SPACE HUB®
YORKSHIRE

Virtual Space Campus Mapping Report

Contents

Foreword

Foreword from Peter O'Brien

Executive Director, Yorkshire Universities.

The Yorkshire region, celebrated for its rich industrial heritage, thriving academic institutions, and entrepreneurial spirit, is uniquely positioned to play a leading role in the rapidly expanding global space economy. At Yorkshire Universities, we recognise the transformative potential of space for driving innovation, creating jobs, and addressing some of society's greatest challenges, from climate monitoring to secure communications and beyond.

Space is not just about exploration beyond our atmosphere; it is a dynamic sector with applications spanning agriculture, energy, and manufacturing and finance. Yorkshire's universities are already at the forefront, conducting cutting-edge research in satellite technology, robotics, and data analysis. However, the true power of space lies in collaboration. By uniting academia, industry, government, and local communities, we can unlock the full potential of this sector, ensuring that Yorkshire becomes a national leader in space innovation. Space Hub Yorkshire are positioned to do exactly this and have conducted an extensive mapping exercise that identifies these strengths and expertise.

Collaborative initiatives between Yorkshire Universities and Space Hub Yorkshire are leading the way to amplify our ability to attract investment, develop a skilled workforce, and inspire the next generation of pioneers. Together, we can harness the boundless opportunities space offers, ensuring that Yorkshire remains not only a hub of innovation but a beacon of ambition and progress.

P. O'Brien

Yorkshire Universities

University of Bradford

University of Huddersfield
Inspiring global professionals

University of Hull

University of Leeds

Leeds Arts University

Leeds Beckett University

Leeds Conservatoire

Leeds Trinity University

University of Sheffield

Sheffield Hallam University

University of York

Est. 1841 York St John University

Introduction

Space Hub Yorkshire (SHY) is a coordinator of space activity across the region, a catalyst for new satellite and geospatial data markets, a source of space expertise, a facilitator of new collaborations, a driver of investments, a champion for space start-ups and an advocate for space research and industry opportunities. Space Hub Yorkshire work closely with Yorkshire Universities, a consortium representing twelve higher education institutions across Yorkshire, aiming to support collaborative projects, research, and development that benefit the region.

The vision of SHY is to unlock space for the people and businesses of Yorkshire. By forming a strong cohesive relationship with Yorkshire Universities, it was clear there was an opportunity to promote the vast strengths and capabilities of the twelve Higher Education (HE) Institutions, sharing a collaborative aim of connecting, promoting, and guiding innovation while looking to raise skills, aspiration and champion inclusion and deliver prosperity.

Yorkshire has **powerful and unique contributions** to make to the UK space industry, particularly regarding commercial applications of satellite data and geospatial intelligence, ubiquitous connectivity and secure communications, and advanced manufacturing and precision engineering capabilities. By utilising the network of Yorkshire Universities, it was possible to start this mapping project of identifying the space-related strengths within the region.

SHY built on the success of previous rounds of UKSA cluster development funding to map the landscape, and to develop an ambitious growth strategy for a regional space cluster in Yorkshire. The region's university contribution to research and teaching on issues highly relevant to the future space industry stands out compared to other UK regions, including climate and environmental science, advanced computer techniques, satellite technology, telecommunications and quantum technology. The potential economic opportunity of space is pro-actively supported by the region's economic development organisations, and the **370+ space-relevant commercial businesses** within Yorkshire.

The HE institutions' **world-class knowledge** through research, skills through teaching and professional development, and inspiration through educational outreach will all develop the future UK workforce and lead to significant milestones being reached in the industry. It can act as a **pathway of development** for the UK, and will be of significant interest to international organisations. The potential for inward investment opportunities is also significant, as companies seek to access the vast talent pool.

The **SHY Virtual Space Campus** is playing a vital and effective role in **coordinating regional space activities across industry, research, teaching and policies**, securing commitment from the region's key stakeholders to tangible and practical mechanisms for ensuring a continued focus on space-enabled activities.

Purpose

The purpose of this report is to map Yorkshire's HE institutions research and teaching capabilities, and expertise related to the space sector, acting as an indicator of opportunity for the region and promotional tool for local government. The space sector is rapidly evolving and diversifying, with the need for specialist skills becoming the forefront of conversations and a priority for international agencies, as well as industry. Not only does the sector require specialist skills, but it is also demonstrating the requirement for roles that span multiple disciplines, such as finance, project management, creative thinking, visual designers. By acting as the first report of its kind for the region, the unique capabilities demonstrated by the Yorkshire HE institutions can be showcased and subsequently utilised by a variety of stakeholders on a local, national and international stage.

This report is the outcome of a comprehensive mapping exercise to look at three aspects of each of the twelve Yorkshire HE institutions:

- The space-related funding that has been successfully awarded to each HE institution.
- The space-related academics at each HE institution.
- The space-related courses that are offered by each HE institution and, where possible, the number of students studying those courses.

Each aspect will showcase the breadth and depth of HE institution capabilities, while highlighting the strength of the space sector in the region and opportunity for significant international collaboration. By looking at the aspects together, it provides evidence of the wide range of skills development and research opportunities with a future workforce potential that can be harnessed by private and public institutions.

METHODOLOGY

This mapping exercise adopts a two-tiered approach to successfully report on the space-related academic expertise, course information and funding awarded to each HE institution within the Yorkshire region. The process was selected to ensure comprehensive quantitative data collection and analysis across each HE institution, and so that the activity could be repeated in future years when appropriate.

Data for this report has been collected over the course of 2024, with the space-related funding data gathered from the period 2019-2024. The space-related course data and space-related academic data is for the academic year 2023-2024, with the student numbers data from 2023-2024 unless stated otherwise. The data in this report has been collected by Space Hub Yorkshire to act as an indicator of opportunity for the region and the intention is for this data to be updated over time, when appropriate. Primary and secondary sources of data were collected, with all data being correct as of December 2024. The two-tiered approach involved:

- Working with the dedicated SHY point of contact (where available) at each HE institution, to supply appropriate data sets and sources for the academic expertise, the course information and funding awarded.
- Manually data scraping the HE institution's website for appropriate data and capturing the information effectively. This information was usually available on the 'News' section of the website, as well as the course information and relevant academics. All data that was collected was sent to the SHY point of contact to review, so any amendments could be made.

This combined approach was chosen to ensure that data could be gathered for each of the twelve HE institutions, regardless of whether there was a dedicated SHY point of contact, and whether they consider themselves space-related or not. By manually searching for the data, it allowed for local expertise to be used, growing the data set and therefore increasing the opportunity for promotion of space-relevant aspects. The HE institutions that supplied data relating to academics, funding, courses or students included: the University of Bradford, the University of Huddersfield, the University of Hull, University of

Leeds, Leeds Arts University, Leeds Beckett University, University of Sheffield, Sheffield Hallam University, University of York and York St John University.

CLASSIFICATION

The space industry encompasses a wide range of skills from law and contracts through to engineering, rockets and data processing. This is one of the reasons why knowledge about space-related courses is not already known as it is not held within one subject area. For the purposes of this report, space-related has been determined by SHY and the UK Space Agency to include several sub-sectors of the space industry. These are sectors that contribute to the economic, social and research development of the industry, and could in future lead to a career in space. These were all taken into consideration when conducting the mapping for the space-relevant academics, courses and funding. For example, sectors that were included in this exercise, but were not limited to, include:

- Artificial intelligence, earth observation, cyber security, engineering, materials, quantum, climate change, physics, machine learning, GIS, additive manufacturing.

Other disciplines that were also included in this classification centred around potential future careers in the space industry and can be classed as space adjacent. This encompassed computer science, game design, mathematics, geography, biology, chemistry, film and tv production and others that could lead to future workforce opportunities.

This classification of space is expected to evolve over time and will be continually assessed to ensure the most appropriate representation of expertise and capabilities within the Yorkshire Universities. Data collection was carried out as two processes:

If a dedicated contact at the SHY partner university was available:

Step 1: Brief the SHY point of contact about the task, explain importance of highlighting space-relevant capabilities. SHY point of contact will then discuss internally with their appropriate colleagues.
Step 2: SHY contact shares data with SHY.
Step 3: SHY dissect and commence analysis.
Step 4: SHY reported the data set back to the SHY point of contact to provide feedback opportunity or amendments.

If no dedicated contact at the SHY partner university was available:

Step 1: SHY commence manual analysis of HE institution's website for course information, academics of relevance and funding awarded (usually found in the News section).
Step 2: Extract information and commence analysis.
Step 3 SHY reported the data set back to the Yorkshire Universities Forum to provide feedback opportunity or amendments.

The report's methodology is subject to certain limitations, such as available information on the HE institution's website and the accuracy of the publicly available information. There are also limitations within each HE institution, and whether they recorded all the grant funding awarded for the time period with specific detail to subset it. The data in this report will change depending on the study period used, the definition of space used, or the number of academics determined to be space-related or working in a space-related field. As such, this report provides quantitative data for the study period used and is expected to change depending on the date range and any external influences on HE. These factors may have influenced the results and are acknowledged.

Executive Summary

This mapping exercise across the 12 Yorkshire Universities provides a comprehensive overview of their space-related capabilities and expertise. Our overall summary of these results is shown in figure one, where the table lists the capabilities recorded for each HE institution and presents a total. Across the Yorkshire Universities, a significant amount of space-related research funding has been awarded from 2019-2024, specifically when looking at the University of Leeds, the University of York, and the University of Huddersfield. These three universities have won 87 % of the total amount of research income, which was £ 306,483,676 for the combined twelve Yorkshire Universities. Most of this funding has come from funders such as the Engineering & Physical Sciences Research Council (EPSRC) and the government departments, such as the Department for Business, Innovation and Skills. The reason for the success can largely be attributed to the capabilities of the academics that put together the funding applications, along with the facilities that their institutions make available to them. For each HE institution, the number of space-related academics is clearly detailed, with the University of Hull and the University of Leeds holding 38 % of the total space-related academics (74) identified across the twelve Yorkshire Universities.

395 Space-related Academics

£306,483,676 Space-related Funding Awarded

641 Space-related Courses

24,156 Students studying Space-related Courses

The contribution Russell Group universities make towards successful space-related funding applications, number of academics and number of space skills taught courses is clear, but there are significant contributions from other HE institutions, such as the University of Bradford and Sheffield Hallam University. The University of Bradford provides over 4 % of academics, funding awarded, courses and students, while Sheffield Hallam University provides 17 % of academics, 14 % of space-related courses and over 12 % of total students studying space-related courses. This report aims to highlight the capabilities of all twelve Yorkshire Universities, and despite being much smaller institutions and not classed as 'technical', York St John and Leeds Beckett University offer a relatively high number of space-related courses at 14 and 22 respectively, which is over 5 % of the total space-related courses offered. This mapping effort is crucial for uncovering these impressive space-related research and teaching capabilities across all Yorkshire Universities, as well as highlighting the important connections between institutions, opportunities for synergies and identifying gaps that may require targeted action. Yorkshire Universities train approximately 10 % of the UK's student population, so it is essential that academic institutions in this region train the skills required for the commercial space industry, to guarantee the pipeline of talent which will enable the sectors continued growth in the future. **The outcomes from this work can serve as a foundation for future initiatives, collaborations, and targeted interventions within the space sector to grow the skills and specific capabilities of the Yorkshire region, such as earth observation, resilient communications and ubiquitous connectivity.**

University	Space-related Academics	Space-related Funding Awarded (since 2019)	Space-related Courses	Students Studying Space-related Courses/Modules
University of Bradford	19	£12,746,609	31	991
University of Huddersfield	66	£32,798,766	48	-
University of Hull	79	£5,461,752	41	-
University of Leeds	74	£165,764,900	125	11,928
Leeds Beckett University	5	£43,481	22	-
Leeds Trinity University	-	-	16	-
Leeds Arts University	5	-	9	832
Leeds Conservatoire	-	-	5	-
University of Sheffield	36	£ 21,057,000	138	6,820
Sheffield Hallam University	69	£558,281	90	3,040
University of York	38	£68,992,887	102	-
York St John University	4	£60,000	14	545
Total	**395**	**£306,483,676**	**641**	**24,156**

Figure 1: An overview of the space-related capabilities of the 12 Yorkshire Universities.

Yorkshire Universities Analysis

University of Bradford

The University of Bradford, established in 1966, is a university in West Yorkshire, with origins dating back to 1832. It has a diverse student body of 11,665 students from over 110 countries and is renowned for its commitment to social mobility, impactful healthcare programs, and globally recognised research and teaching.

The University of Bradford comprises of five research themes related to space, including communications, satellite imaging, data science, artificial intelligence, distributed computing, and control systems. As well as a dedicated satellite systems MSc course, University of Bradford has an in-house miniaturised satellite that they are planning to launch in the last quarter of 2024.

The Bradford-Renduchintala Centre for Space AI

The Bradford-Renduchintala Centre for Space AI is a facility dedicated to advancing AI in space technology, focussing on developing low-cost, sustainable, and smart satellite solutions. It aims to transform space research and applications, particularly in AI and machine learning. The centre plans to launch its own 'pocket cube' satellite, innovating satellite technology and contributing to global advancements in space exploration. A hub positioned for groundbreaking developments in space science.

Figure 2: Professor Ifiok Otung, Director of the Bradford-Renduchintala Centre for Space AI.

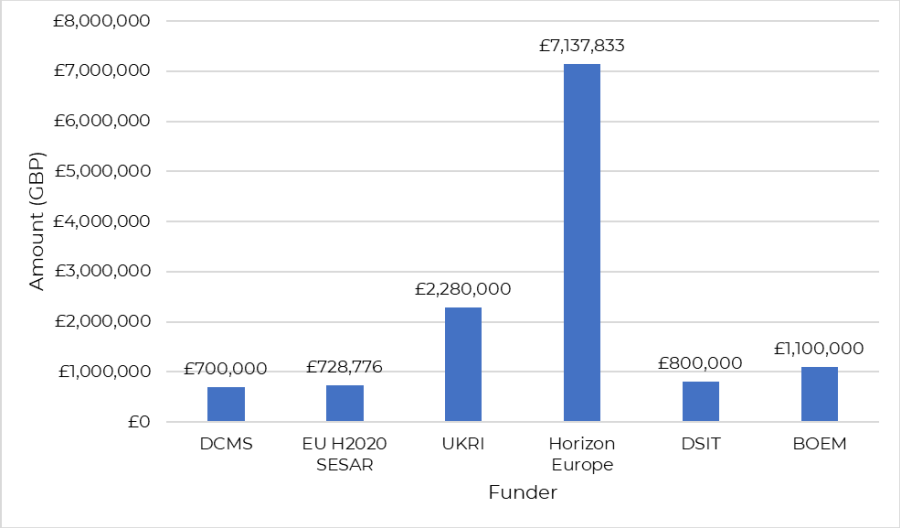
The University of Bradford provide 31 space-related courses, and this is broken down between three faculties, as shown in figure four. This figure also shows that the University of Bradford provides space-related expertise across a variety of departments, with the Bradford-Renduchintala Centre for Space AI providing 8 academics, which is 42 % of the total and the School of Built Environment, Architecture & Creative Industries providing 31 % with 6. The funding that the University has been awarded shown in figure three is from a diverse range of funders, the highest value of this being through Horizon Europe at over £7million, which is 56 % of the total won. Most students studying space-related courses at the University of Bradford are undergraduate and within the Faculty of Engineering and Digital Technologies, as shown in figure five.

19 Academics

£12,746,609 Funding Awarded

31 Courses
- **22 undergraduate**
- **9 postgraduate**

991 Students



Funder breakdown:

- DCMS – Department for Digital, Culture, Media and Sport
- EU H2020 SESAR – European Union Horizon 2020 Single European Sky ATM Research
- UKRI – UK Research and Innovation
- DSIT – Department for Science, Innovation and Technology
- BOEM – Bureau of Ocean Energy Management

Figure 3: Space-related funding awarded – University of Bradford.

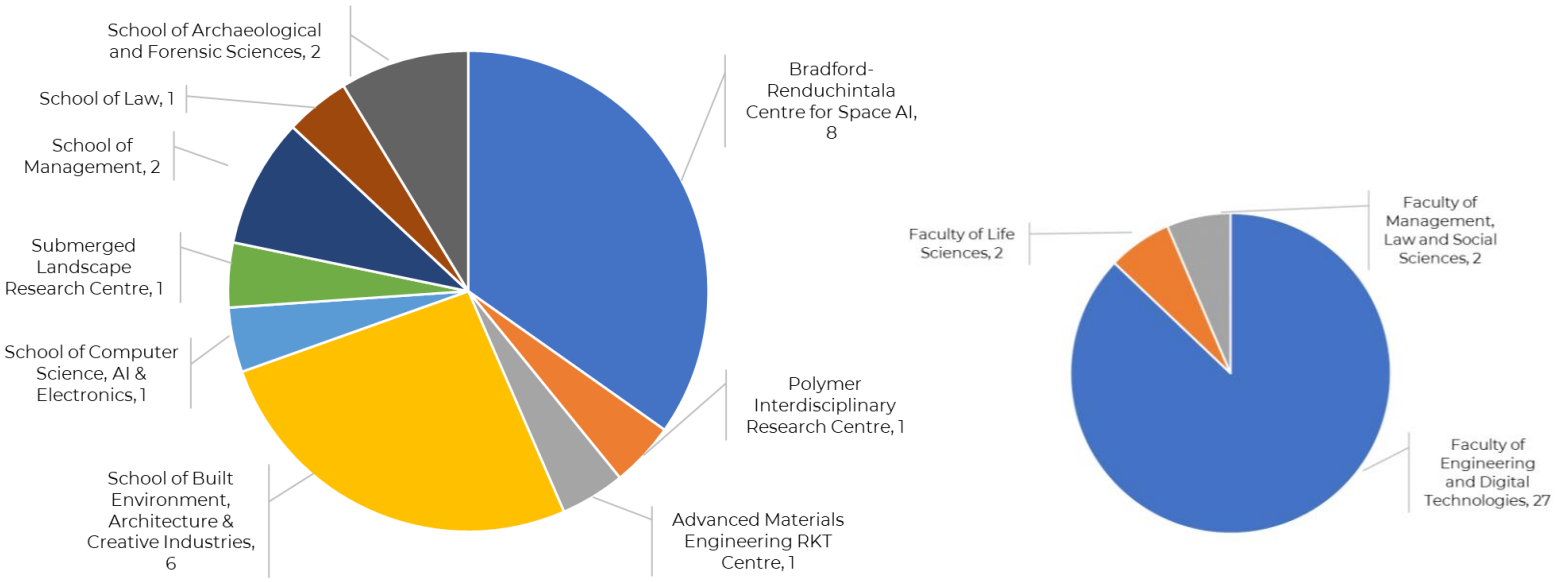


Figure 4: Space-related Academics by Department/School and Space-related Courses by Faculty – University of Bradford.

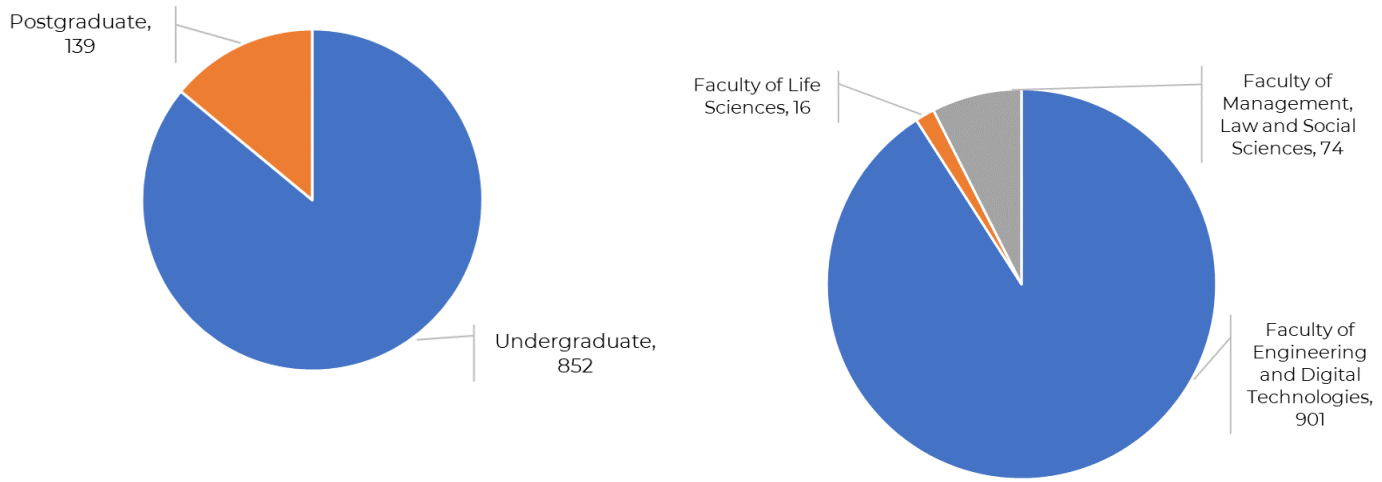


Figure 5: Distribution of Students on Space-related Courses by Degree Type and Distribution of Students on Space-related Courses by Faculty.

University of Huddersfield

Located in West Yorkshire, the University of Huddersfield is known for its strong emphasis on teaching excellence and employability, and its campus includes the award-winning Business School and the Centre for Precision Technologies. The university is highly regarded for its research in areas such as engineering, health, and the creative industries, and it has strong industry links that enhance student opportunities.

The University of Huddersfield offers courses in electronic, electrical, communications and mechanical engineering; physics; computer science (including AI and cyber security); as well as environmental and analytical sciences, and environmental monitoring and modelling.

Their research centres are dedicated to areas such as advanced materials, ultra-precision manufacturing, autonomous and intelligent systems, climate-resilient societies, structural & condition-based monitoring, beyond 5G communications and technical textiles for cross-sectoral applications.

66 Academics

£32,798,766 Funding Awarded

48 Courses

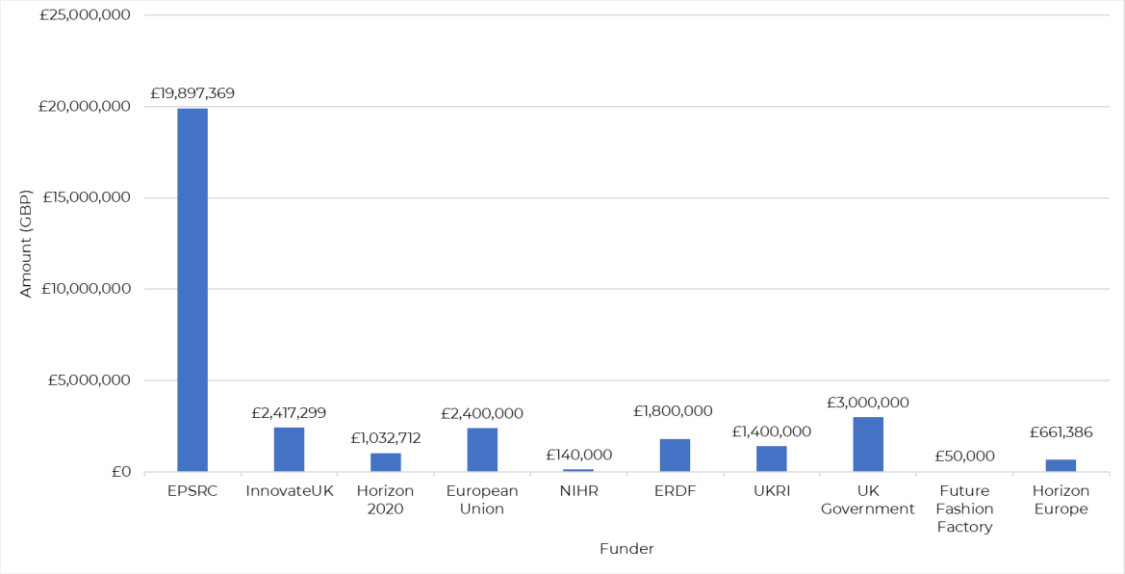
- **31 undergraduate**
- **16 postgraduate**

The Centre for Precision Technologies

The Centre for Precision Technologies (CPT) at the University of Huddersfield is a research hub specialising in advanced metrology and precision engineering. Its expertise in ultra-precision manufacturing, surface metrology, and machine tool technologies is crucial for developing high-precision components required in space applications. By ensuring the accuracy and reliability of manufacturing processes, CPT contributes to the production of components that can withstand the extreme conditions of space.

Figure 6: The University of Huddersfield's CPT.

The University of Huddersfield's vast range of research expertise can be best illustrated by figure seven, where the space-related funding awarded is from 10 different funders, the highest of these being from EPSRC at over £ 19million, which makes up 60 % of the total funding. Space-related research at the University of Huddersfield includes areas such as dune modelling on Mars, structural monitoring of space assets and computational fluid dynamics. The University of Huddersfield is home to the Ion Beam Centre, the Centre for Precision Technologies, the Future Metrology Hub, the 3M Buckley Innovation Centre, the STAR lab (Systems, Telecommunications Antenna Research) and the Technical Textiles Research Centre. Alongside this space-related capability, the University of Huddersfield is home to over 60 space-related academics, with 32 % from the Department of Computer Science and 38 % from the Department of Engineering and Technology, as shown in figure eight.



Funder breakdown:

- EPSRC – Engineering and Physical Sciences Research Council
- NIHR – National Institute for Health Research
- ERDF – European Regional Development Fund
- UKRI – UK Research and Innovation

Figure 7: Space-related funding awarded to the University of Huddersfield.

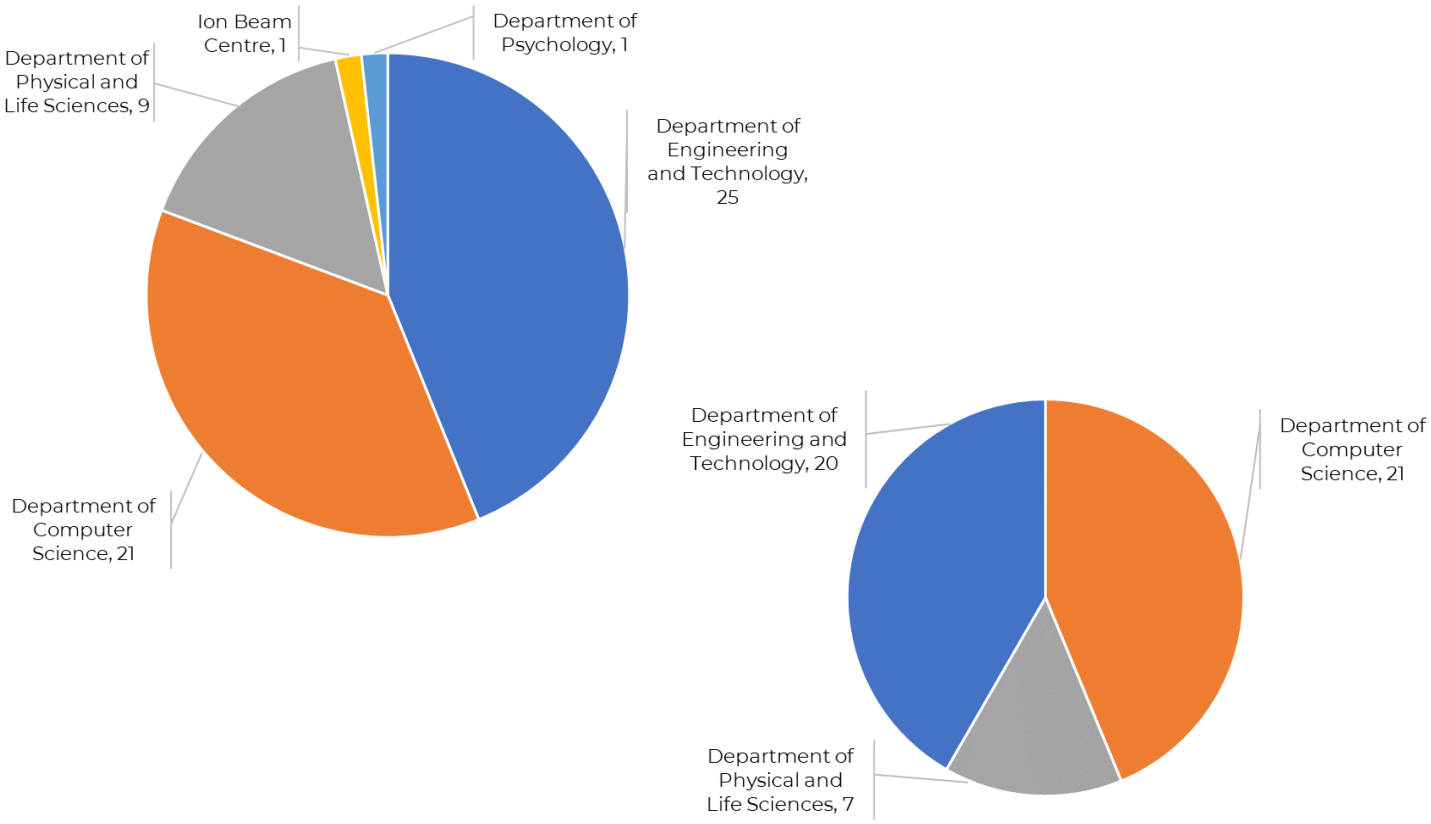


Figure 8: Number of Space-related Academics by Department and Number of Space-related Courses by Department – University of Huddersfield.

University of Hull

The University of Hull is located in East Yorkshire and known for its teaching excellence and impactful research, offering programs across fields like health, engineering, business, and the arts. It is home to the Hull York Medical School and has a strong reputation for its research in maritime history, environmental sustainability, and social justice. Its student community includes individuals from over 100 countries, fostering a global and inclusive academic environment.

The University of Hull has a wide range of expertise focusing on downstream applications for space, such as data management, interpretation, and science exploitation of space data. They also have a variety of sensors and platforms development, including hyperspectral remote sensing methodologies, thermal hyperspectral and FTIR spectroscopy, microwave sensors (passive and SAR), as well as integration of laboratory-field, UAV, airborne, and satellite-mounted sensors. The applications of Hull's technology include, but are not limited to, coastal and marine biological and oceanographic processes, natural resource mapping, environmental pollution monitoring, geological and geohazard mapping.

79 Academics

£5,461,752 Funding Awarded

41 Courses

- **18 undergraduate**
- **23 postgraduate**

Centre of Excellence for Data Science, Artificial Intelligence, and Modelling (DAIM)

DAIM at the University of Hull is a state-of-the-art facility dedicated to advancing education and research in AI and data science. Established with a £ 4.5 million investment, the centre emphasises interdisciplinary collaboration, breaking traditional boundaries to apply AI and data science solutions across various sectors. DAIM's mission is to deliver high-quality education, conduct impactful research, and facilitate knowledge exchange with industry, to position Hull at the forefront of developments in AI and data science.

Figure 9: The DAIM Centre at the University of Hull.

The variety of space-related courses offered through the university supports the applications of the space-related technology, by having a pathway of learning for students that will involve real-life scenarios and opportunities to develop related careers, illustrated in in figure ten, as well as the diverse space-related academics, with 13 % of these coming from the DAIM Centre, and 15 % from the Department of Physics. The School of Computer Science provided the highest number of space-related courses at 15, followed by the School of Engineering with 10. The University of Hull has successfully won £ 5,461,752 in space-related funding, shown in figure eleven, with the 37 % coming from the Natural Environment Research Council at £ 2,000,000.

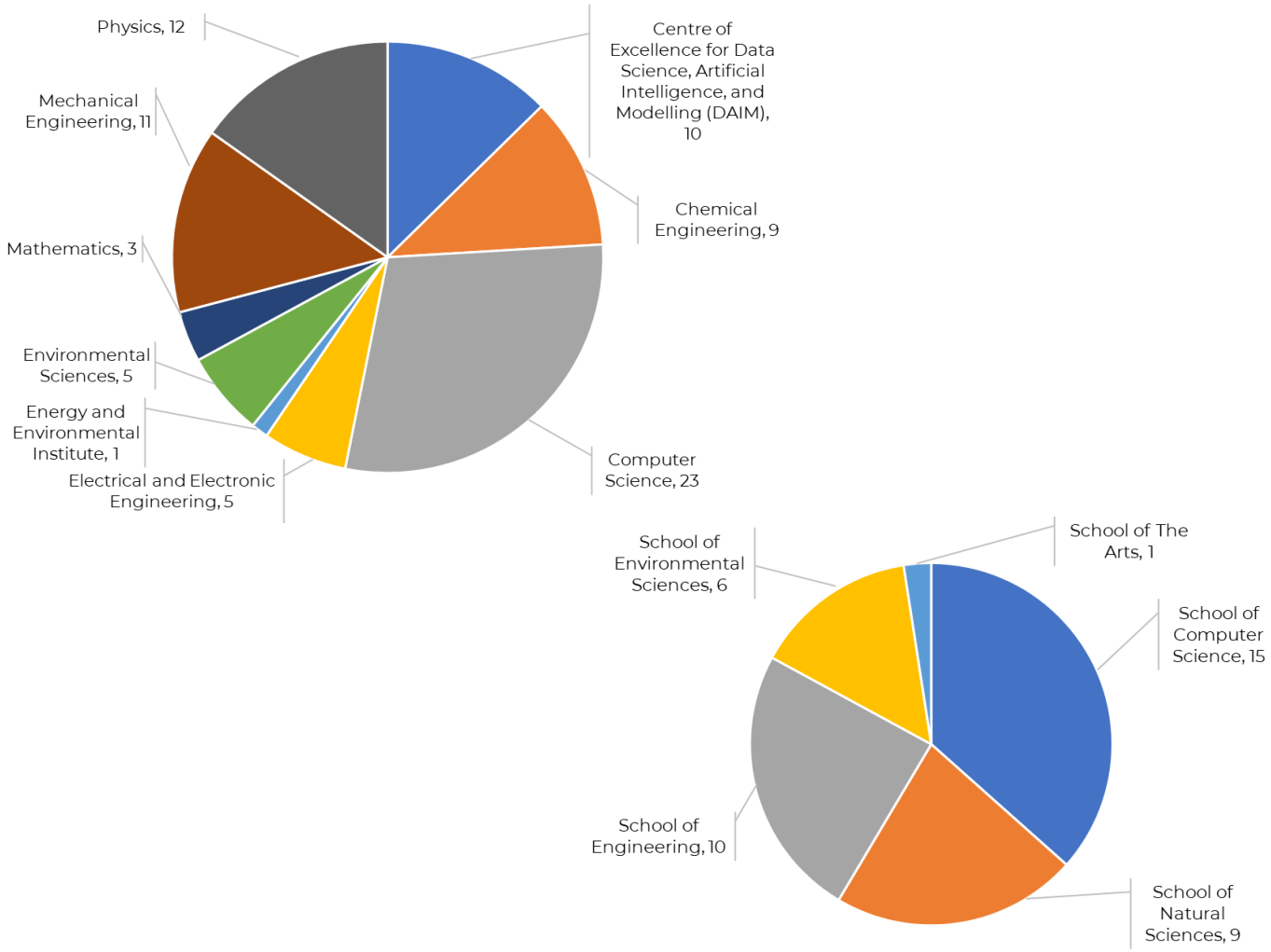
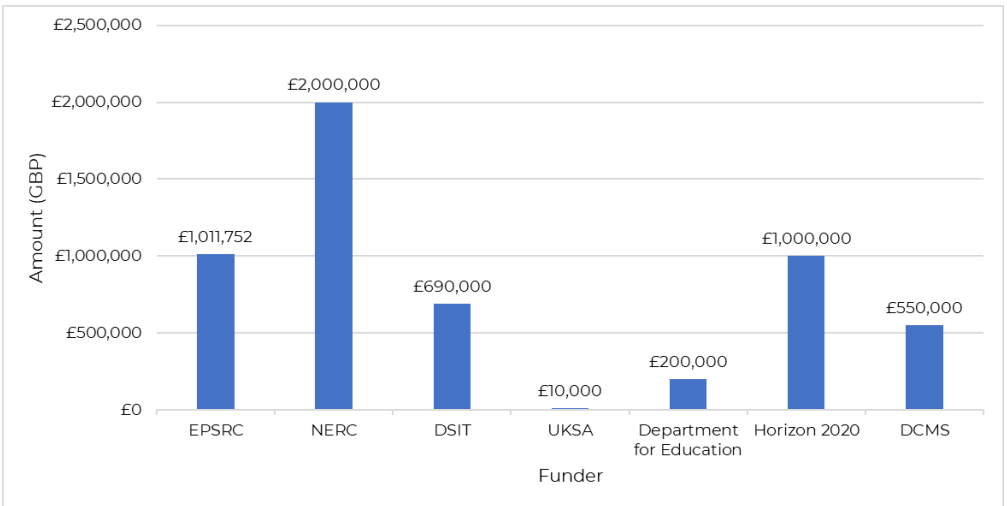


Figure 10: Space-related Academics by School/Department and Space-related Courses by School –University of Hull.



Funder breakdown:

- EPSRC – Engineering and Physical Sciences Research Council
- NERC – Natural Environment Research Council
- DSIT – Department for Science, Innovation and Technology
- UKSA – UK Space Agency
- DCMS- Department for Digital, Culture, Media and Sport

Figure 11: Space-related funding awarded to the University of Hull.

University of Leeds

The University of Leeds, founded in 1904, is one of the largest universities in the UK, located West Yorkshire. As a member of the Russell Group, it is renowned for research excellence and hosts a diverse community of over 39,000 students from more than 130 countries, creating a dynamic and inclusive environment. Leeds excels in areas such as health, sustainability, engineering, and business, and boasts state-of-the-art facilities like the Nexus innovation hub.

The University of Leeds holds expertise in Earth observation and advanced computer techniques, which has led to their role in the Met Office Academic Partnership (MOAP) and the decision to locate the headquarters of UK centres of excellence, such as the National Centre for Atmospheric Science (NCAS) and the Centre for the Observation and Modelling of Earthquakes, Volcanoes, and Tectonics (COMET). The University of Leeds is home to a number of research institutes and world-leading expertise, which includes data science, artificial intelligence, communications, quantum technology, and climate science. These are housed within the Alan Turing Institute, the Leeds Institute for Data Analytics (LIDA), the Institute for Communication and Power Networks, the Wired Core and Access Networks (WCAN), the Priestley International Centre for Climate, and SENSE – Centre for Satellite Data in Environmental Science. Leeds University Rocketry Association (LURA) provides a space for students to design, test, and build their own rockets, payloads, and engines. They compete in competitions, drive innovation within rocketry, and continue to inspire students to pursue careers in the space sector.

74 Academics

£165,764,900 Funding Awarded

125 Courses
- **Modules: 242**

11,928 Students

SENSE Centre for Satellite Data in Environmental Science

Located within the School of Earth and Environment at the University of Leeds, the SENSE Centre for Satellite Data in Environmental Science is a collaborative research initiative that trains PhD students in the application of EO data to address environmental challenges. It focuses on using satellite data to tackle issues such as climate change, biodiversity loss, and natural resource management. By integrating advanced data science techniques with satellite data, SENSE contributes to innovative solutions for managing and monitoring the environment.

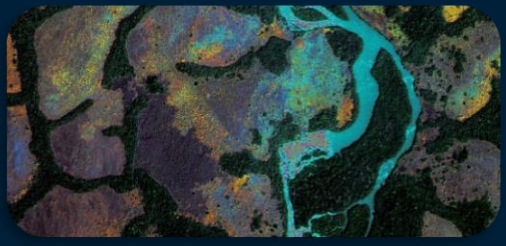


Figure 12: A SENSE satellite image

The space-related expertise can be best illustrated by the data in figures thirteen, fourteen and fifteen. These figures related to the immense funding that the University of Leeds has been awarded, in excess of £165million, with 45 % of that value coming from the Faculty of Environment who have also won 792 grants, shown in figure fifteen. This not only demonstrates the vast capabilities of the academics' abilities to win funding, but also how diverse the funding bodies are and the variety of funders. The multifaceted range of space-related academics shown in figure sixteen goes hand in hand with space-related courses by School and subsequently the number of students on those modules. The School of Earth and Environment contain 49 % of space-related academics, and the School of Electronic and Electrical Engineering offer 17 % of the total space-related courses at the University. The faculty containing the highest number of students studying space-related modules is shown as Engineering and Physical Sciences, at 10,927. It's important to note however, that if the student is studying more than one module related to space, they may have been counted more than once.

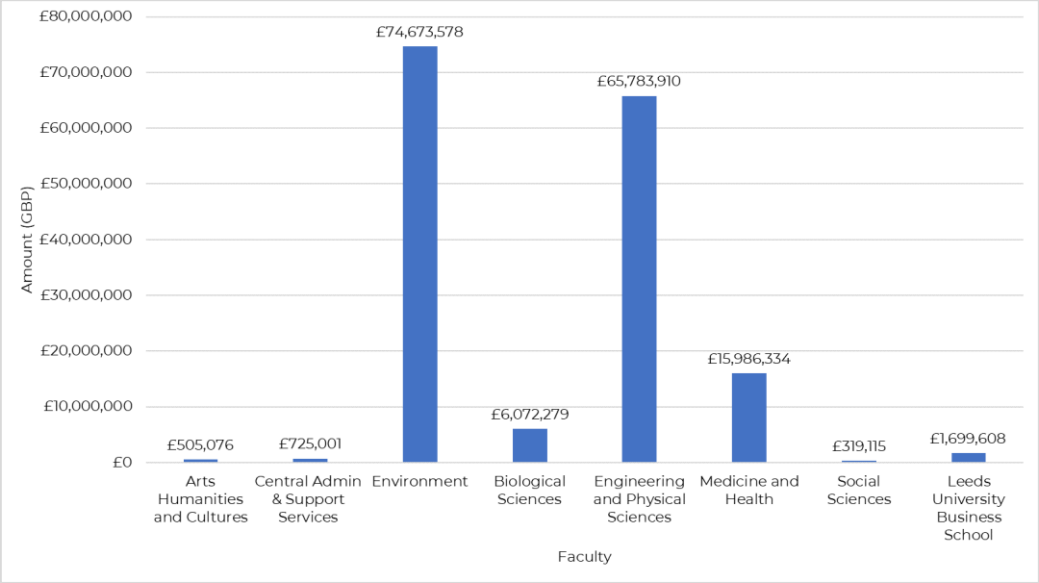


Figure 13: Funding awarded to the University by Faculty – University of Leeds.

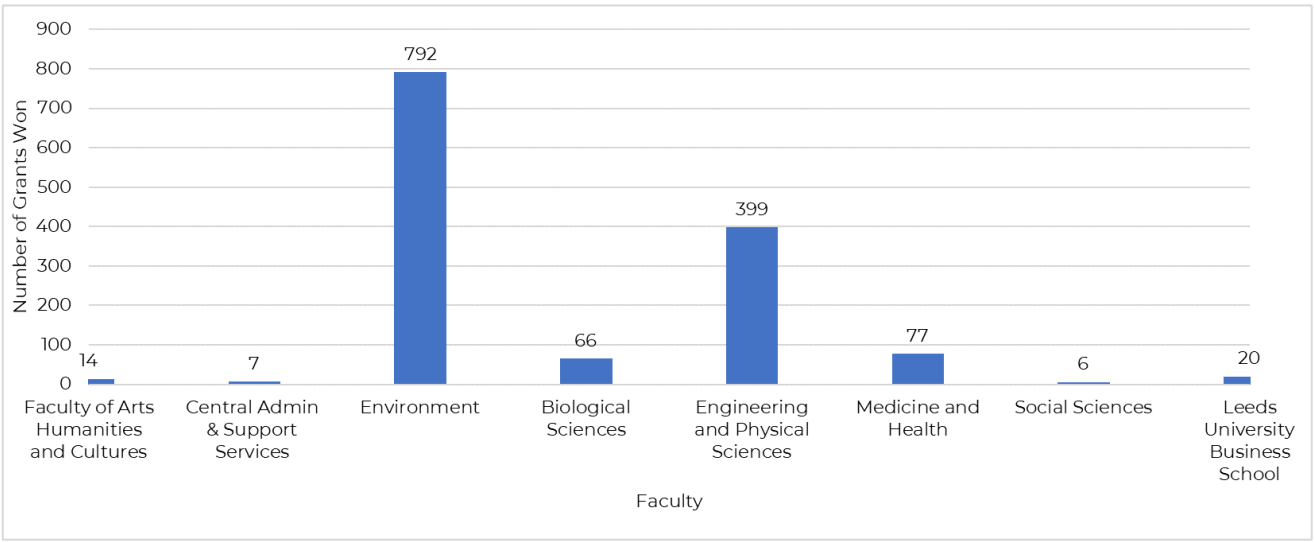
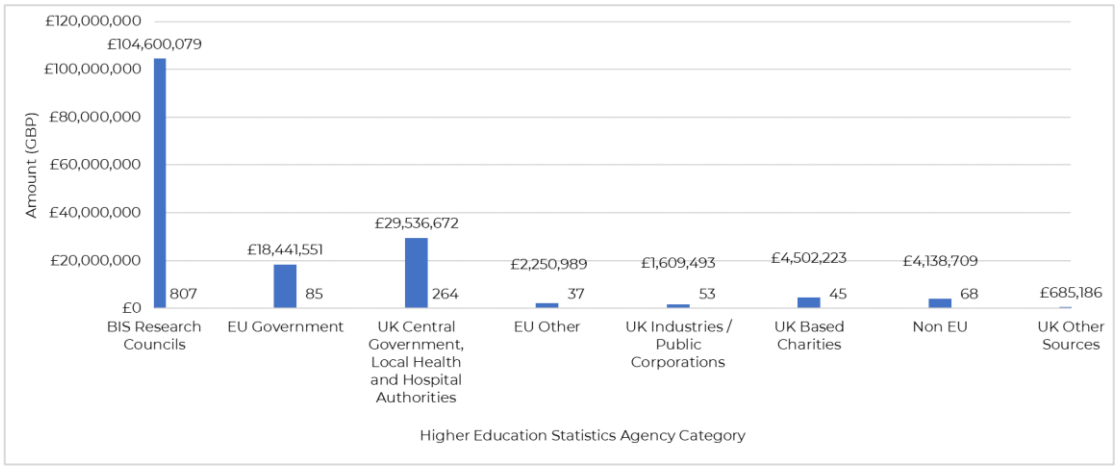


Figure 14: Faculty distribution of grants awarded – University of Leeds



Funder Breakdown:

- BIS Research Councils: Department for Business Innovation and Skills Research.

Figure 15: Funders by Higher Education Statistics Agency Category & Amount of Grants – University of Leeds.

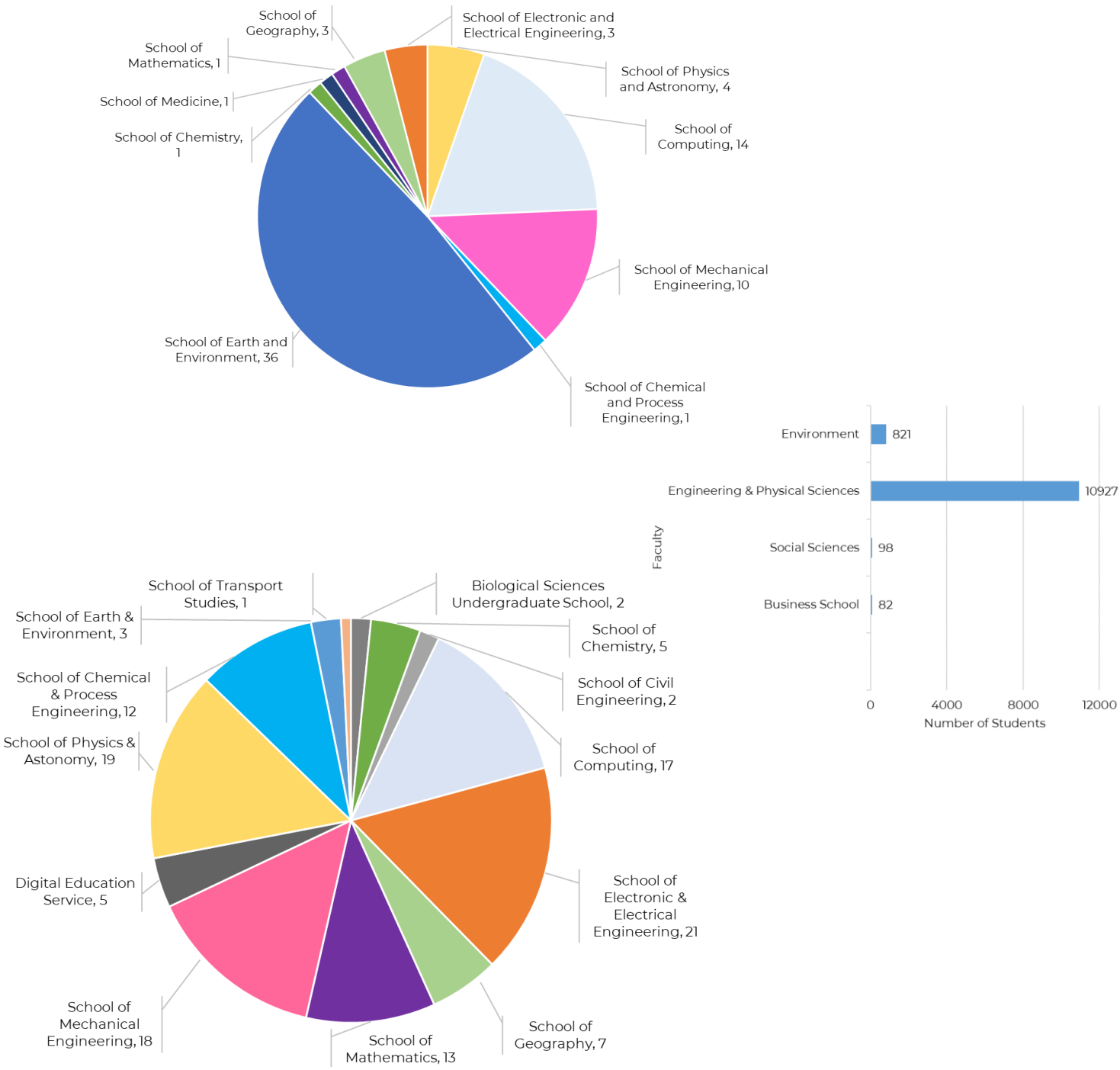


Figure 16: Space-related Academics by School, Space-related Courses by School and Students Studying Space-related Modules – University of Leeds.

Leeds Beckett University

Leeds Beckett University, based in West Yorkshire, serves a community of around 23,000 students from over 100 countries. The university offers programs across disciplines such as business, arts, health, and technology. Known for its focus on practical learning and employability, Leeds Beckett has strong links with industries and provides opportunities for internships and placements.

Leeds Beckett University offers various degrees in engineering, technology, and related fields that can provide a solid foundation for a career in the space industry. Through their School of Built Environment, Engineering, and Computing, a wealth of research exists as illustrated in figure seventeen, with 19 space-related programmes, which is 86 % of the total courses offered.

5 Academics

£42,481 Funding Awarded

22 Courses

- **15 undergraduate**
- **7 postgraduate**

Centre for Research in Computer Science and Applications (CriSCA)

CriSCA is a leading hub for research in AI, data science, and sustainable IT at Leeds Beckett University. It focuses on developing innovative AI applications in fields such as e-health, smart living, robotics, and smart cities, often in collaboration with stakeholders. It's also committed to addressing global challenges through its research in sustainable computing. By advancing AI technologies and sustainable practices, the centre contributes to innovation across various industries while supporting global sustainability goals.

Figure 18: Leeds Beckett University

The School of Built Environment, Engineering and Computing hosts projects related to aerospace engineering, astrophysics, satellite technology, AI, cyber security, IoT, data science, and sustainability – all of which can be applied to space exploration. Figure nineteen highlights the school's success with space-related funding awarded, which is currently at £ 32,000 and 75 % of the total. Leeds Beckett University is home to the Centre for Research in Computer Science and Applications, which focuses on research in the field of computer science, including software engineering, artificial intelligence, and data science. Additionally, there is the Cybercrime and Security Innovation Centre, which holds applications relevant to the space sector.

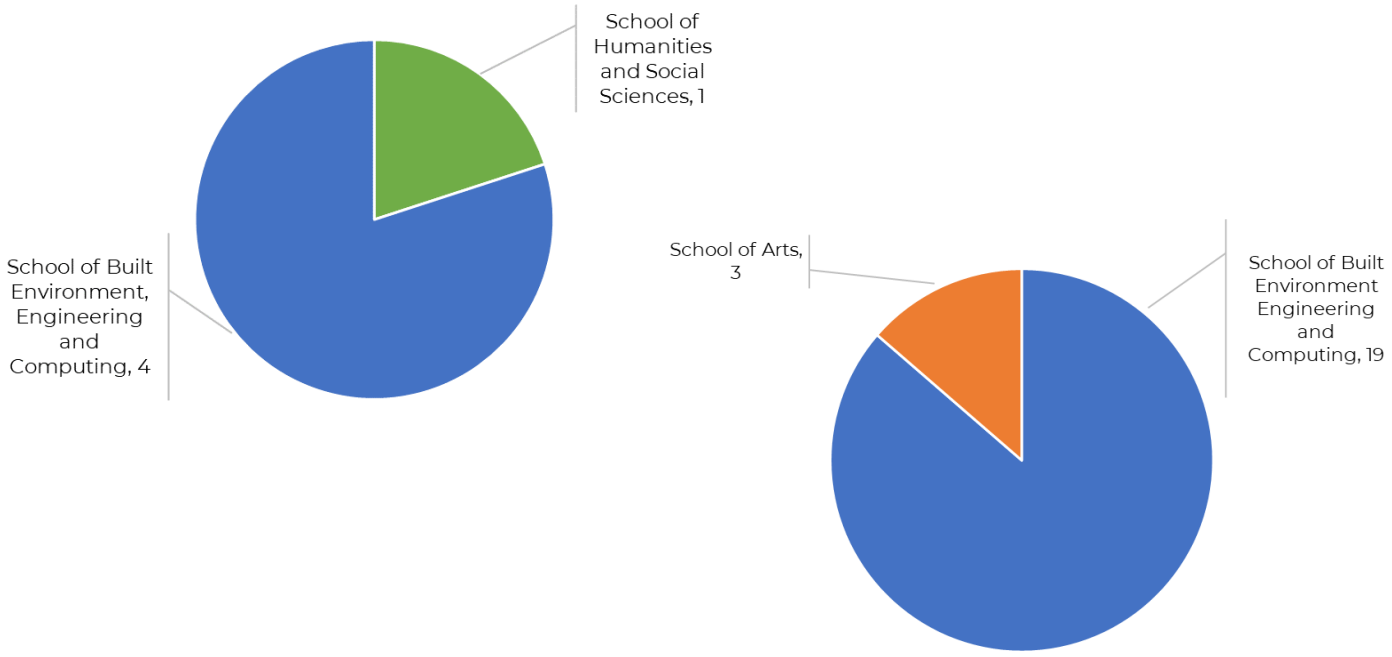


Figure 17: Space-related Academics by School and Space-related Programmes by School – Leeds Beckett University.

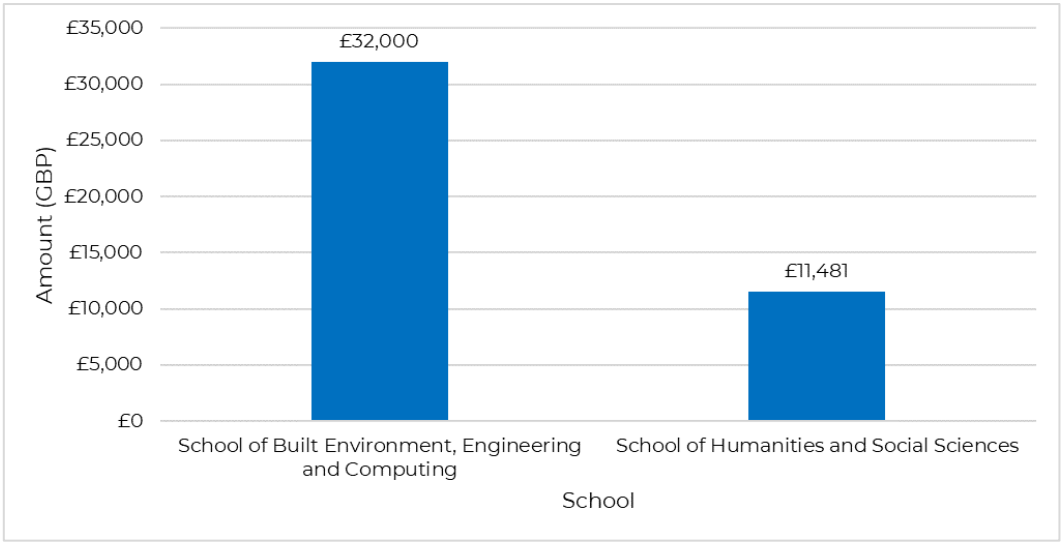


Figure 19: Space-related funding awarded by School – Leeds Beckett University.

Leeds Trinity University

Leeds Trinity University is in West Yorkshire and was established in 1966 and gained full university status in 2012. Known for its focus on employability and professional development, the university has a student population of around 3,500, creating a close-knit community. Leeds Trinity's emphasis on practical experience and personal support ensures students are well-prepared for their careers.

Leeds Trinity University primarily focuses on disciplines such as arts, humanities, social sciences, education, and health sciences. While it may not offer courses specifically dedicated to space-related subjects, there are plenty of areas that have relevance to the space industry. Some of these include media and journalism, digital media, film and television production, education, psychology, sport and exercise sciences, criminology and sociology. These courses all offer transferable skills that are applicable to, and support the development of, the space industry in the region. Leeds Trinity University offer 16 space-related courses, with the majority being taught by the School of Computer Science, as shown in figure twenty.

NA Academics

NA Funding Awarded

16 Courses

- **10 Undergraduate**
- **6 Postgraduate**

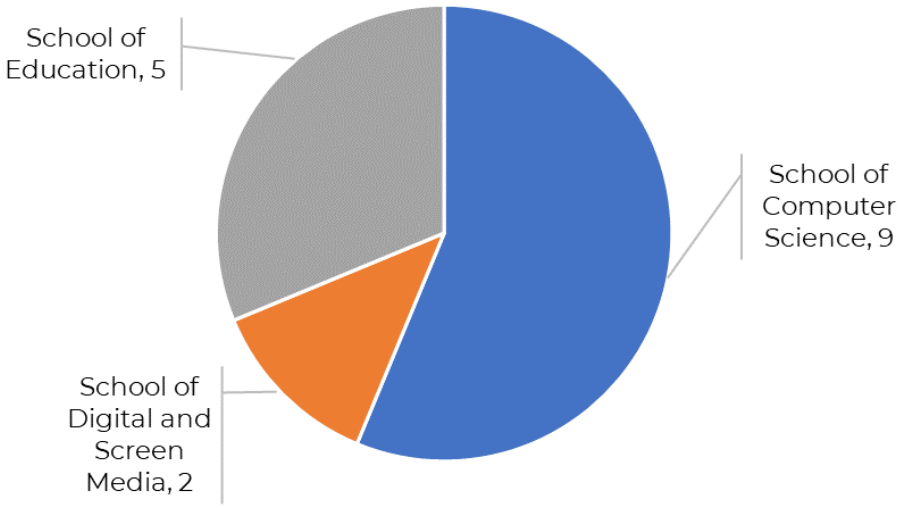


Figure 20: Space-related courses by School – Leeds Trinity University.

Leeds Arts University

Leeds Arts University is the only specialist arts university in the North of England, offering courses from across the creative arts, including photography, filmmaking, animation, illustration, graphic design, creative writing, marketing, music, acting for screen, fashion design and textile design – all of which can support the development of the space sector and create narratives across a wide range of mediums to communicate with different audiences.

Through Space Hub Yorkshire's analysis, it has been identified that there are 832 students studying space-related courses at Leeds Arts University. This is shown in figure twenty-one and highlights the opportunity for undergraduate study.

5 Academics

NA Funding Awarded

9 Courses
- **7 Undergraduate**
- **2 Postgraduate**

832 Students

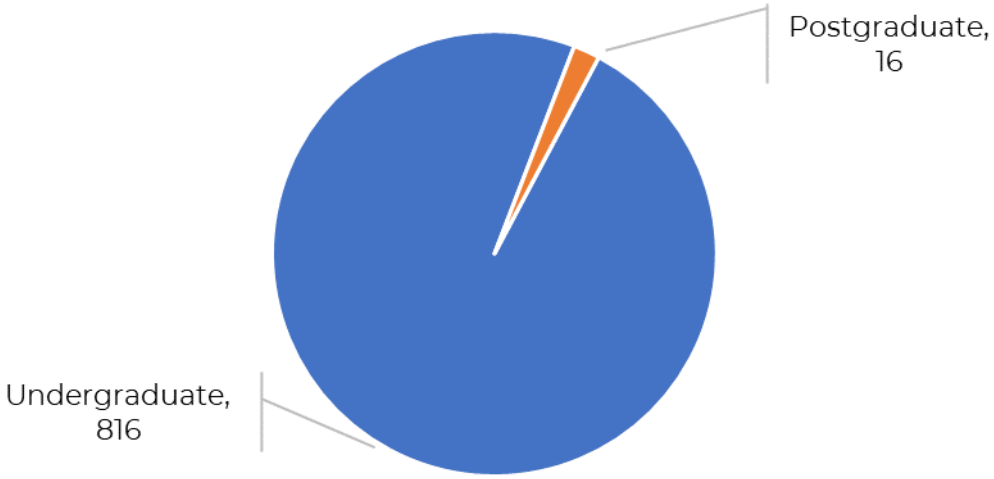


Figure 21: Numbers of students by degree type studying Space-related courses at Leeds Arts University.

Leeds Conservatoire

Leeds Conservatoire specialises in providing high-quality education and training in music performance, composition, production, and related disciplines. All of these provide opportunities for creative exploration within the space industry and support student development. Space-relevant themes from Leeds Conservatoire include composition, music production, sound design, performance, and music technology. Students can potentially incorporate space-related themes into their creative work as part of their broader artistic exploration and expression.

NA Academics

NA Funding Awarded

5 Courses

- **3 Undergraduate**
- **2 Postgraduate**

The University of Sheffield

The University of Sheffield, established in 1905, is a member of the Russell Group and one of the UK's leading research-intensive universities. Located in South Yorkshire, it has a student population of over 30,000, from over 150 countries. Known for its academic excellence and innovation, the university offers a wide range of programs across disciplines such as engineering, medicine, social sciences, and the arts. With a strong focus on research impact, Sheffield is known for tackling global challenges in areas like sustainability and advanced manufacturing.

The University of Sheffield currently has a wide range of space-related expertise, including sensors, communications, materials, space systems, and theoretical modelling of space plasma dynamics. They have strong experience working with the European Space Agency through their Department of Chemical and Biological Engineering to design heuristics to speed up the way novel MOF catalysts are discovered for advancing fuel production technologies via photocatalytic CO2 reduction.

36 Academics

£21,057,000 Funding Awarded

138 Courses
- **95 Undergraduate**
- **43 Postgraduate**

6,820 Students

The Advanced Manufacturing Research Centre (AMRC)

The AMRC is a centre for advanced manufacturing technologies, research, and development. It specialises in areas such as additive manufacturing, automation & robotics, composite, and digital manufacturing. They collaborate with industry to drive innovation and improve productivity across sectors including aerospace, automotive, construction, and space. Its capabilities in the sector include developing lightweight structures, advanced materials, and manufacturing processes tailored for space applications.

Figure 22: An AMRC robot with space-sector applications.

The Department of Automatic Control and Systems Engineering and the School of Mathematics and Physical Sciences are heavily involved in research topics that lie in the fields of solar/space plasmas, space weather, solar wind, the solar-terrestrial system, nonlinear systems, identification of linear and non-linear processes in data, and methods of data analysis for multi-spacecraft missions. This is evident in figure twenty-three, where the amount of space-related funding awarded by Department is significant and the number of successful grants by Department is also shown. The Department for Automatic Control and Systems Engineering boasts 26 % of total funding awarded, and 31 % of the total volume of grants. Figure number twenty-four illustrates the variety of funders and their value, showing the University's ability to successfully diversify. In figure twenty-five, the space-related academics, courses and student numbers is shown, where the School of Mathematics and Physical Sciences offers 29 % of space-related courses, and the School of Electrical and Electronic Engineering contain 44 % of space-related academics. Engineering as a theme also offer the highest number of students studying space-related courses at 5,004, further providing evidence that there are many students who could explore space careers after university.

The University of Sheffield has also collaborated with the European Space Agency through Professor Shaun Quegan, who led the EU Biomass Satellite project to quantify biomass through data and monitoring. Through the Advanced Manufacturing Research Centre (AMRC), the University of Sheffield are working on futuristic projects with the Space Generation Advisory Council and the Institute of Engineering and Technology. The University of Sheffield is home to Project Sunride, a rocketry team that set the UK Open Altitude Record by reaching 36,274 feet with their rocket in 2019. They also specialise in liquid rocket engines.

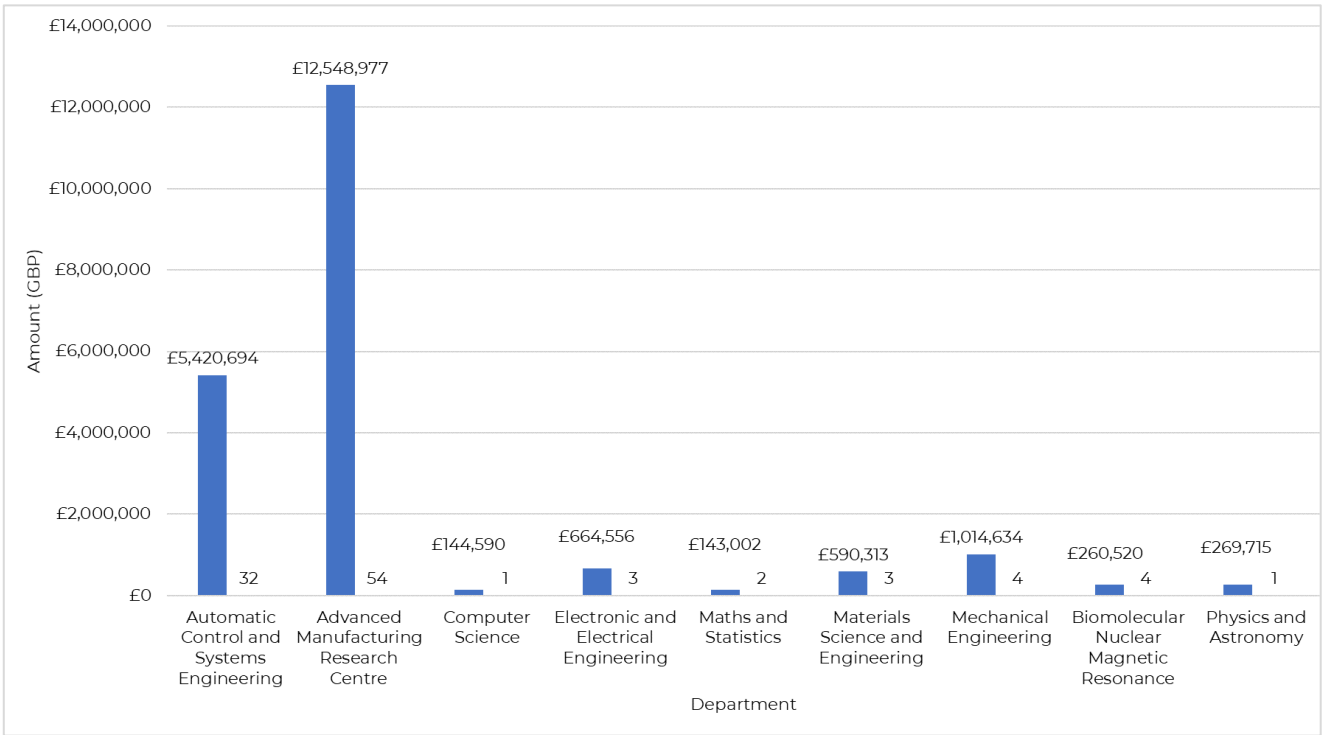


Figure 23: Space-related funding awarded to the University by Department and number of successful grants won – University of Sheffield.

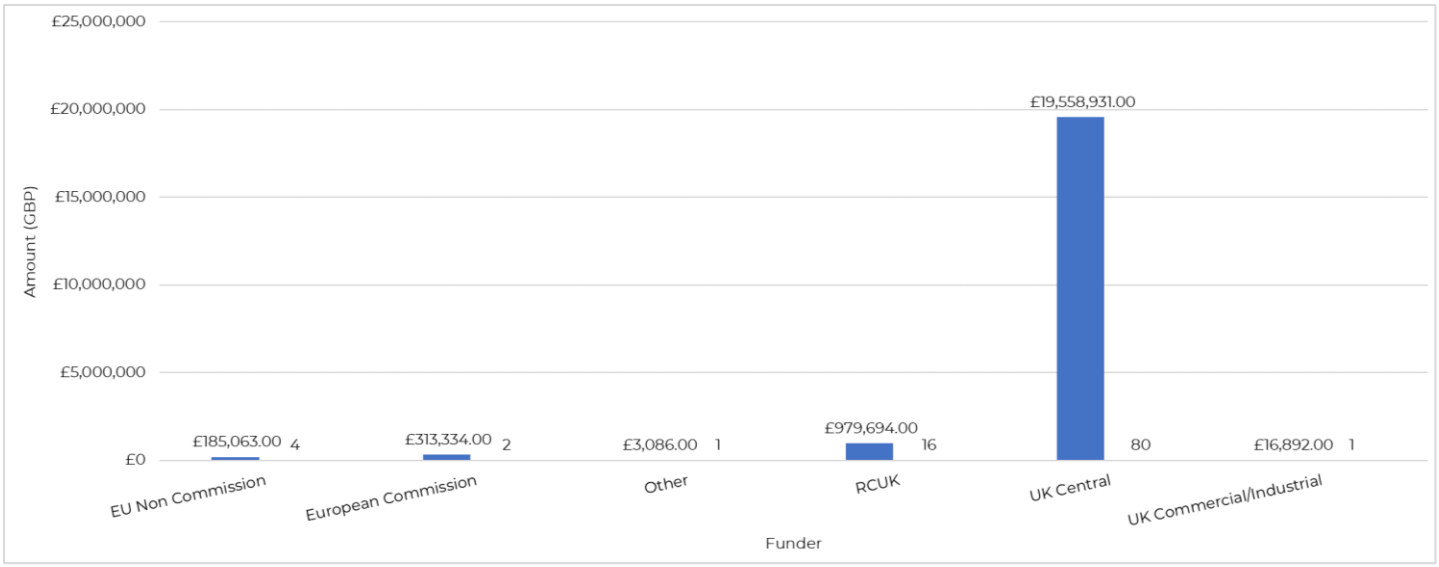
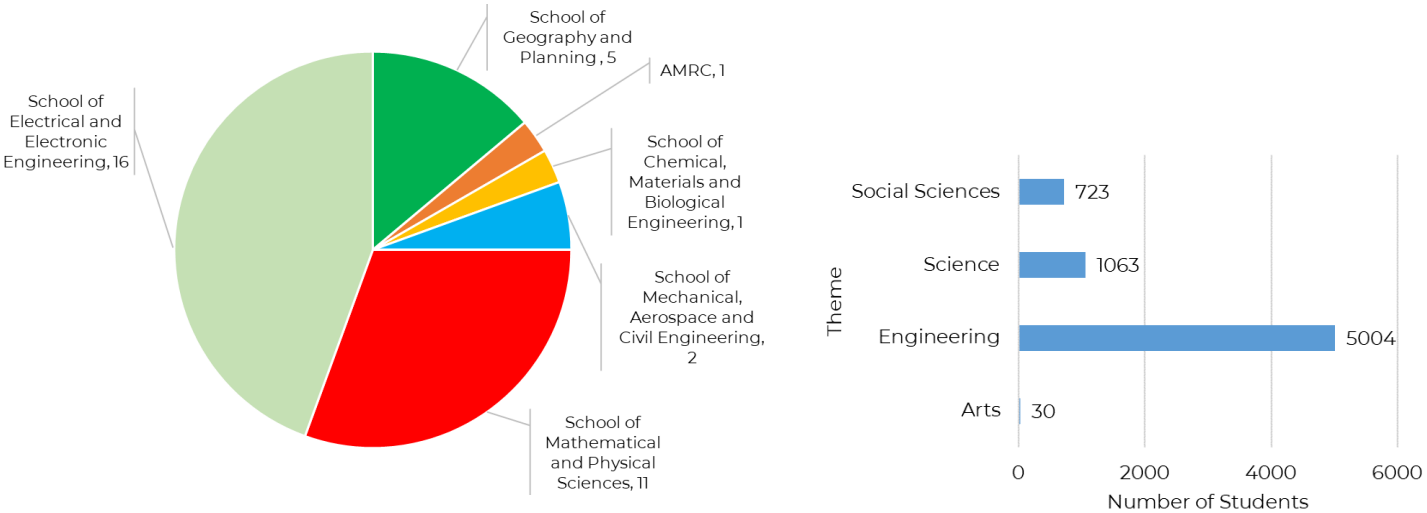


Figure 24: Number of Space-related funding grants awarded by funder and value - University of Sheffield.

Funder Breakdown:

- RCUK – Research Councils UK.



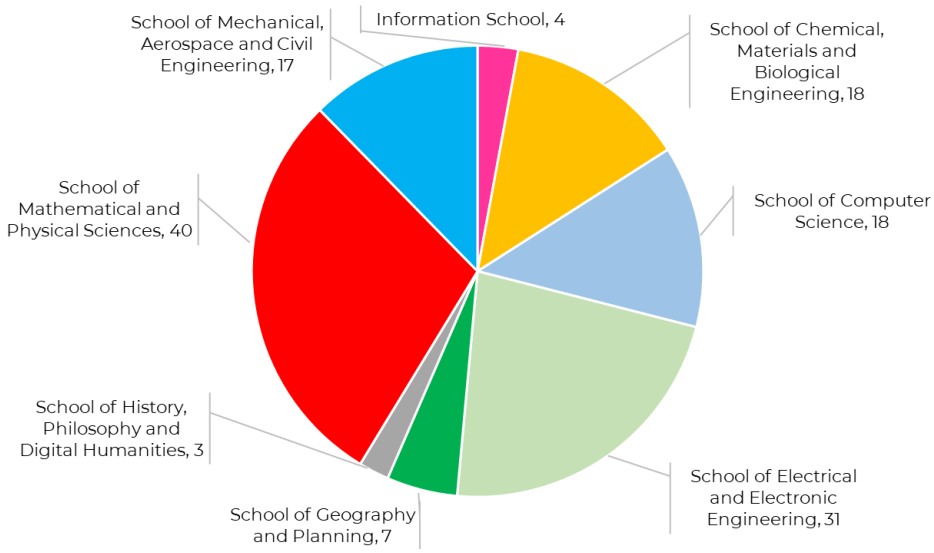


Figure 25: Space-related Academics by School, Space-related Courses by School and Space-related Courses Student Numbers (summarised by Theme) – University of Sheffield.

Sheffield Hallam University

Sheffield Hallam University, based in South Yorkshire, hosts over 30,000 students offering courses designed with a focus on real-world application and career readiness. The university is well-regarded for its strong ties to industry, providing students with opportunities for placements and work experience. Spread across two campuses, City and Collegiate, Sheffield Hallam features facilities such as specialist labs, such as the Materials and Engineering Research Institute, ensuring students have access to an innovative learning environment. The University holds four Research Institutes that support several specialist centres containing space-related expertise as well as research within specific academic departments. Key academic disciplines related to space include Materials Science and Engineering, Surface Engineering and Advanced Coatings, Cybersecurity and Information Systems, Robotics and Human Interaction, Multimodal Imaging, and Product Design.

69 Academics

£558,281 Funding Awarded

90 Courses
- **51 Undergraduate**
- **39 Postgraduate**

3,040 Students

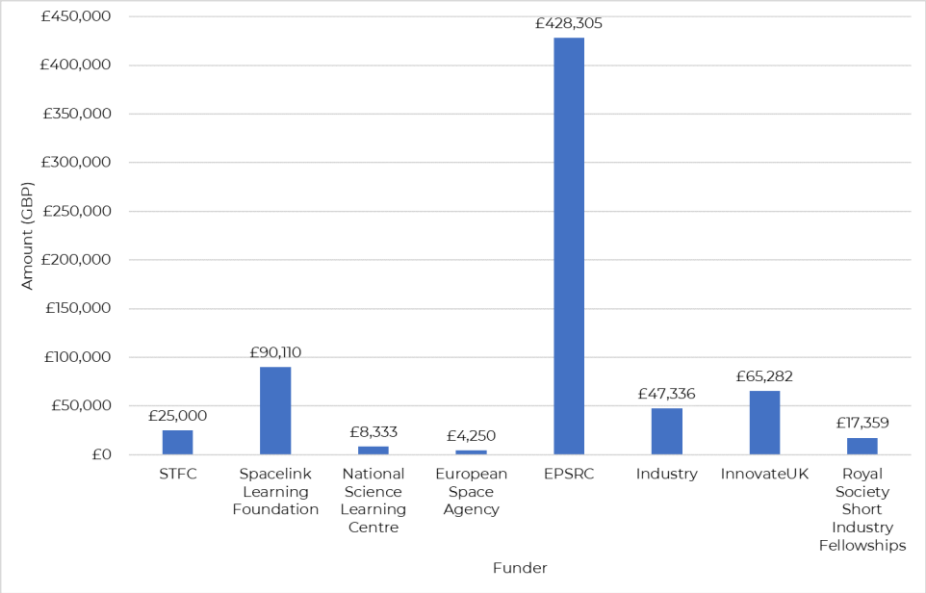
The National HIPIMS Technology Centre

A leading research facility specialising in High Power Impulse Magnetron Sputtering (HIPIMS) technology. The centre focuses on advancing HIPIMS processes for applications in various sectors, including medical implants and advanced coatings. It offers services such as process development, plasma diagnostics, and pilot production, aiming to enhance coating adhesion and performance. With many applications relevant to the space industry, the centre is at the forefront of technological advancements and support.

Figure 26: Professor Arutiun Ehiasarian, Head of National HIPIMS Technology Centre.

There are various focuses related to space such as conventional and functional materials, electron microscopy, automation and robotics research, intelligence management, and many more. Sheffield Hallam is also home to the National HIPIMS Technology Centre, which represents the latest development in PVD (Physical Vapor Deposition) coating deposition technology. Much of the funding that the National HIPIMS Technology Centre has been awarded was through the EPSRC and has contributed to Sheffield Hallam's space-related funding total, which is £ 558,281 and shown in figure twenty-seven.

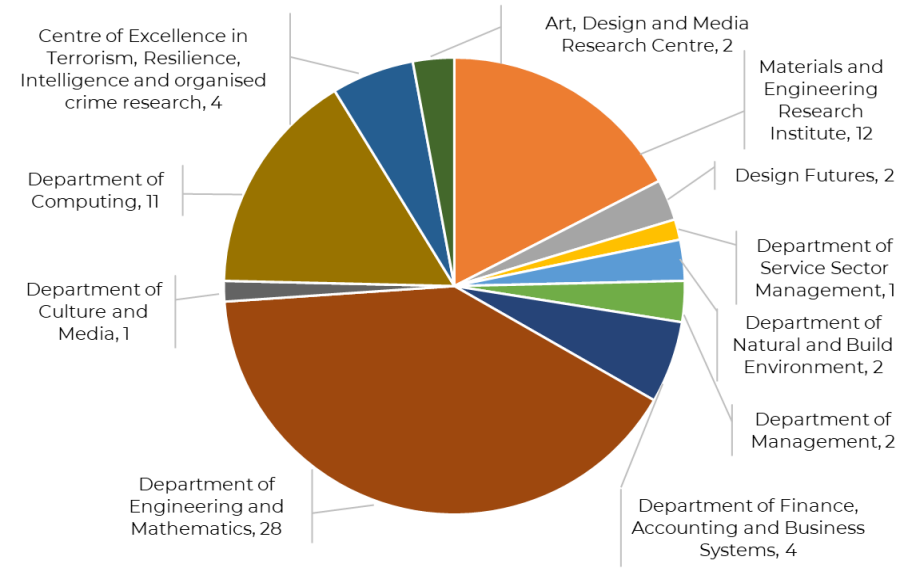
The EPSRC funding contributed 77 % of the total. For the academic year 2024/2025, there were 3,040 students across 90 courses that were identified as space-related, as shown in figure twenty-eight. The students across the schools are taught by a significant wealth of space-related expertise, which has been split across the Departments, as shown in figure twenty-eight. The Department of Engineering and Mathematics provided nearly half of the total number of academics at 41 %.

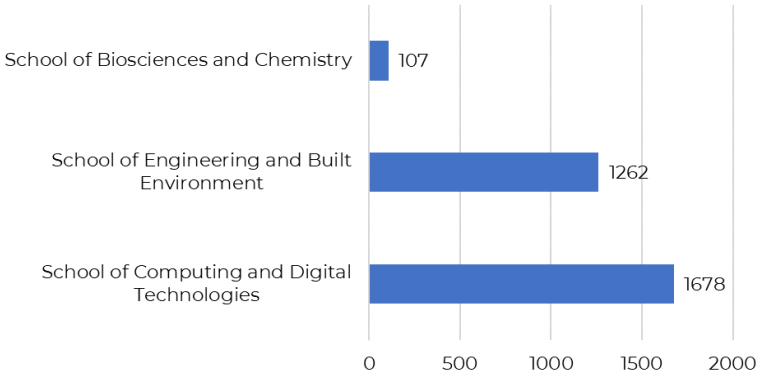


Funder Breakdown:

- STFC – Science and Technology and Facilities Council.
- EPSRC - Engineering & Physical Sciences Research Council.

Figure 27: Space-related funding awarded for Sheffield Hallam University.





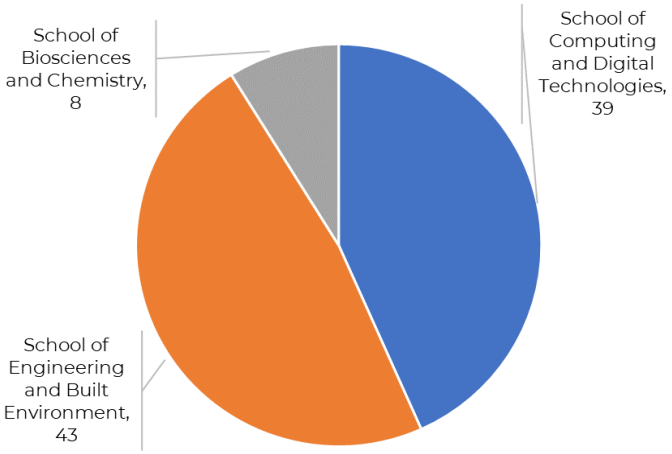


Figure 28: Space-related Academics by Department, Space-related Courses by School, and Number of Students Studying Space-related Courses by School – Sheffield Hallam University.

University of York

The University of York, founded in 1963, is a university located in North Yorkshire with a student population of over 19,000, including more than 3,000 international students from around the world. A member of the Russell Group, York offers programs across various disciplines, including humanities, sciences, social sciences, and engineering.

The University of York has expertise in experimental and theoretical quantum communication and has demonstrated in-lab and in-field quantum communication experiments. It is now expanding its quantum portfolio to space applications. This includes the design, development, verification, testing, and documentation of space-qualified payloads for quantum communications with optical signals. The York team is also developing quantum receivers for optical ground stations. The Institute for Safe Autonomy will be hosting an optical ground station, equipped with a 60cm diameter telescope, which will have the capability to receive not only optical signals from space but also link the communication to a fibre-based metropolitan quantum network. York is also home to the Quantum Communications Hub, which aims to accelerate the translation of quantum technologies into the marketplace.

38 Academics

£68,992,887 Funding Awarded

102 Courses

- **85 Undergraduate**
- **17 Postgraduate**

The Institute for Safe Autonomy

The Institute for Safe Autonomy is a research facility dedicated to ensuring the safe, ethical, and reliable development of autonomous systems. It focuses on research in areas like robotics, AI, and autonomous vehicles, with applications in fields such as transportation, healthcare, and manufacturing. With state-of-the-art facilities, including labs, testing zones, and drone testing areas, the institute enables rigorous testing and validation of autonomous technologies, with many applicable solutions for the space industry.

Figure 29: Resilient Communication hardware at the University of York

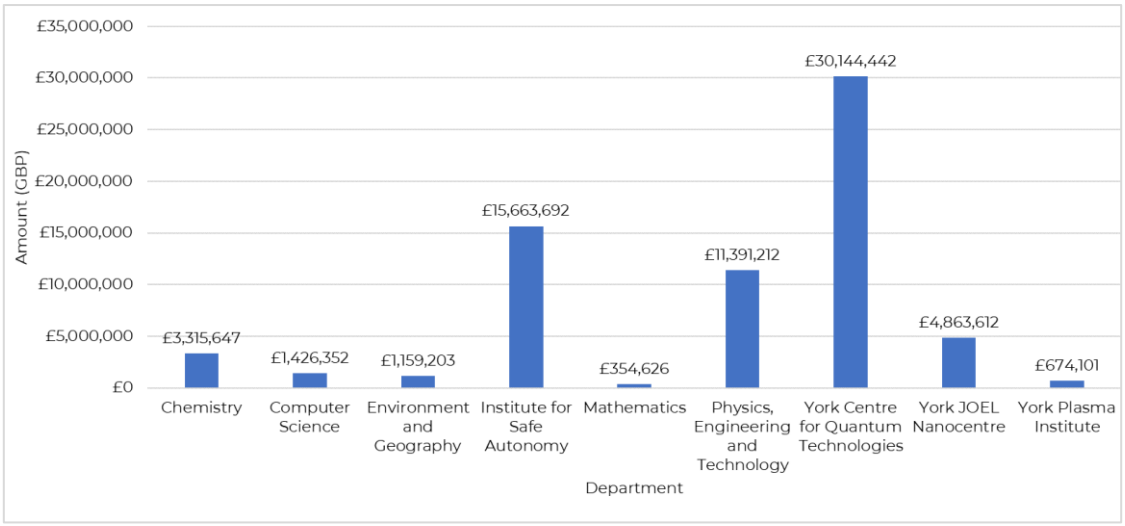


Figure 30: Space-related funding awarded by Department - University of York.

Figure thirty presents the space-related funding awarded by departments at the University of York, and the Institute for Safe Autonomy and York Centre for Quantum Technologies have won a significant amount between them at 66 %, totalling over £ 45million. As well as this, the University of York have a wide variety of space-related academic expertise, spread across multiple Schools and Departments, as shown in figure thirty-one. The School of Physics Engineering and Technology offers 24 % of total space-related academics and the York Centre for Quantum Technologies offers 18 %.

The School of Physics, Engineering and Technology offer 33 courses that are space-related, and the Department of Computer Science offers an impressive 21. Together, they make up 53 % of total space-related courses offered at the University of York.

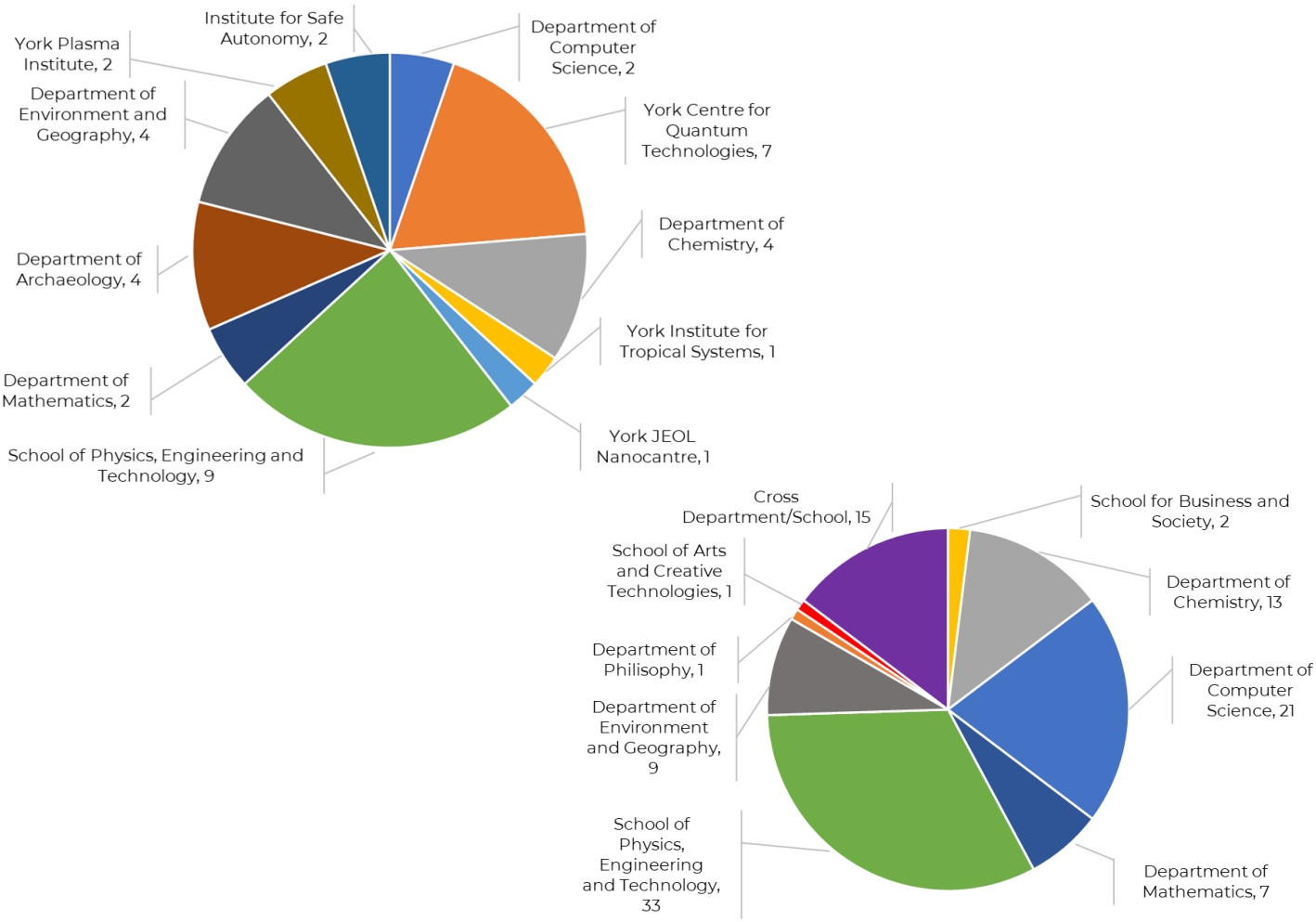


Figure 31: Space-related Academics by School/Department and Space-related Courses by School/Department – University of York.

York St John University

York St John University, located in North Yorkshire, has a rich history with around 13,000 students, offering a wide variety of programs, from arts and business to health and education. The university places a big emphasis on employability and sustainability, with modern facilities and has campus in London.

York St John University offers courses in both Data Science and Computer Science and holds expertise in astrophysics, cosmology, space and atmospheric sciences, as well as machine learning, deep learning, AI, and cybersecurity. On a more creative side, they also hold expertise in science fiction, utopia, and in contextualizing and examining the philosophical and ethical issues raised by space exploration.

4 Academics

£60,000 Funding Awarded

14 Courses

- **8 Undergraduate**
- **6 Postgraduate**

545 Students

The Centre for Applied Innovation

The Centre for Applied Innovation (CAI) at York St John University is a dynamic hub focused on driving innovation and creating real-world impact through research and collaboration. Bringing together experts from different fields, it aims to address technological and societal challenges while fostering creativity and practical solutions. CAI is dedicated to inspiring positive change and supporting advancements that benefit both local communities and wider global initiatives.

Figure 32: The Centre for Applied Innovation at York St John University

From figure thirty-three, it can be observed that out of the 545 students studying space-related courses at York St John, 48 % come from the School of Humanities and 45 % come from the School of Science, Technology and Health. York St John also has a London campus that offers an empowering environment for collaboration and original thinking.

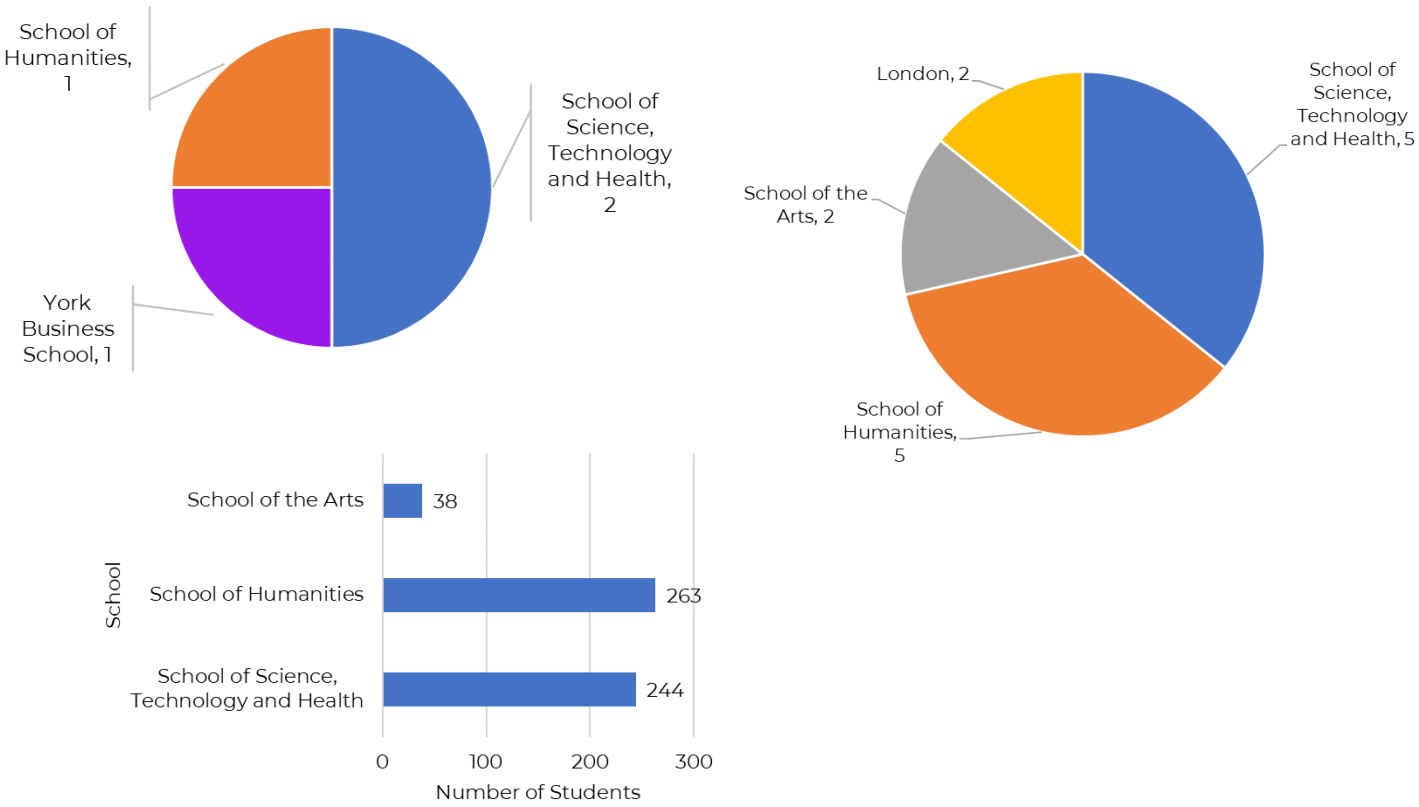


Figure 33: Space-related Academics by School, Space-related Courses by School, and Number of Students Studying Space-related Courses by School – York St John University

Summary & Future Landscape

The purpose of this report was to map the Yorkshire Universities capabilities and expertise related to the space sector. This was done through analysing the space-related research funding awarded to the HE institutions for the 2019 to 2024 study period, to identify the space-related academics and their areas of expertise in each institution, and to document the number of space-related courses and the students studying on them. Collectively, this information provides the first overview of the space related teaching and research capability in all 12 Yorkshire HE institutions and provides a blueprint for how a UK-wide assessment could be conducted in the future.

Our report has found that all twelve Yorkshire HE institutions are already actively contributing to the health of the UK's space industry, with evidence of this success shown in the form of research funding awarded, number of world-leading research experts, and substantial student numbers on the many space-related courses in figure 34. Universities such as Leeds, Sheffield and York lead the way with space-related funding, and universities such as Hull, Huddersfield and Sheffield Hallam possess a significant number of space-related academics. It is important to note that those which are not considered 'technical' institutions still feature prominently in our analysis and provide a significant contribution in terms of upskilling the future generations of talent looking to enter the space industry.

University	Space-related Academics	Space-related Funding Awarded (since 2019)	Space-related Courses	Students Studying Space-related Courses/Modules
University of Bradford	19	£12,746,609	31	991
University of Huddersfield	66	£32,798,766	48	-
University of Hull	79	£5,461,752	41	-
University of Leeds	74	£165,764,900	125	11,928
Leeds Beckett University	5	£43,481	22	-
Leeds Trinity University	-	-	16	-
Leeds Arts University	5	-	9	832
Leeds Conservatoire	-	-	5	-
University of Sheffield	36	£ 21,057,000	138	6,820
Sheffield Hallam University	69	£558,281	90	3,040
University of York	38	£68,992,887	102	-
York St John University	4	£60,000	14	545
Total	**395**	**£306,483,676**	**641**	**24,156**

Figure 34: An overview of the space-related capabilities of the 12 Yorkshire Universities.

This report will be a useful tool for the Yorkshire region to evidence the collective contribution of its academic institutions to the UK space sector, will act as an evidence base for more actively promoting this expertise. We hope this report will highlight the immense opportunity that Yorkshire Universities can provide the UK space sector and will aid the identification of collaborative opportunities where we can work together to be greater than the sum of our parts. The academic sector is an enabler of innovation through research projects, and through our taught program we train the next generation of experts in space-relevant skills. This information will be used to support the UK's as inward investment ambitions for our region and nationally and will also be a useful source of inspiration and pot talent for existing industry. Collaboration with the HE institutions will significantly benefit all parties and will further accelerate the development of the space sector not just in Yorkshire, but across the UK.

We strongly recommend that this mapping activity is carried out on a yearly basis to ensure that the data is kept up to date, but more importantly so that change over time in our academic capability can be tracked. The methodology used was designed to facilitate such an annual iteration. This will ensure

accurate promotion of the capabilities and lead to stronger relationship development between the universities.

Future Landscape

The UK space sector has experienced significant growth over the last decade, driven by advancements in satellite technology, space exploration, and commercial services. Collectively, the Space sector contributes over £16.5 billion annually to the UK economy, employing around 47,000 people. The sector focuses heavily on satellite manufacturing, telecommunications, Earth observation, and data services, with the UK being a global leader in small satellite technology.

It is clear that from this report, the Yorkshire Universities offer expertise and capabilities related to the sector focuses and can provide vast numbers of students to support both public and private industry. The Yorkshire region has a significant connection across local government and HE institutions, with all four local authorities confirmed to be working as Mayoral Combined Authorities by June 2025. SHY are integrated within this network and will continue to support engagement with the space sector into the future.

As the space sector becomes increasingly diverse and continues to expand, the rate at which opportunities are created should be utilised and harnessed by the capabilities presented in this report. HE institutions can use their position within society, government and industry to become global leaders in the space sector by creating a pathway for securing students with a real passion and a desire to carry out research within the institutions. Industry would then be able to access this pipeline of talent that could support with the development of home-grown UK spinouts, and the workforce could even attract overseas companies, leading to further investment.

Recommendations

Following this mapping exercise, a series of recommendations have been created to ensure the success and continued development of Yorkshire University strengths within the space sector. These recommendations can be used by HE institutions to act as a template for future mapping activities, and if other regions were to adopt this mapping practise. This information could be used to act as a promotional tool for the institution, therefore attracting national and international interest as well as industry engagement.

1. **Develop a Centralised Expertise Directory.**
    a. Create a dynamic, publicly accessible database of space-related expertise within the Yorkshire Universities. Ensure this is GDPR compliant but provides an opportunity for further exposure of capabilities and possible collaborations.
    b. Include key researchers, facilities, projects, and funding opportunities as they come in, so that potential subscribers to the database can be made aware of these.
    c. Ensure this information is continually kept up to date, with quarterly reviews of data.

2. **Strengthen Inter-University Collaborations.**
    a. Continue to host regular networking events and workshops to encourage interdisciplinary research, not only within HE institutions but also between different ones.

3. **Focus on Strategic Specialisation.**
    a. Encourage HE institutions to strengthen their already identified niche expertise in alignment with national and international priorities.

4. **Increase Industry Engagement.**
    a. Continued collaboration with regional space-tech companies for practical applications.
    b. Foster student placements and internships in the space sector, with a clear identified plan for these.

5. **Secure Collaborative Funding.**
    a. Support HE institutions applying for joint grants with industry.
    b. Leverage regional development funds for infrastructure enhancement and facilities development.

6. **Create a Continued Professional Development (CPD) Programme**
    a. With the identification of capabilities and expertise, HE institutions could look to diversify their offering and provide CPD programmes relating to that specific portfolio of skills.
    b. Offer the programme to industry and students, which will provide an income stream that could be used to support the development of the programme.

By implementing these recommendations, Space Hub Yorkshire can continue to strategically map and promote the immense capabilities of the 12 Yorkshire Universities, while looking to strengthen the depth and breadth of expertise across the region. By aligning to national objectives, this will support the contribution to the UK space sector and provide pathways for skills and development, as well as increasing awareness of opportunities within the sector for younger generations.

Any data sources can be checked and verified by emailing: spacehubyorkshire@leeds.ac.uk.

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