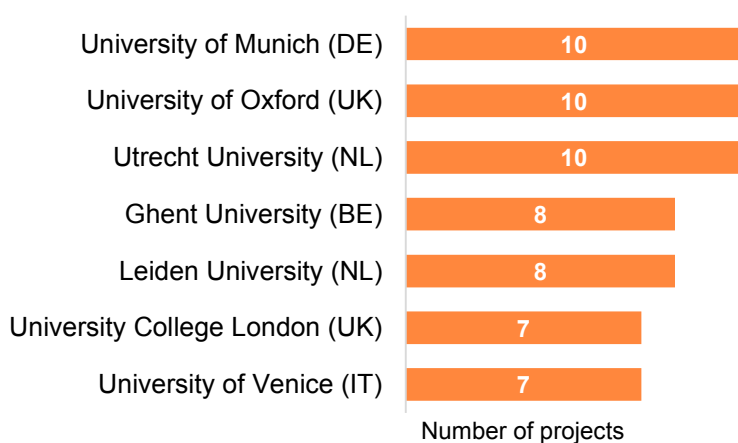
€495 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

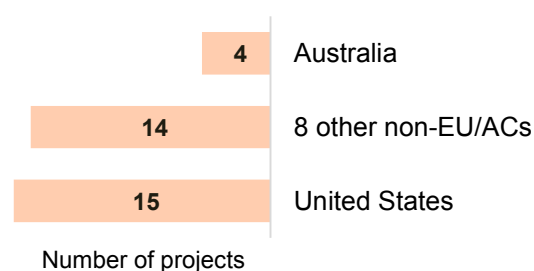
The 274 funded projects (numbers in the graph) are in 20 EU Member States and 5 Associated Countries (ACs)



Host institutions with ≥7 funded projects



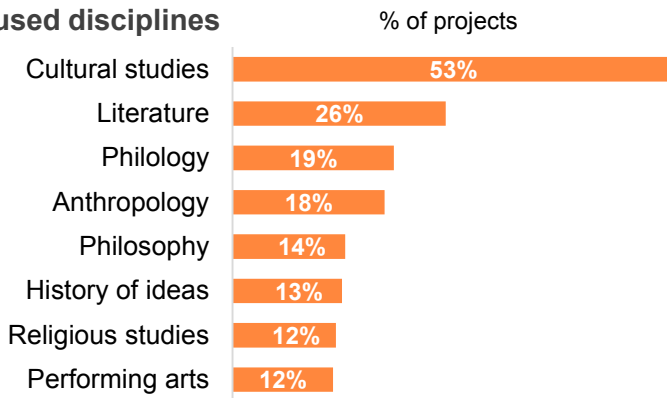
Country of origin of grantees other than EU or ACs (≤3 grouped together)



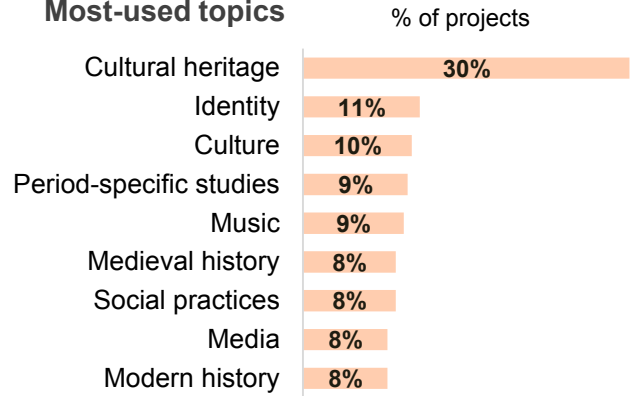
*Data as of December 2021

Scientific landscape of ERC-funded projects in this panel

Most-used disciplines



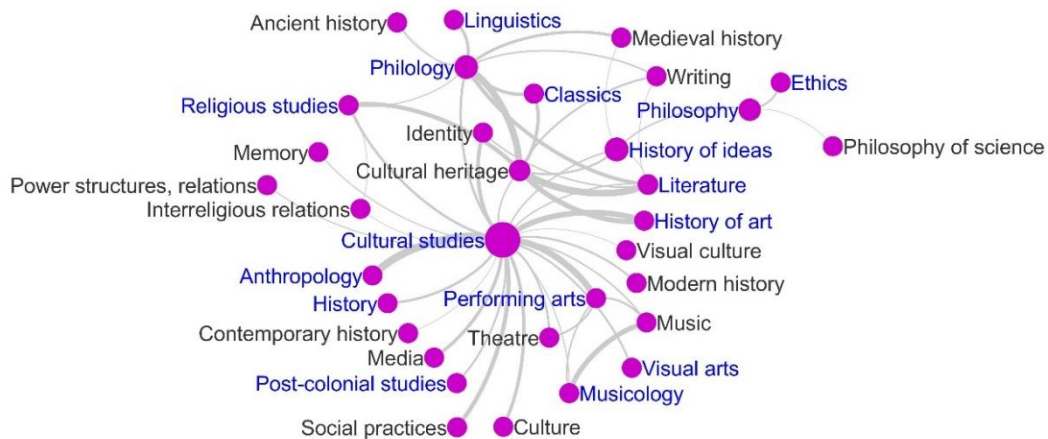
Most-used topics



- *Cultural studies* and *Codicology* grew in use from 2014 to 2020
- *Cultural studies* was used more in StG projects compared to those funded in CoG and AdG schemes, while *Culture* was used more in CoG projects and *Philosophy* and *Identity* were used more in AdG projects
- Around 1/3 of the projects in this panel generate methodological developments. *Digital humanities* and *Comparative methods* are the main ones

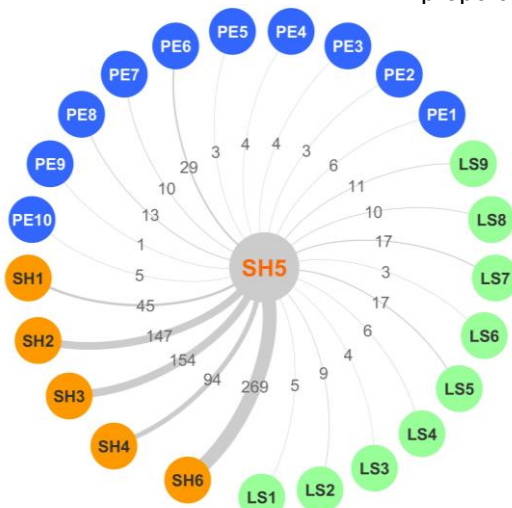
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with The Study of the Human Past (SH6), The Social World, Diversity, Population (SH3), and Institutions, Values, Environment and Space (SH2) panels through the disciplines *Anthropology*, *History of ideas* and *Cultural studies*
- **PE domain:** the interaction is not very strong, but there is some connection with the Computer Science and Informatics (PE6) panel
- **LS domain:** the interaction is not very strong, but there are some connections with the Neuroscience and Neural Disorders (LS5), and Applied Medical Technologies, Diagnostics, Therapies and Public Health (LS7) panels

The Study of the Human Past (SH6)

This fact sheet provides an overview of the projects funded in the 'The Study of the Human Past' panel in the Social Sciences & Humanities (SH) domain (see [ERC panel structure](#)). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG) and Advanced Grant (AdG) calls launched in the H2020 Framework Programme (2014–2020)*



2383 applications
(4.4% of total)



273 projects funded
(4.1% of total)



107 projects
(€155M)



94 projects
(€181M)



72 projects
(€172M)



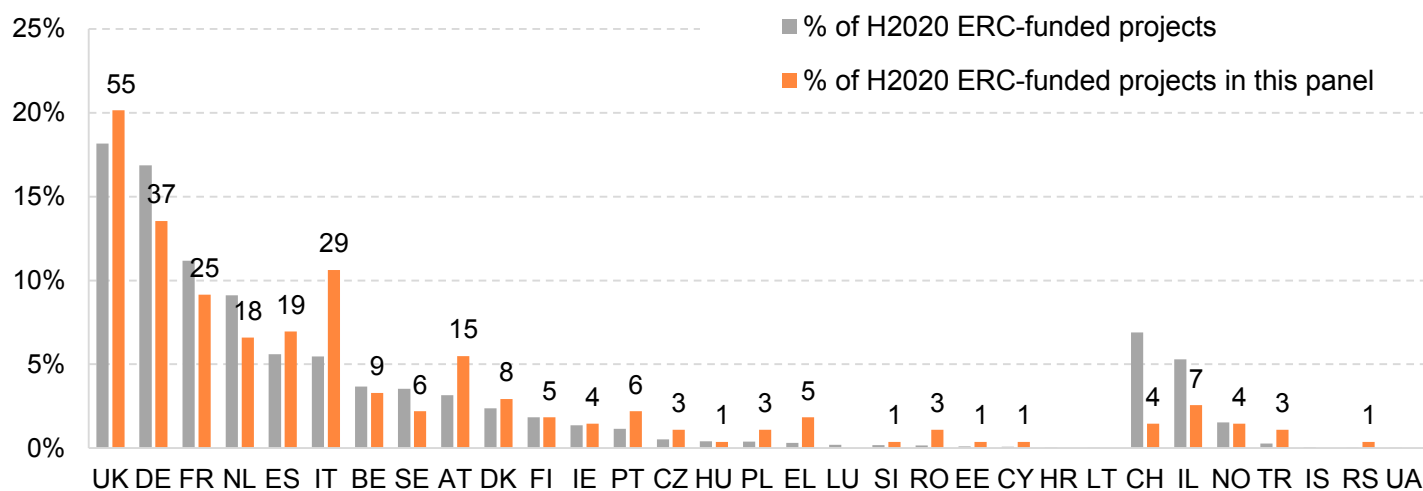
126 female grantees
(46% of grantees in this panel)



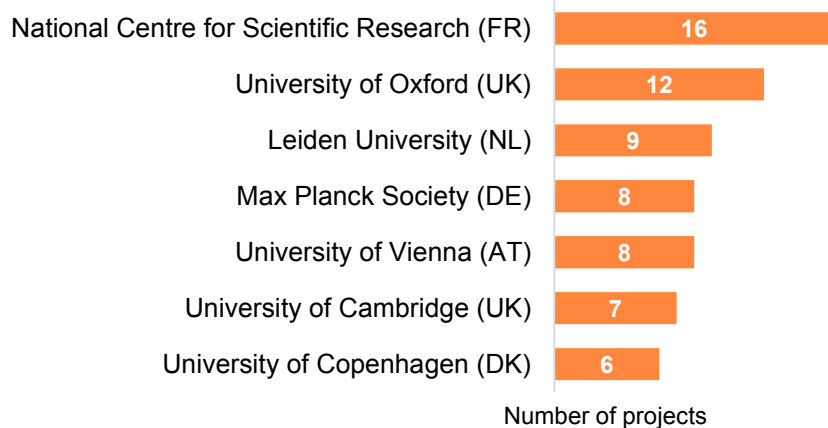
€508 million budget

Distribution of ERC-funded projects in EU Member States and Associated Countries in H2020

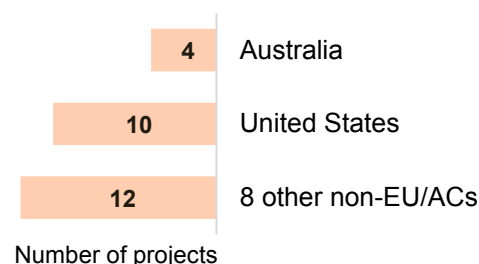
The 273 funded projects (numbers in the graph) are in 21 EU Member States and 5 Associated Countries (ACs)



Host institutions with ≥6 funded projects

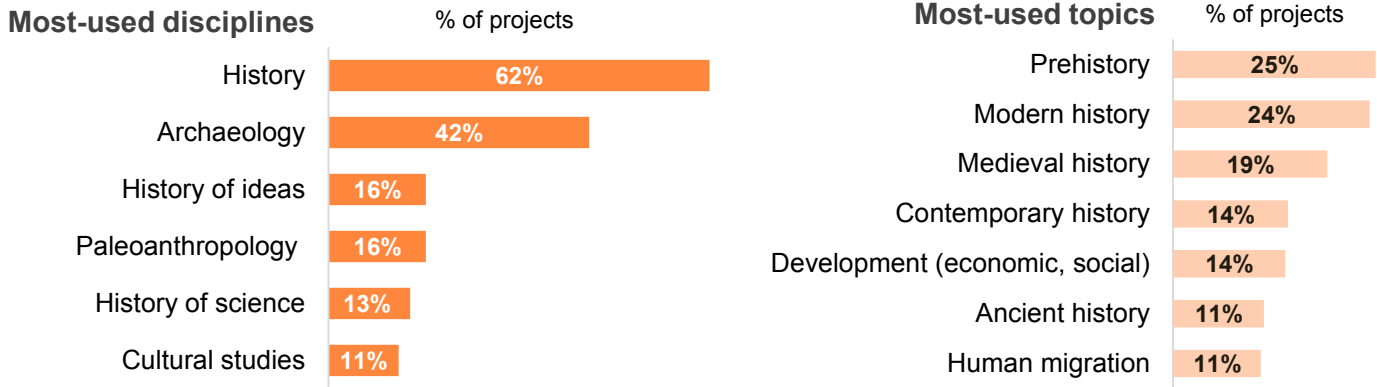


Country of origin of grantees other than EU or ACs (≤3 grouped together)



*Data as of December 2021

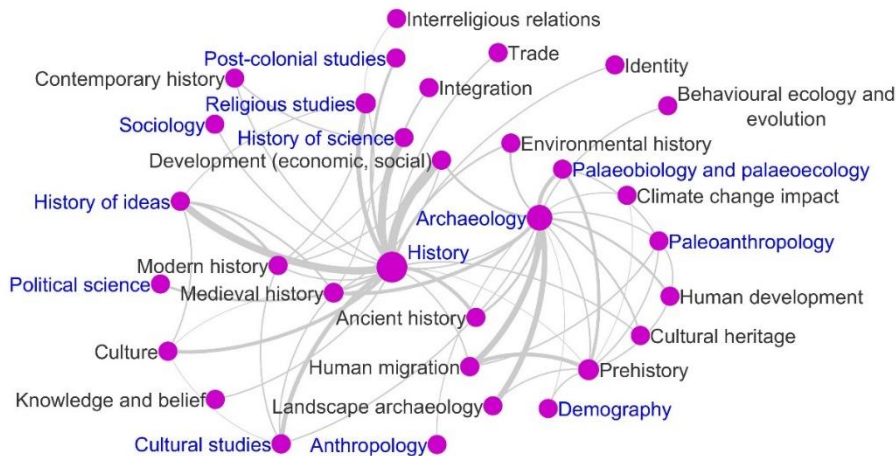
Scientific landscape of ERC-funded projects in this panel



- *Paleoanthropology*, *History of science* and *Landscape archaeology* grew in use from 2014 to 2020
- *Paleoanthropology*, *Prehistory*, *Modern history* and *Contemporary history* were used more in StG projects compared to those funded in CoG and AdG schemes, while *History of science* was used more in AdG projects
- Around 1/3 of the projects in this panel generate methodological developments. *Archival research* and *Archaeological material analysis* are the main ones

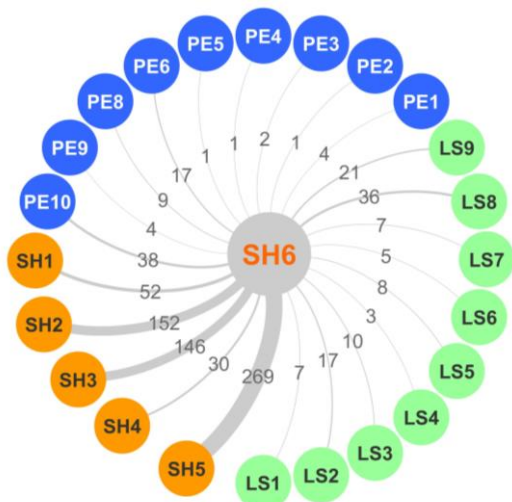
Connections between disciplines and topics in this panel

The strength of the connection between disciplines (blue) and topics (grey) is represented by the thickness of the arcs, which is proportional to the number of times they appear together



Synergies with other panels and domains

The strength of the connections is represented by the thickness of the arcs and the numbers indicated, which are proportional to the number of shared disciplines



- **SH domain:** the main interactions are with the Cultures and Cultural Production (SH5), Institutions, Values, Environment and Space (SH2), and The Social World, Diversity, Population (SH3) panels through the disciplines *History of ideas*, *Cultural studies* and *Religious studies*
- **PE domain:** the interaction is not very strong, but there is some connection with the Earth System Science (PE10) panel through the discipline *Palaeobiology and palaeoecology*
- **LS domain:** the interaction is not very strong, but there is some connection with the Ecology, Evolution and Environmental Biology (LS8) panel through the discipline *Palaeobiology and palaeoecology*



European Research Council

Established by the European Commission





European Research Council
Established by the European Commission



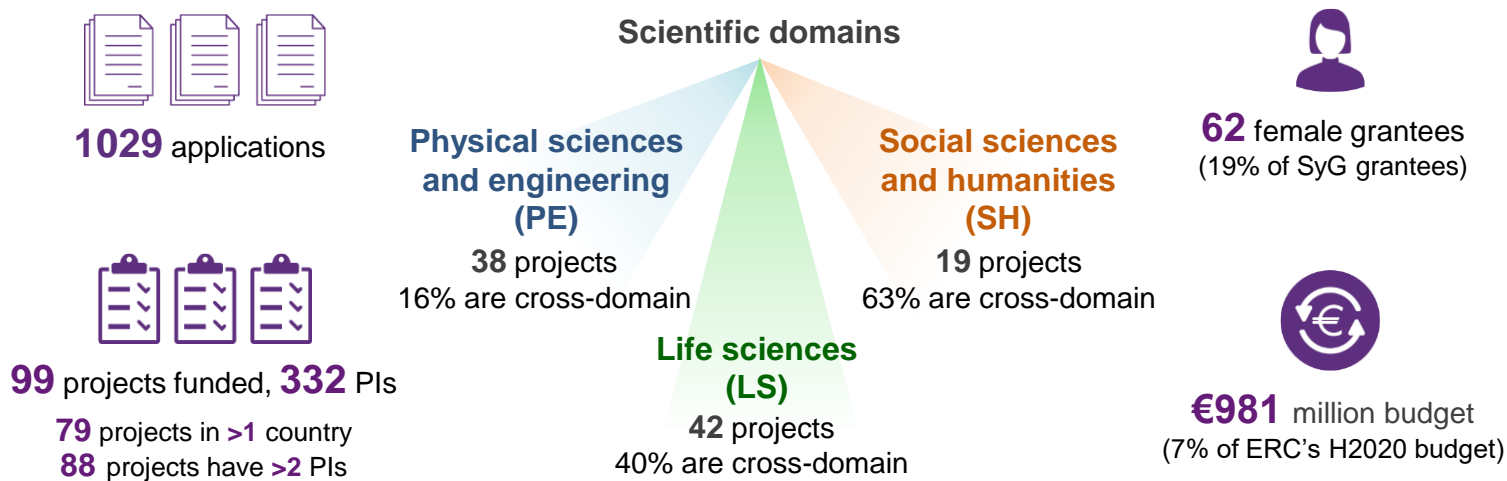
ERC Frontier Research in the Synergy Grant calls

This fact sheet provides an overview of the projects funded in the three Synergy Grant calls launched in the H2020 Framework Programme (2014-2020). Unlike single-investigator grants (Starting Grant, Consolidator Grant and Advanced Grant), the Synergy Grant funds a group of two to four principal investigators, working together and combining different skills and resources to tackle ambitious research problems. Synergy projects are often interdisciplinary and cover several of the ERC's scientific domains. The ERC's ambition for the Synergy Grants scheme is to become a world benchmark in funding transformative research.

Data as of December 2021

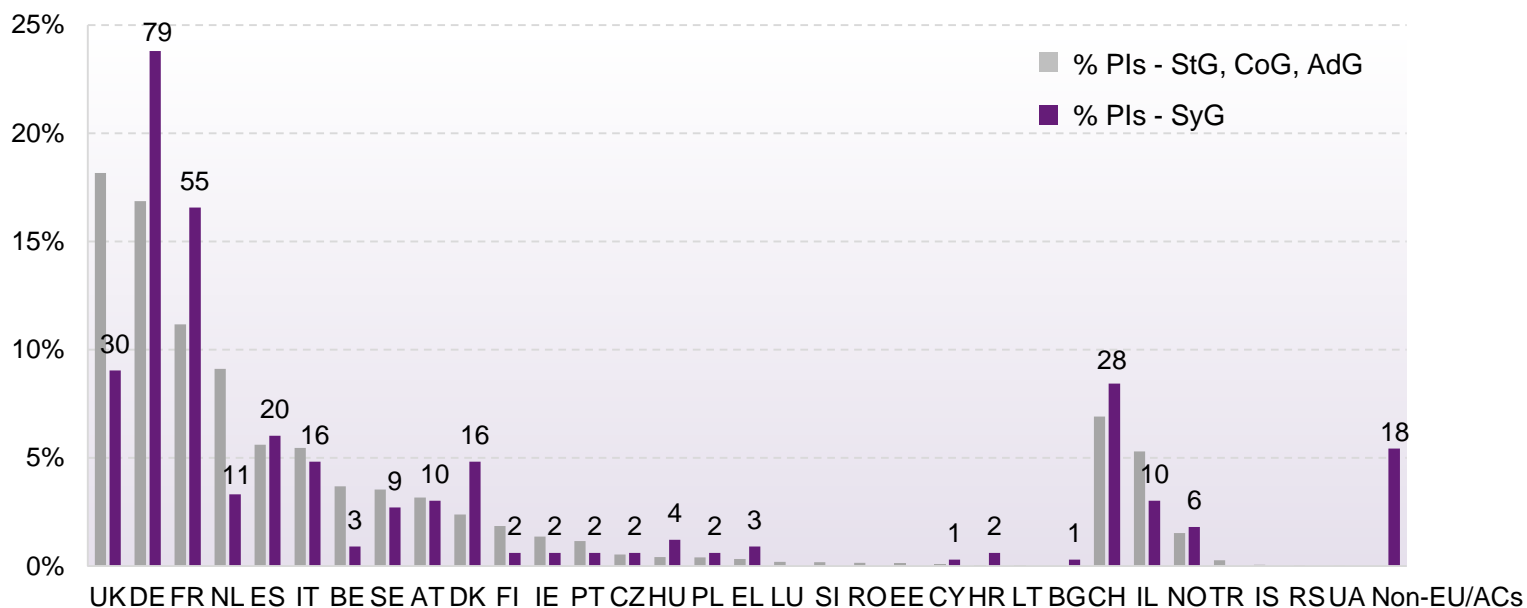
Synergy Grant calls

This fact sheet provides an overview of the projects funded in the three Synergy (SyG) calls launched in the H2020 Framework Programme (2014–2020)*



Distribution of SyG PIs in Horizon 2020

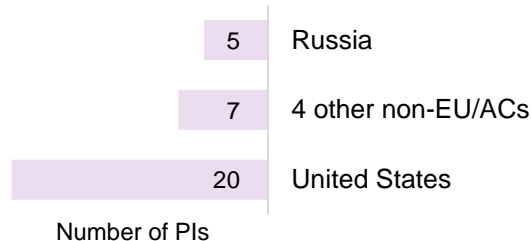
The 332 PIs of the 99 funded projects are in 20 EU Member States, 3 Associated Countries (ACs) and 5 non-EU/ACs



Host institutions with ≥5 SyG PIs



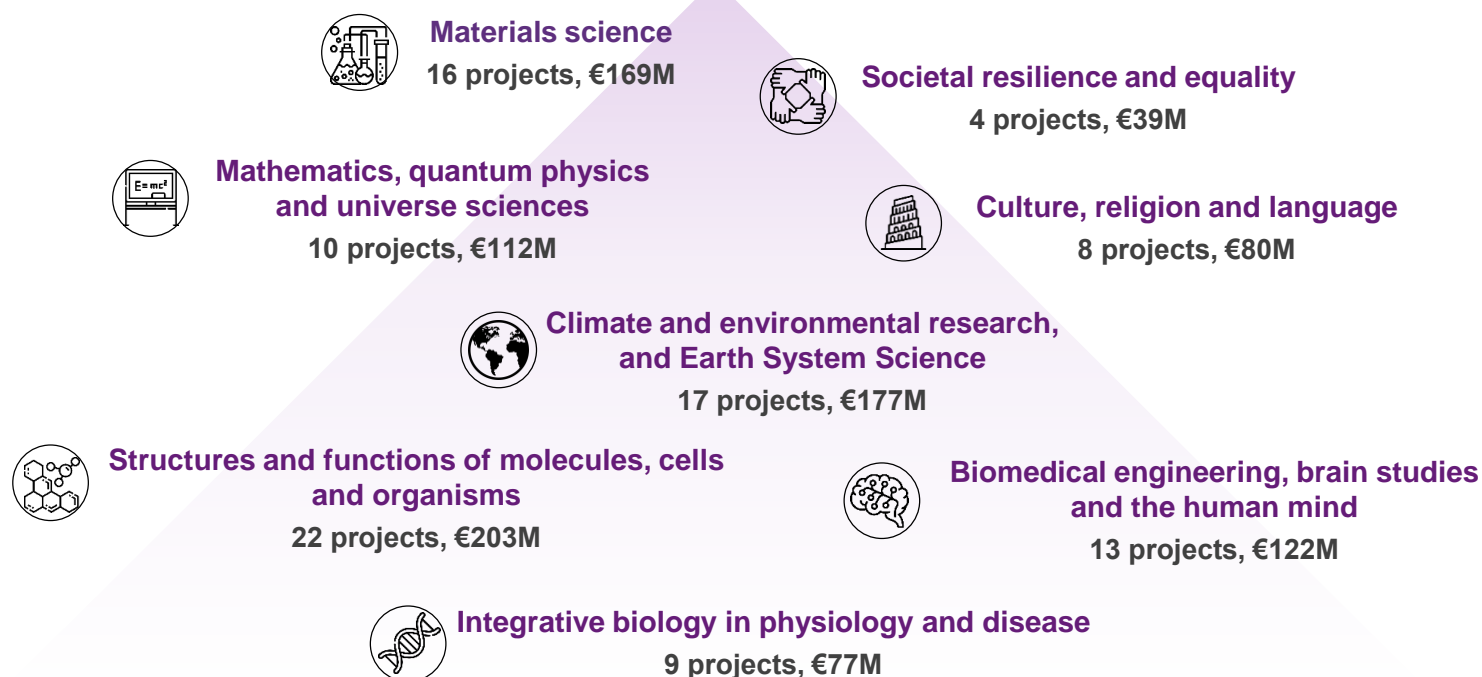
Country of origin of grantees other than EU or ACs (≤4 grouped together)



*Data as of December 2021

Disciplinary and topical clustering of Synergy projects

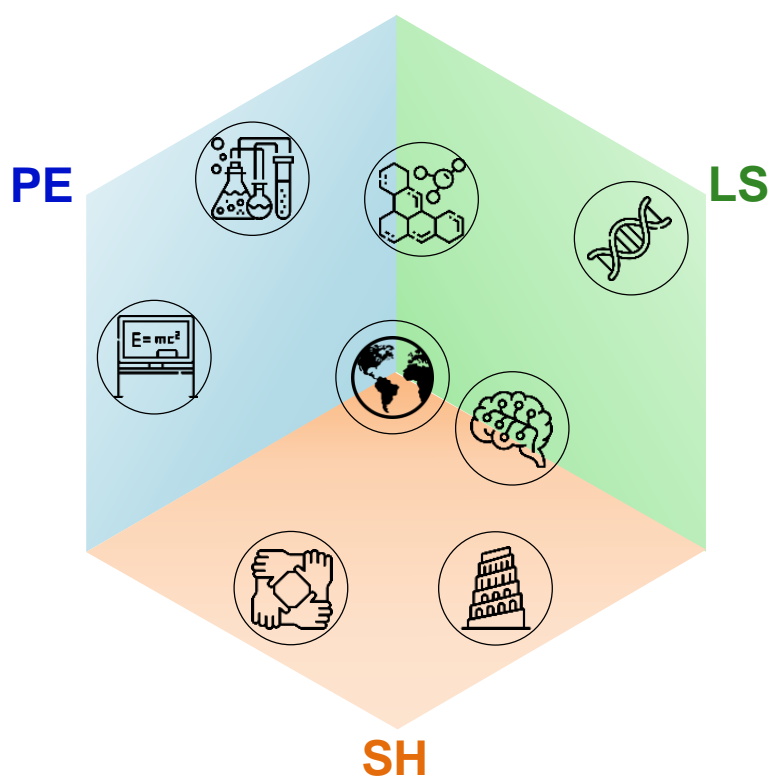
Clusters of SyG projects



The 99 SyG projects were grouped into thematic clusters to better capture their scientific landscape. The clustering was achieved by exploring common disciplines and topics between individual projects, where a total of 336 terms were used as classifiers, including 117 disciplines and 219 topics. The scope of each cluster spans across a range of scientific areas that are reflected in the cluster's name.

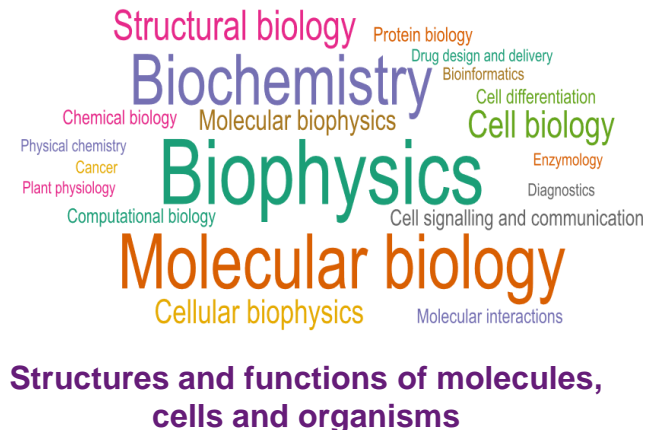
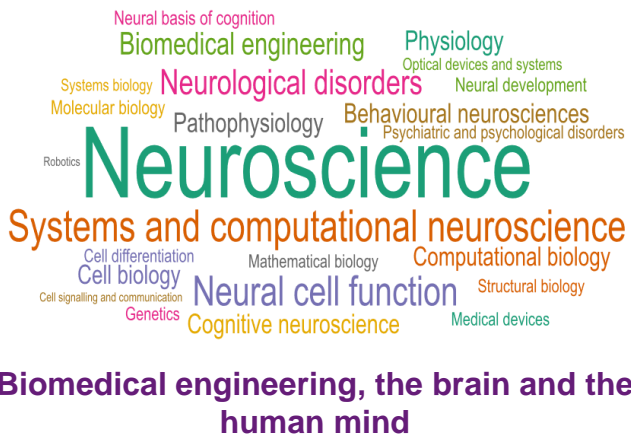
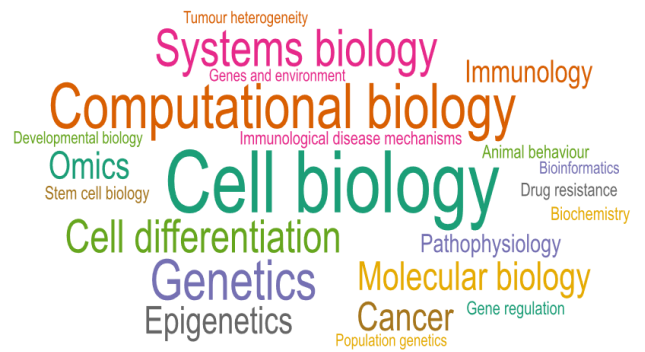
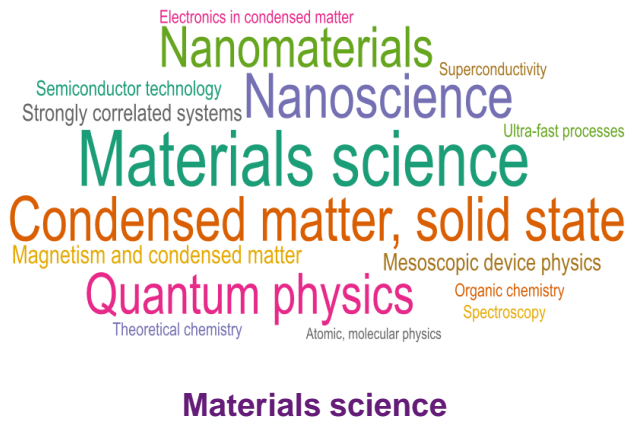
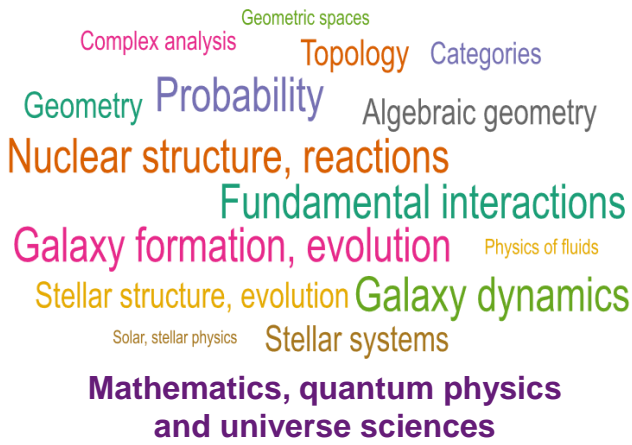
SyG clusters in the 3 scientific domains

SyG clusters are spread across the 3-domain space. Five clusters are more focused on a single domain and three clusters have a strong inter-domain component



- Mathematics, quantum physics and universe science** and **Materials science** are predominantly PE. **Integrative biology in physiology and disease** is mainly LS. **Culture, religion and language** and **Societal resilience and equality** are substantially SH.
- Climate and environmental research, and Earth System Science** lies at the intersection of the three domains, which contribute equally to the cluster. In the **Structures and functions of molecules, cells and organisms** cluster, the majority of the projects have an LS orientation with several having a strong PE component. **Biomedical engineering, the brain and the human mind** is at the intersection between LS and SH domains with a predominant LS orientation.

Scientific landscape of ERC-funded projects in Synergy: exploring the clusters

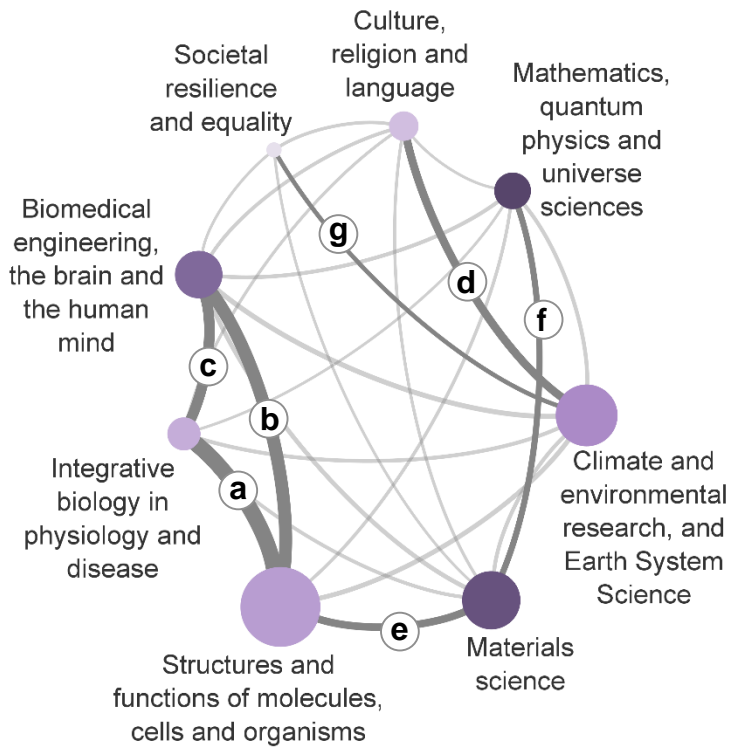


The word clouds represent the most prevalent scientific fields in the pool of SyG ERC projects under each scientific cluster.

Scientific synergies and methodological developments in Synergy

Main connections between the clusters of SyG projects

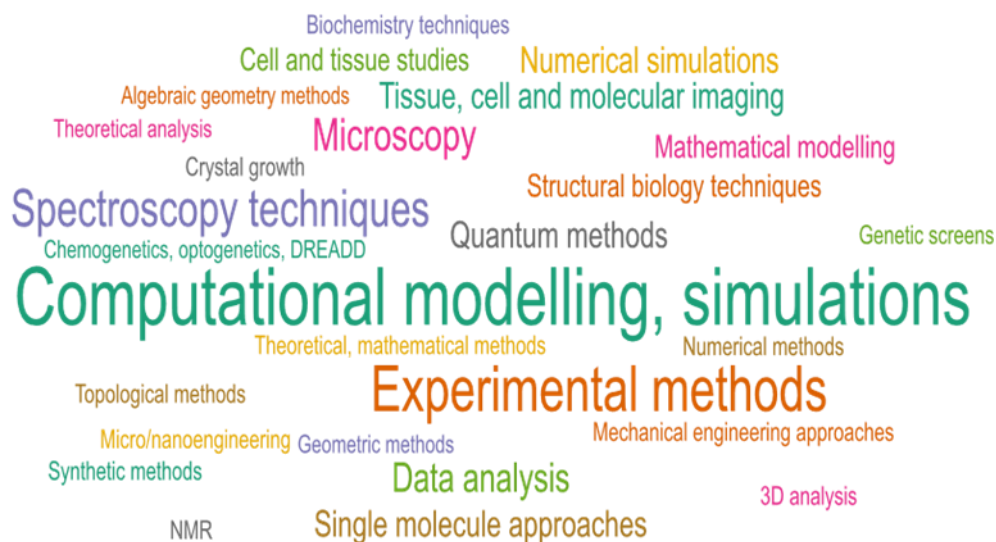
The nodes, whose size is proportional to the number of projects, represent scientific clusters of the Synergy projects. These clusters are interconnected and the strength of this connection is represented by the thickness of the arc that is proportional to the number of shared scientific fields. The most representative scientific fields of the main connections, tagged with letters, are listed.



- a** Cell biology; Computational biology; Cell differentiation; Cancer; Molecular biology
- b** Computational biology; Mathematical biology; Neurological disorders; Molecular biology; Physiology; Structural biology; Cell differentiation; Cell signaling and communication; Cell biology; Optical devices and systems
- c** Systems biology; Computational biology; Genetics; Molecular biology; Pathophysiology; Cell biology; Cell differentiation
- d** Climatology and paleoclimatology; Paleoanthropology; Climate change impact
- e** Biochemistry; Physical chemistry; Spectroscopy
- f** Atomic molecular physics; Optics and laser physics; Gas and plasma physics; Quantum information, physics, optics; Electronics photonics; Materials engineering; Nanoscience; Topology; Optoelectronic photonic systems; Spectroscopy; Thermodynamics
- g** Governance; Anthropology; Economics; Political Science; Social psychology; Policy

Landscape of methodological developments in SyG projects

The main methodological development across all domains is in the field of *Computational modelling, simulations* with a substantial contribution to models and algorithm development for Earth system studies. The largest share of projects contributing towards methodological developments is found in the PE domain followed by the LS domain and to a lesser extent in the SH domain.





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ERC frontier research contribution to a Europe fit for the digital age

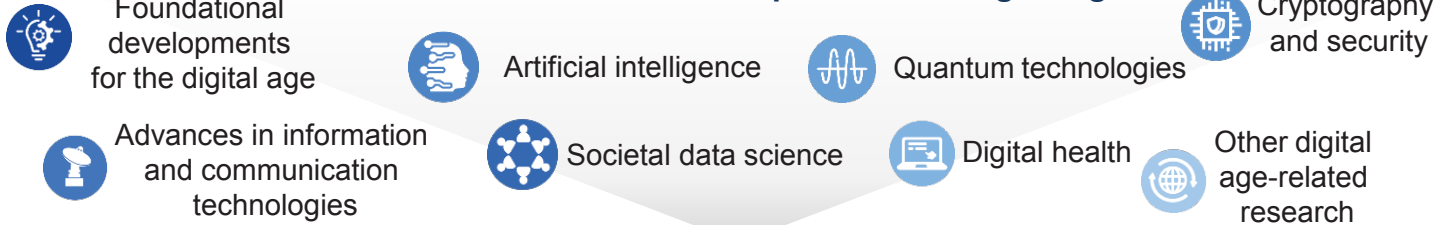
The European Research Council (ERC) follows a strictly bottom-up approach to funding research proposals, with excellence as the sole criterion for selection. The research that ERC grantees pursue, free of any thematic objectives, generates results that address a wide range of issues with significant socioeconomic, environmental and policy relevance. As a result, this rich and diverse portfolio of frontier research generates new knowledge and proposes concrete solutions for addressing some of the most pressing policy priorities of the European Commission. This is the case of the over 700 projects funded by the ERC, worth more than €1 billion, in the Horizon 2020 (H2020) Framework Programme (2014–2020) that are relevant for ‘Europe fit for the digital age’.

Data as of December 2021

ERC frontier research contribution to a Europe fit for the digital age

This fact sheet provides an overview of the projects relevant for the selected areas of the [Europe fit for the digital age](#). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG), Advanced Grant (AdG) and Synergy Grant (SyG) schemes launched in the H2020 Framework Programme (2014–2020)*

Areas of interest for a Europe fit for the digital age



757 ERC-funded projects, worth €1466 million

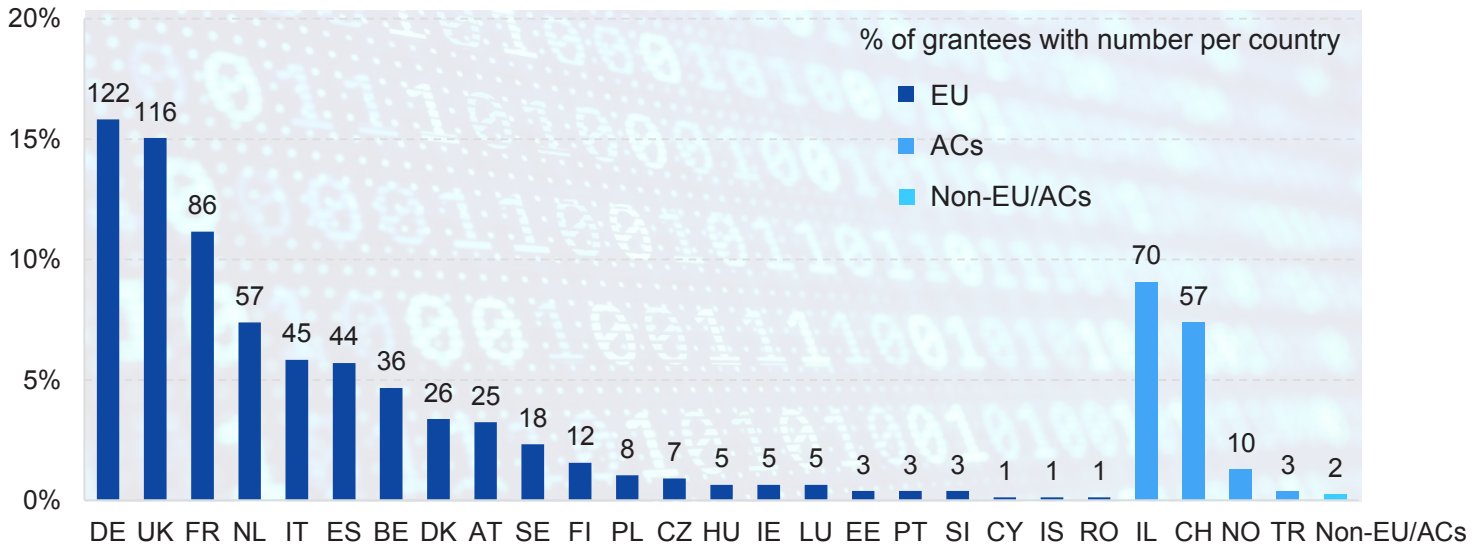
Physical sciences and engineering
632 projects, €1226M

Life sciences
32 projects, €75M

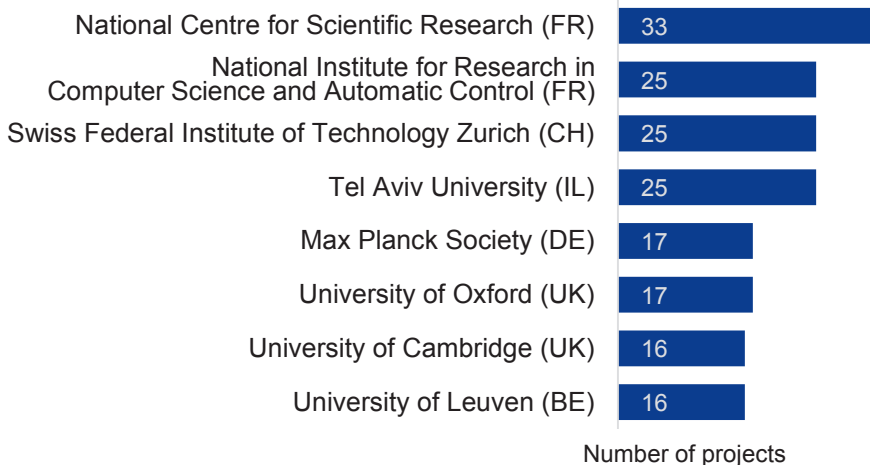
Social sciences and humanities
93 projects, €165M

Distribution of ERC-funded projects in Horizon 2020

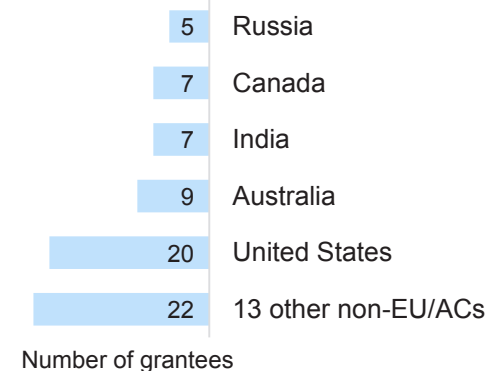
771 grantees lead 759 projects and are based in 22 EU Member States, 4 Associated Countries (ACs) and 2 non-EU/ACs



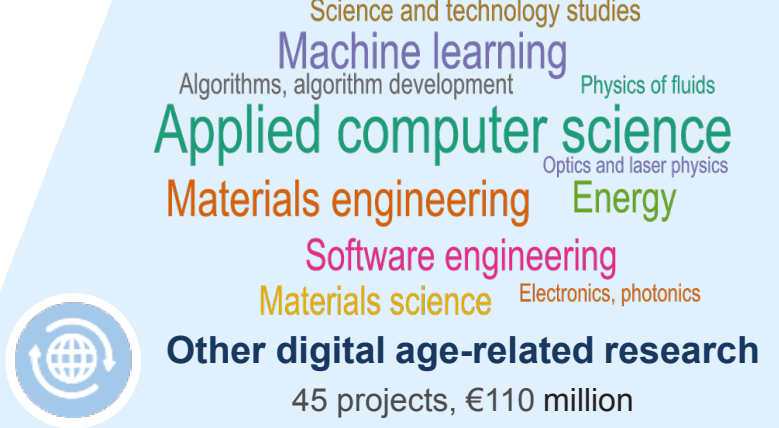
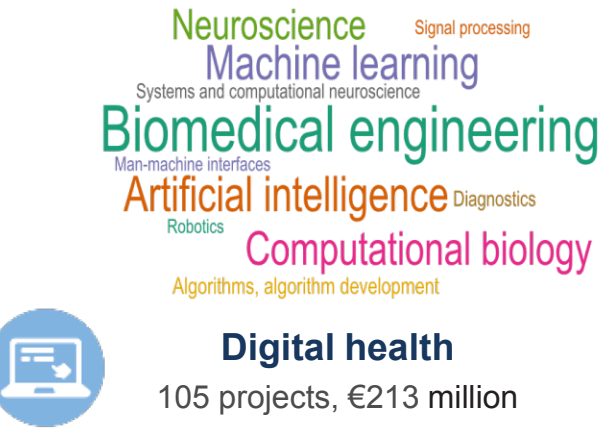
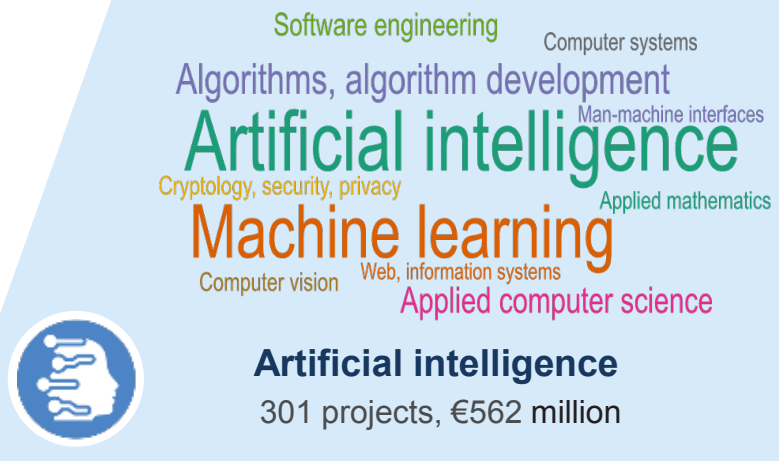
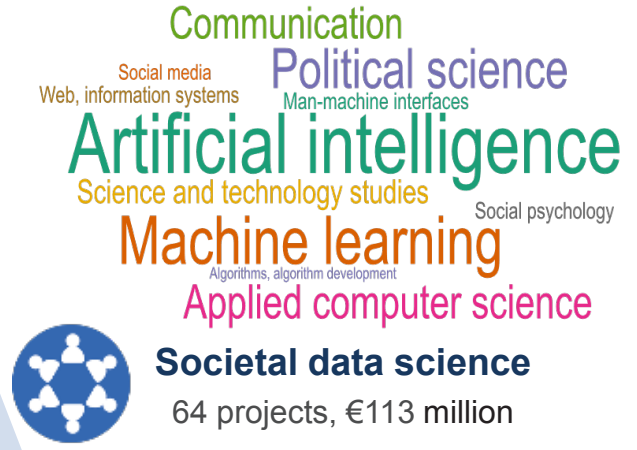
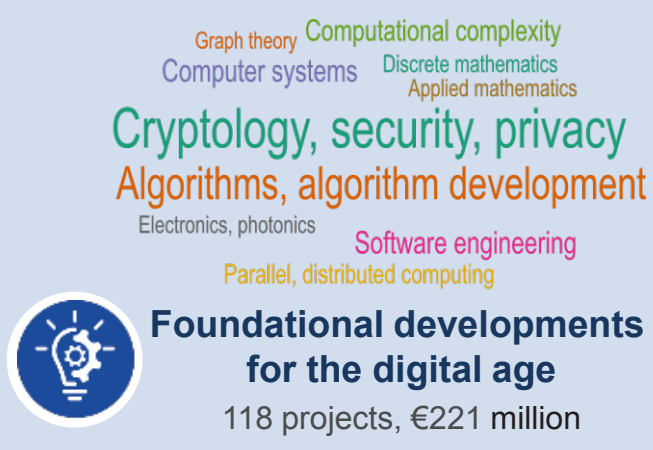
Host institutions with ≥16 funded projects



Country of origin of grantees other than EU or ACs (≤4 grouped together)



The scientific landscape of frontier research projects contributing to the selected Europe fit for the digital age areas

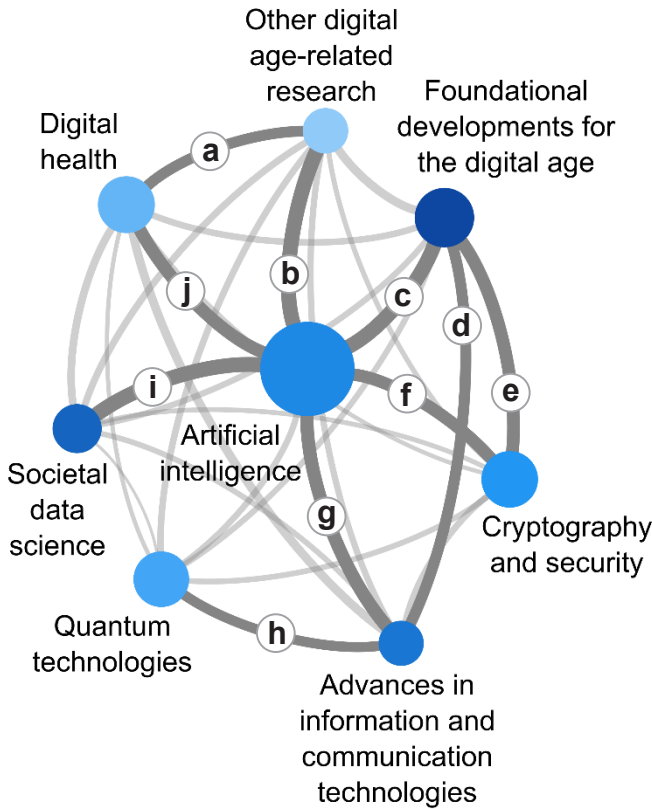


The word clouds represent the most prevalent scientific fields in the pool of ERC projects identified as relevant for each of the selected areas of a Europe fit for the digital age. The total number of projects under each area as well as the budget are indicated. 15% of the 757 projects contribute to two or more of these areas.

Scientific synergies and methodological developments in the selected Europe fit for the digital age areas

Scientific synergies among Europe fit for the digital age areas

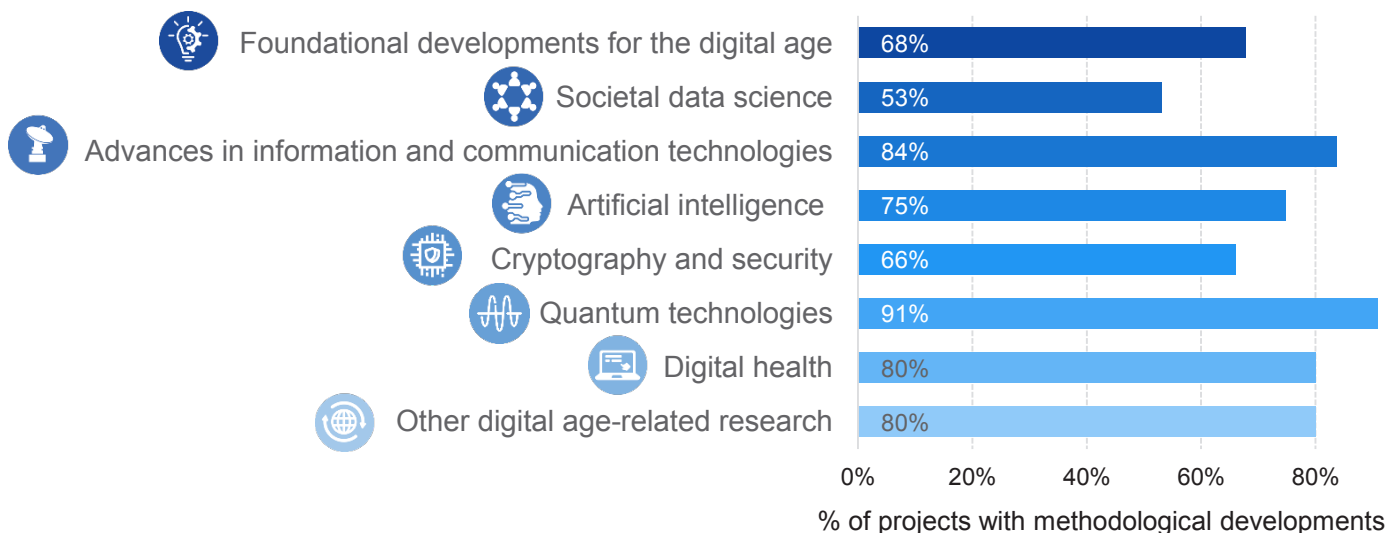
The nodes represent the selected areas of Europe fit for the digital age and their size is proportional to the number of projects. These areas are interconnected and the strength of this connection is represented by the thickness of the arc, which is proportional to the number of shared scientific fields. The most representative scientific fields for the main connections, highlighted with letters, are listed.



- a** Applied computer science; Software engineering; Materials engineering
- b** Applied computer science; Materials engineering; Software engineering; Science and technology studies
- c** Cryptology, security, privacy; Computer systems; Software engineering; Applied mathematics; Electronics, photonics
- d** Electronics, photonics; Systems engineering; Communications engineering; Electronic engineering; Materials engineering
- e** Cryptology, security, privacy; Computer systems; Software engineering
- f** Cryptology, security, privacy; Computer systems; Software engineering; Web, information systems
- g** Systems engineering; Electronics, photonics; Communications engineering; Electronic engineering; Materials engineering
- h** Electronics, photonics; Materials engineering; Optics and laser physics
- i** Artificial intelligence; Applied computer science; Political science; Science and technology studies; Web, information systems
- j** Artificial intelligence; Biomedical engineering; Diagnostics; Control engineering

Methodological developments in projects contributing to the selected Europe fit for the digital age areas

The main methodological development in the projects relevant for the selected Europe fit for the digital age areas is in the field of *Computational modelling, simulations* with Artificial Intelligence and complex systems being the focus. Other prominent methodological developments are *Theoretical, mathematical methods* with a focus on digital methods and *Validation, demonstration, prototyping* with a focus on digital developments and applications.



Examples of ERC-funded projects contributing to the selected Europe fit for the digital age areas



[COMPUTED](#) drew on behavioural models from psychology to develop algorithms better suited to design user interfaces, therewith [improving human-computer interaction](#).



Using the latest techniques in Big Data, Magdalena Wojcieszak's [EXPO](#) project analyses how exposing people to [dissimilar views in the media](#) can be both risky and beneficial.



[BNYQ](#) is set to revolutionize the [analogue-to-digital conversion systems](#) with a crucial impact in day-to-day applications, including ultrasound imaging and radar detection.



[Tamed Cancer](#) is a pioneering project aiming at improving personalized therapies by developing robust algorithms. This breakthrough concept could [revitalize cancer treatment](#) by calculating optimal drug dosages.



[INTERACT](#) is developing new [interactive learning algorithms](#) to address sentences in text of speech that is often complex and compositional.



[CIRCUS](#) takes a comprehensive approach to cybersecurity. The team led by Karthik Bhargavan was able to improve the Transport Layer Security protocol [using downgrade cyber attacks simulations](#).

Examples of ERC-funded projects contributing to the selected Europe fit for the digital age areas



[SOPHIA](#) aims to establish the scientific foundation for [securing software](#) against physical attacks, and discovered two new security vulnerabilities in computer processors, named Meltdown and Spectre, allowing unauthorised external access to personal data.



[Grenadyn](#) demonstrates that [assemblies of imperfect, dynamical nanodevices can self-learn through physical principles](#), like biological neurons and synapses do. The team led by Julie Grollier will produce a chip and achieve state-of-the-art recognition rates on AI image benchmarks



[SPRINT](#) made substantial advancements in [surface polaritronics and Terahertz Detection](#) with the ultimate goal to develop a new generation of passive mode-locked THz photonic laser resonators through the combination of quantum cascade laser technology with graphene



[EAR](#) proposes models linking sound to disease diagnosis. The team led by Cecilia Mascolo launched an [app to identify symptoms through voices and coughs](#) to explore automatic diagnosis of COVID-19



[EmbodiedTech](#) demonstrated that the human brain can repurpose neurons to represent and control artificial limbs with the ultimate goal of finding the necessary conditions for the [brain to recognise artificial limbs](#) following an amputation.



[CALC](#) establishes a computer-assisted framework for linguistics analysis, focussing on how [languages convey emotion and its meaning across cultures](#).





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ERC frontier research contribution to the European Green Deal

The European Research Council (ERC) follows a strictly bottom-up approach to funding research proposals, with excellence as the sole criterion for selection. The research that ERC grantees pursue, free of any thematic objectives, generates results that address a wide range of issues with significant socioeconomic, environmental and policy relevance. As a result, this rich and diverse portfolio of frontier research generates new knowledge and proposes concrete solutions for addressing some of the most pressing policy priorities of the European Commission. This is the case for the over 950 projects funded by the ERC, worth more than €2 billion, in the Horizon 2020 (H2020) Framework Programme (2014–2020) that are relevant for the ‘European Green Deal’.

Data as of December 2021

ERC frontier research contribution to the European Green Deal

This fact sheet provides an overview of the projects relevant for the selected areas of the [European Green Deal](#). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG), Advanced Grant (AdG) and Synergy Grant (SyG) schemes launched in the H2020 Framework Programme (2014–2020)*

Areas of interest for the European Green Deal



953 ERC-funded projects, worth **€2039** million

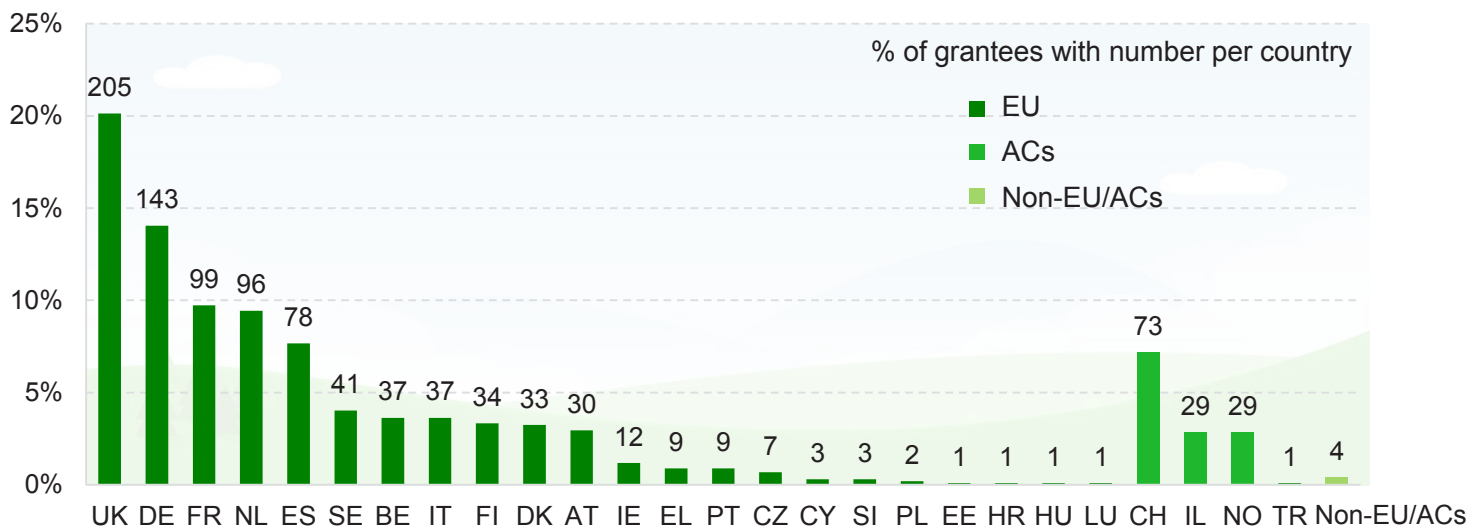
Physical sciences and engineering
490 projects, €1075 million

Life sciences
252 projects, €539 million

Social sciences and humanities
211 projects, €425 million

Distribution of ERC-funded projects in H2020

1018 grantees lead 953 projects and are based in 22 EU Member States, 4 Associated Countries (ACs) and 2 non-EU/ACs



Host institutions with ≥16 funded projects

National Centre for Scientific Research (FR)	62
University of Cambridge (UK)	32
Swiss Federal Institute of Technology Zurich (CH)	25
Helmholtz Association of German Research Centres (DE)	23
Delft University of Technology (NL)	20
Max Planck Society (DE)	20
Utrecht University (NL)	20
University of Oxford (UK)	18
Imperial College (UK)	16

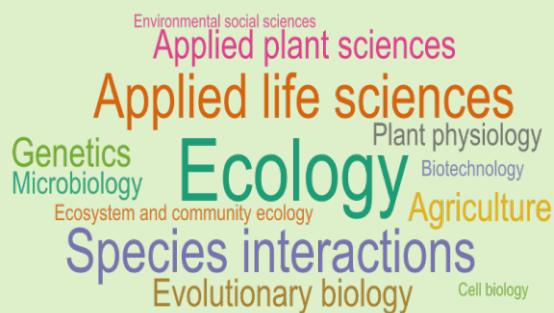
Country of origin of grantees other than EU or ACs (≤4 grouped together)

5	Russia
7	Australia
7	India
8	China
14	Canada
21	13 other non-EU/ACs
40	United States

Number of projects

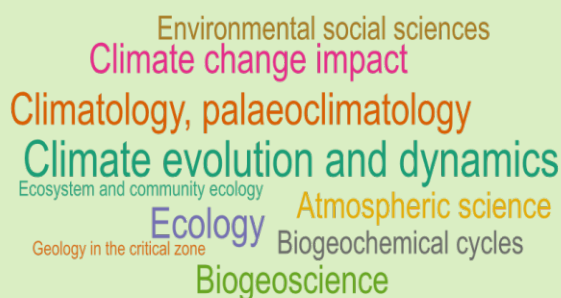
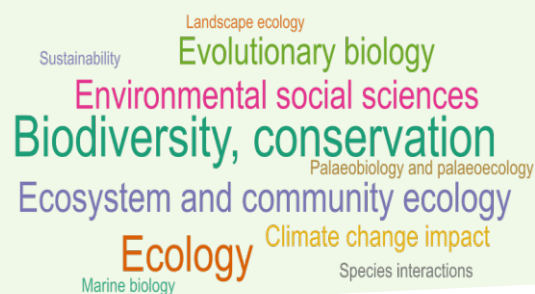
Number of grantees

The scientific landscape of frontier research projects contributing to the selected European Green Deal areas



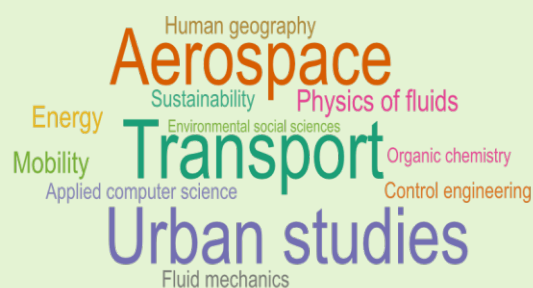
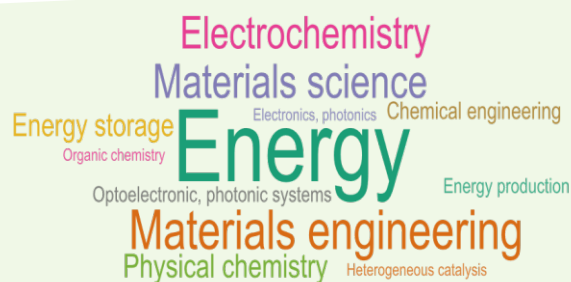
Farm to fork
270 projects, €587 million

Biodiversity and ecosystems
95 projects, €202 million



Boosting climate action
574 projects, €1273 million

Clean, affordable and secure energy
277 projects, €586 million



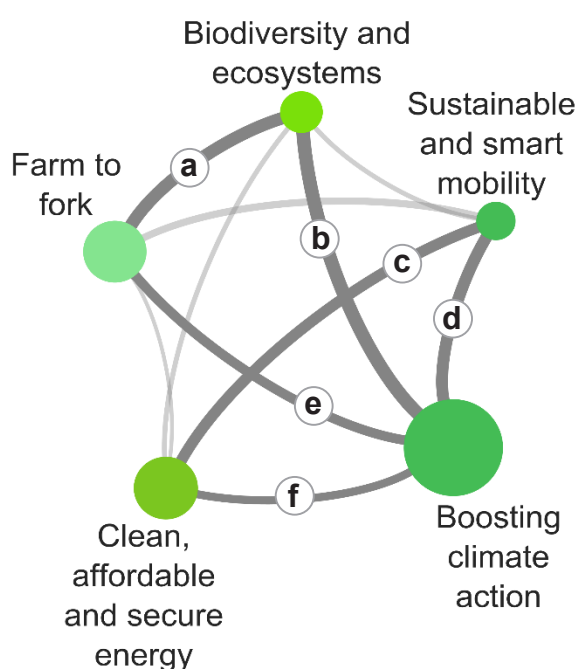
Sustainable and smart mobility
66 projects, €132 million

The word clouds represent the most prevalent scientific fields in the pool of ERC projects identified as relevant for each of the selected areas of the European Green Deal. The total number of projects under each area as well as the budget are indicated. 29% of the 953 projects contribute to two or more of these areas.

Scientific synergies and methodological developments in the selected European Green Deal areas

Scientific synergies among European Green Deal areas

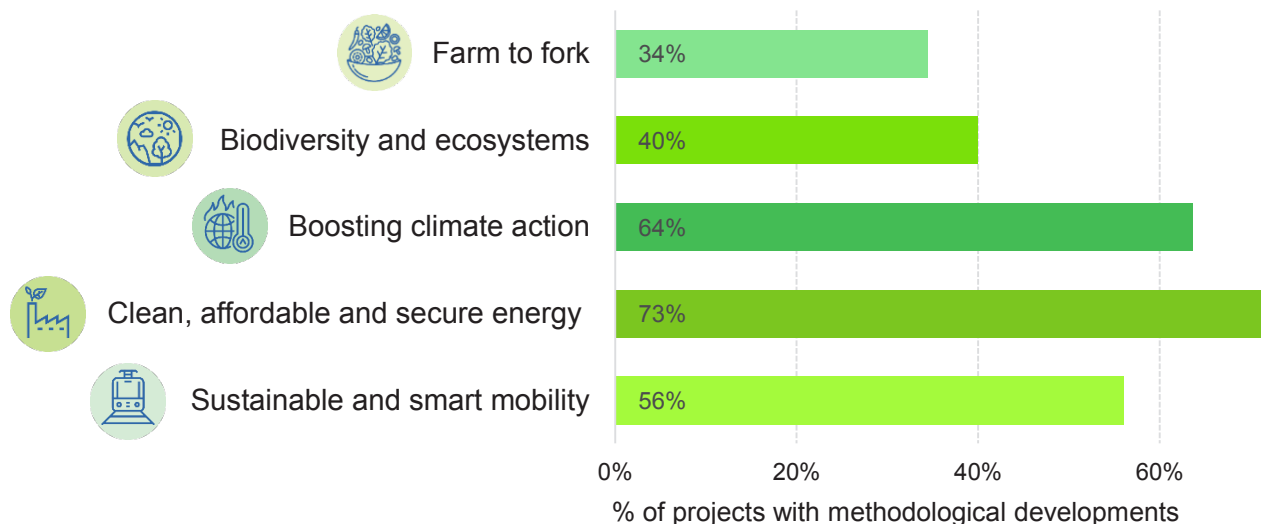
The nodes represent the selected areas of the European Green Deal and their size is proportional to the number of projects. These areas are interconnected and the strength of this connection is represented by the thickness of the arc, which is proportional to the number of shared scientific fields. The most representative scientific fields for the main connections, highlighted with letters, are listed.



- a** Ecology; Evolutionary biology; Environmental social sciences; Biogeoscience
- b** Ecology; Evolutionary biology; Environmental social sciences; Palaeobiology and palaeoecology; Biogeoscience
- c** Energy; Aerospace; Physics of fluids; Environmental social sciences; Human geography
- d** Energy; Urban studies; Human geography; Environmental social sciences; Physics of fluids; Aerospace
- e** Ecology; Evolutionary biology; Environmental social sciences; Marine biology; Microbiology
- f** Energy; Materials engineering; Chemical engineering; Organic chemistry; Physical chemistry

Methodological developments in projects contributing to the selected European Green Deal areas

The main methodological development in the projects relevant for the selected European Green Deal areas is in the field of *Computational modelling, simulations* with the earth system, carbon cycle and sea level being the focus. Other prominent methodological developments are *Experimental methods* with a focus on climate change monitoring and CO₂ emissions, and *Synthetic methods* with a focus on renewable energy and new materials.



Examples of ERC-funded projects contributing to the selected European Green Deal areas



Award winning project [SHARECITY](#) explores [urban food sharing initiatives](#), and how they can become a real transformative mechanism for sustainable cities.



Food historian Dulce Freire examines the [history of seeds in Europe](#) in the project [ReSEED](#), which is an effort to rediscover ancient varieties that could help modern agriculture to become more sustainable.



[BIODESERT](#) at the [Dryland Ecology and Global Change Lab](#) is led by renowned climate change expert Fernando Maestre and includes the first global field survey focussing on how aridity and grazing pressure changes affect dryland ecosystems.



[LEGALARCHITECTURES](#) looks into how policy makers can [design environmental governance laws](#) to maximise compliance and involvement non-State actors in environmental governance.



[BIGSEA](#) produced the [first global fishery model](#) with interactive, dynamic management and used it to provide the first-ever assessment of global fishery dynamics following an abrupt climate shock.



Project [urbisphere](#) looks at cities to explore how urbanization, human behaviour and technology [impact climate change](#), and how urban populations are affected and adapt.

Examples of ERC-funded projects contributing to the selected European Green Deal areas



CC-TOP explores the Arctic Ocean to study the potential impact of methane release from thawing permafrost to the atmosphere. The results have major relevance for future global warming predictions.



COFLeaf focusses on new photocatalytic systems that efficiently harvest and convert light into chemical energy such as hydrogen, opening the new research field 'soft photocatalysis'.



NOVCARBFIX managed to engineer bacteria to use CO₂ as the sole source to produce all its biomass carbon, with important implications for agricultural productivity and renewable energy storage.



SOLENALGAE and its proof of concept ASTAOMEGA successfully improved photosynthetic efficiency of microalgae, bringing a 30 percent increase in biomass. Besides potential applications as sustainable biofuels, an innovative and commercially competitive production platform for high value products as omega-3 and antioxidants was developed.



Scale-FreeBack aims to improve the management of large-scale road traffic networks, and resulted in the Grenoble Traffic Lab, an experimental public platform for testing traffic estimation, forecasting and control algorithms with real-time data.



2D4D brings together two important topics, decarbonisation and disruptive digitalisation, to ensure that the digital revolution becomes a decarbonisation enabler and not a barrier.





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ERC frontier research contribution to EU4Health

The European Research Council (ERC) follows a strictly bottom-up approach to funding research proposals, with excellence as the sole criterion for selection. The research that ERC grantees pursue, free of any thematic objectives, generates results that address a wide range of issues with significant socioeconomic, environmental and policy relevance. As a result, this rich and diverse portfolio of frontier research generates new knowledge and proposes concrete solutions for addressing some of the most pressing policy priorities of the European Commission. This is the case for the over 2000 projects funded by the ERC, worth more than €4 billion, in the Horizon 2020 (H2020) Framework Programme (2014–2020) that are relevant for ‘EU4Health’.

Data as of December 2021

ERC frontier research contribution to EU4Health

This fact sheet provides an overview of the projects relevant for the selected areas of [EU4Health](#). The projects were funded under the Starting Grant (StG), Consolidator Grant (CoG), Advanced Grant (AdG) and Synergy Grant (SyG) schemes launched in the H2020 Framework Programme (2014–2020)*



2281 ERC-funded projects, worth €4613 million

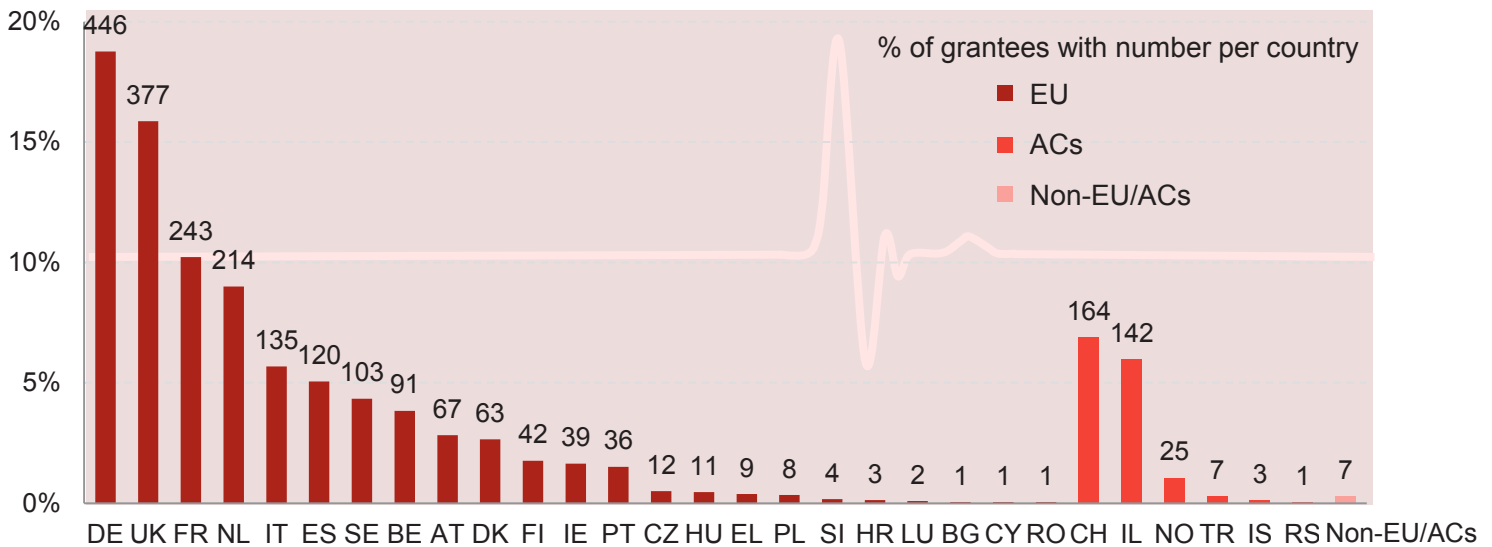
Physical sciences and engineering
408 projects, €844M

Life sciences
1482 projects, €3046M

Social sciences and humanities
391 projects, €723M

Distribution of ERC-funded projects in Horizon 2020

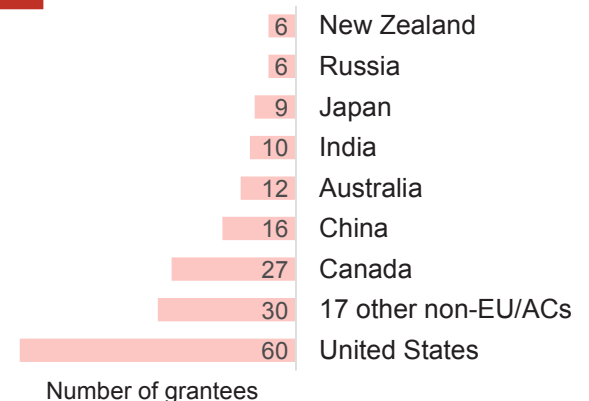
2377 grantees lead 2281 projects and are based in 23 EU Member States, 6 Associated Countries (ACs) and 3 non-EU/ACs



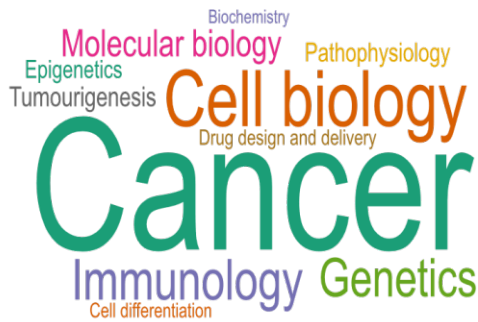
Host institutions with ≥37 funded projects



Country of origin of grantees other than EU or ACs (≤4 grouped together)



The scientific landscape of frontier research projects contributing to the selected EU4Health areas



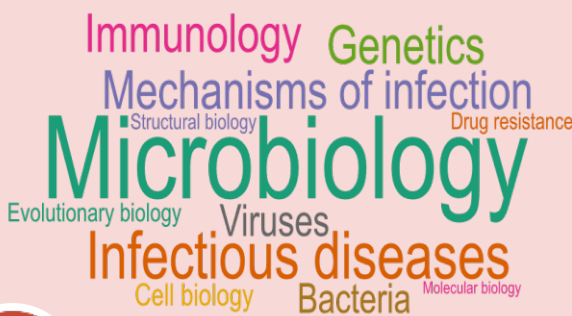
Cancer

527 projects, €1082 million



Other non-communicable diseases

280 projects, €550 million



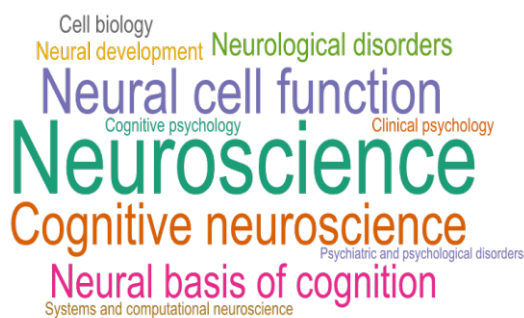
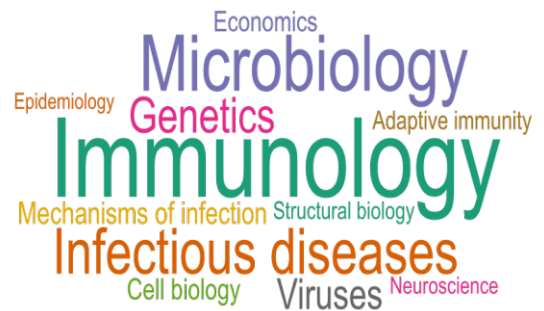
Infectious diseases

222 projects, €438 million



COVID-19

192 projects, €420 million



Brain and human mind research

600 projects, €1232 million



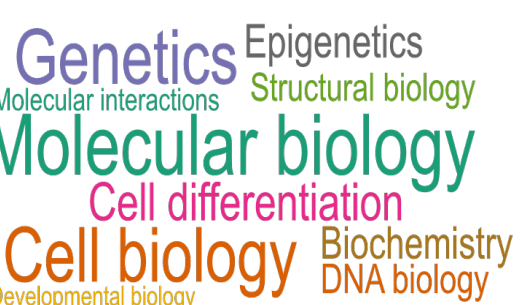
Public health and healthcare

316 projects, €618 million



Tools, therapies and digital health

678 projects, €1392 million



Other health-related research

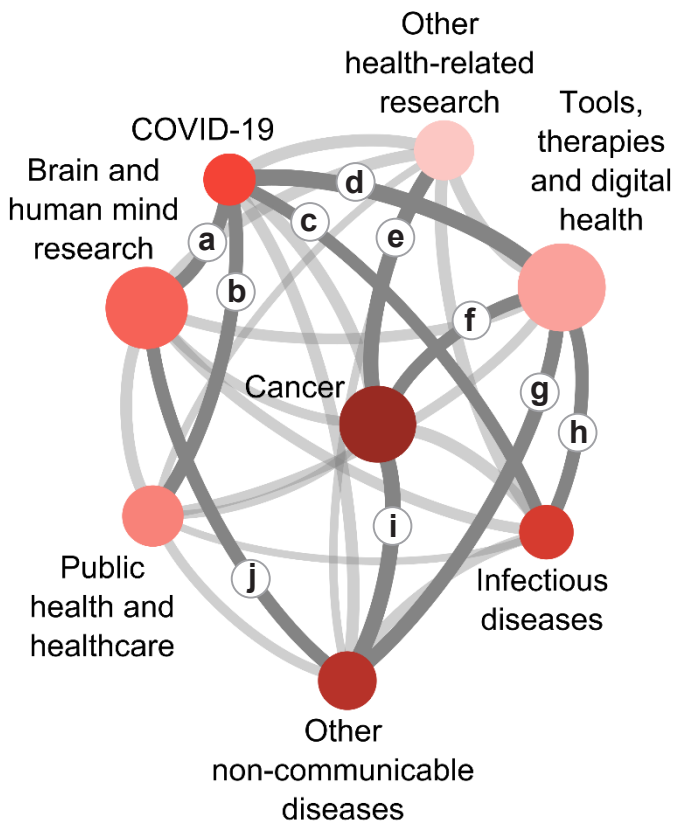
299 projects, €590 million

The word clouds represent the most prevalent scientific fields in the pool of ERC projects identified as relevant for each of the selected areas of EU4Health. The total number of projects under each area as well as the budget are indicated. 30% of the 2281 projects contribute to two or more of these areas.

Scientific synergies and methodological developments in the selected EU4Health areas

Scientific synergies among EU4Health areas

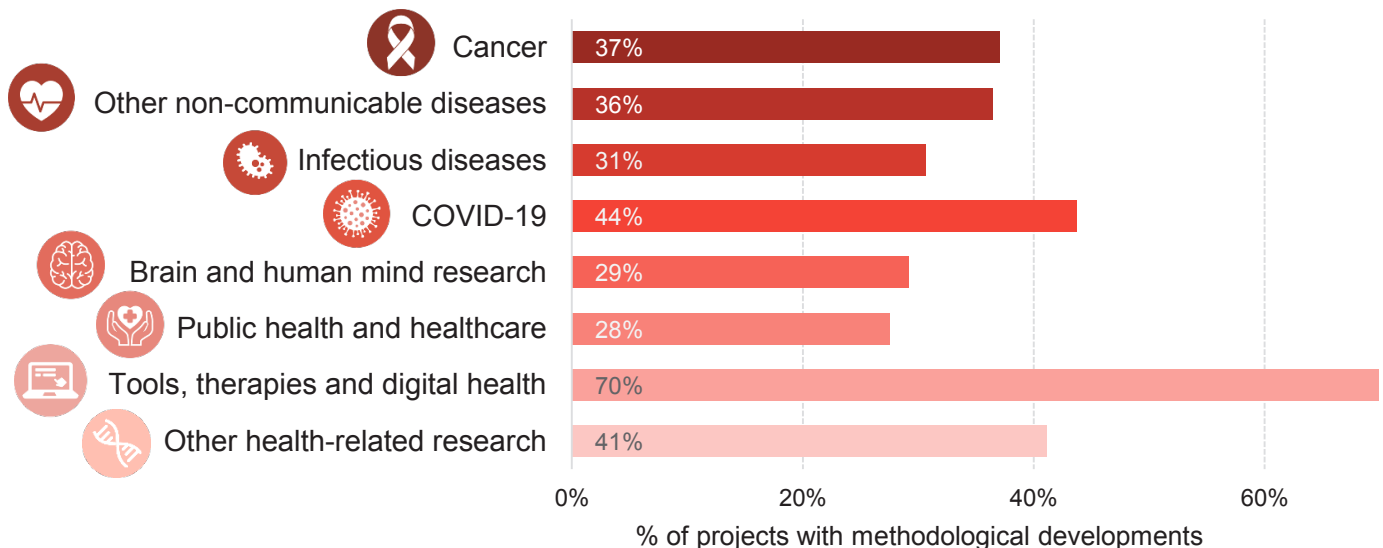
The nodes represent the selected areas of EU4Health and their size is proportional to the number of projects. These areas are interconnected and the strength of this connection is represented by the thickness of the arc, which is proportional to the number of shared scientific fields. The most representative scientific fields for the main connections, highlighted with letters, are listed.



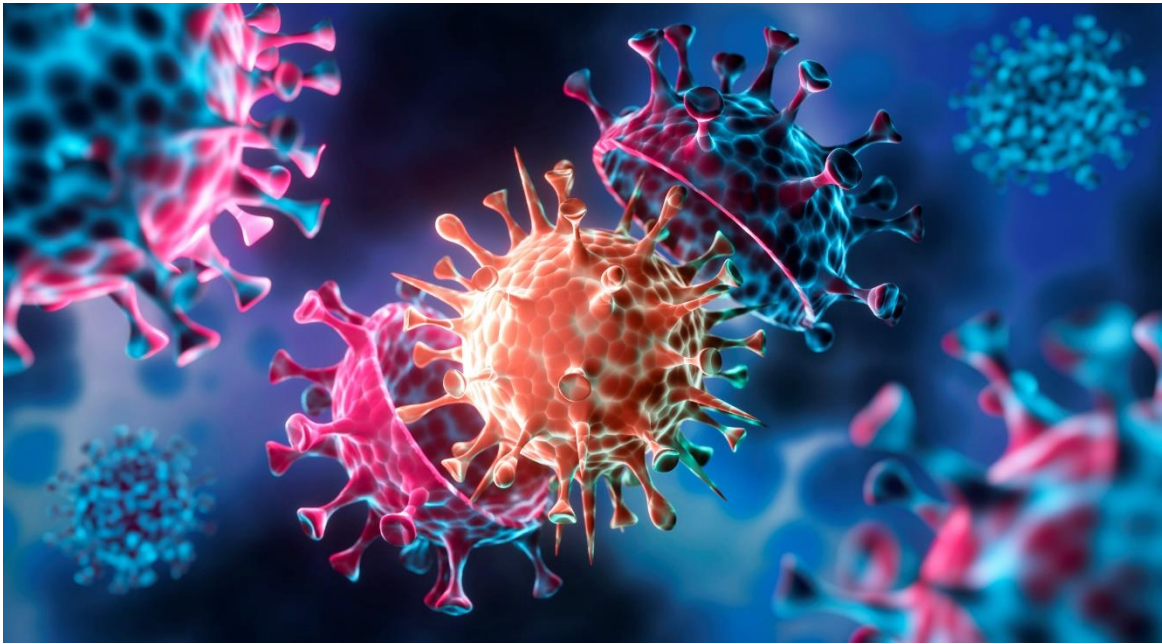
- Ⓐ Immunology; Genetics, Cell biology; Structural biology; Neuroscience
- Ⓑ Genetics; Immunology; Cell biology; Economics; Epidemiology; Neuroscience
- Ⓒ Immunology; Infectious diseases; Microbiology; Genetics; Cell biology; Structural biology; Epidemiology
- Ⓓ Immunology; Genetics; Cell biology; Microbiology; Infectious diseases; Structural biology
- Ⓔ Molecular biology; Cell biology; Genetics; Structural biology; Biochemistry; Immunology
- Ⓕ Cancer; Biomedical engineering; Diagnostics; Immunology; Pharmacology; Stem cells, regeneration
- Ⓖ Immunology; Cell biology; Genetics; Regenerative medicine; Biomedical engineering; Diagnostics; Molecular biology
- Ⓗ Immunology; Cell biology; Genetics; Molecular biology; Structural biology
- Ⓘ Immunology; Pathophysiology; Cell biology; Genetics; Biomedical engineering; Diagnostics; Molecular biology
- Ⓙ Cell biology; Genetics; Pathophysiology; Biomedical engineering; Diagnostics; Molecular biology

Methodological developments in projects contributing to the selected EU4Health areas

The main methodological development in the projects relevant for the selected EU4Health areas is in the field of *Computational modelling, simulations* with in silico model and machine learning being the focus. Other prominent methodological developments are *Experimental methods* with a focus on imaging and microscopy and *Animal models* with a focus on humanized and engineered mouse models.



Examples of projects contributing to the selected EU4Health areas



ERC grantee Irmela Jeremias' [LeukaemiaTargeted](#) project focusses on effective leukaemia treatment. Their [work](#) introduces molecular target validation as an important step for precision medicine.



At the University of Cyprus, [Triantafyllos Stylianopoulos](#) focusses on biomechanical aspects of tumour microenvironment to predict immunotherapy outcome. Their team developed a mathematical model for this [Immuno-Predictor](#) project that was also used to study COVID-19 disease progression.



Nuria Montserrat studies kidney diseases and in particular how to regenerate mammal's kidneys by [modelling genetic kidney disorders](#). The engineered mini-organs developed with the [REGMAMKID](#) project have served as model to study SARS-CoV-2 infection.



With [vAMRes](#), Rino Rappuoli originally tackled [antibiotic resistance](#) through the technology of reverse vaccinology, which was then used to screen for preventive and therapeutic tools against SARS-CoV-2.



Csaba Pál's [resistance evolution](#) project and its proof of concept [Aware](#) provide unprecedented knowledge about [antibiotic resistance](#) evolution and tools to identify at an early stage of drug development antibiotic agents that are less prone to resistance growth.



Madeleine Lowery's [DBSModel](#) project and its proof of concept [DBScontrol](#) aimed at improving the control of [Parkinson's disease](#) symptoms by advancing the use of closed-loop deep brain stimulation.

Examples of projects contributing to the selected EU4Health areas



Juergen Knoblich's [MiniBrain](#) generated brain organoids, a highly cost-effective tool in the discovery and development of therapies for [neurodegenerative and developmental diseases](#).



The [AGNES](#) project studied the [determinants and modifiers of active ageing](#), including a study on the quality of life during COVID-19 pandemic.



[Maria Collado](#) studies the mechanisms behind the protective role of maternal microbes on the baby's health. Their [MAMI](#) project opens up possibilities for research and applications in the field of personalized nutrition and medicine, for mothers and infants.



[SmartCardiacPatch](#) engineered a miniature heart, 3D-printed using biological materials from human patients, together with the next generation smart implantable [cardiac patches](#) to enable monitoring the organ in real-time.



Daniel Miller leads a world-wide [SmartPhoneSmartAging](#) project examining the [global impact of new social media](#) and how the rise of the smartphone is changing people's relationship to age and health.



The [GutBCells](#) project developed techniques to visualize the immune system and study the antibody [immune response](#) in the gut.

