Commons Select Committee: Leaving the EU: implication and opportunities for science and research

Written submission: University of Exeter

http://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/news-parliament-2015/leaving-the-eu-inquiry-launch-16-17/

The University of Exeter is a Russell Group university that combines world-class research with very high levels of student satisfaction. Exeter has over 21,000 students and is one of the global top 100 universities according to the *Times Higher Education* World University Rankings 2015-16, positioned 93rd. Exeter is also ranked 7th in T*he Times and The Sunday Times Good University Guide 2016,* 9th in the *Guardian University Guide 2016* and 10th in *The Complete University Guide 2016*. In the 2014 Research Excellence Framework (REF), the University ranked 16th nationally, with 98% of its research rated as being of international quality. Exeter was named *The Times* and *The Sunday Times* Sports University of the Year 2015-16, in recognition of excellence in performance, education and research. Exeter was *The Sunday Times* University of the Year 2012-13.

Question 1: What the effect of the various models available for the UK's future relationship with the EU will be on UK science and research, in terms of collaboration; free movement of researchers and students; access to funding; access to EU-funded research facilities, both in the UK and abroad; Intellectual property and commercialisation of research?

The University of Exeter believes the UK government must consider research and innovation, in collaboration with the EU, as a key pillar of the UK economy, central to our ability to solve significant global challenges and drive the productivity of the UK economy. In respect of the areas outlined the view of the University of Exeter is as follows:

Collaboration: ***Enabling scientific collaboration is essential to maintaining our world class research and societal and economic impacts*****.** As identified by the Royal Society (The Royal Society, 2016), addressing complex and often interdisciplinary scientific questions requires the best and most appropriate researchers, wherever in the world they may be found. Collaboration between researchers in the UK and the EU is therefore important for high quality, impact led UK research. For Exeter the impact of our publications is significantly increased by EU collaborators, (FWCI[1] rising from 2.23 (international) to 2.78 (EU), with 33% of our collaborative publications over the last 4 years involving at least one EU partner. We are particularly concerned that newer collaborations, previously enabled by EU mechanisms, may suffer disproportionately.

Free movement of researchers and students. ***The primacy of international movement of researchers for science and all forms of academic research is the hallmark for the quality of UK Research***. Restrictions on bidirectional researcher mobility for the UK hinders us in our collaborations; in our ability to attract the best researchers and thereby remain internationally competitive. The reputational aspects of restrictions compounds the effect on our international reputation as a country open for international research. The University of Exeter's growth of 32% in research awards and 41% in staff over the 2011/12-2015/16 period, and subsequent achievement in REF, where we rank 16th nationally for world-leading (4*) publications and 11th in the Russell Group, has been underpinned by

[1] Field Weighted Citation Impact - https://www.elsevier.com/__data/assets/pdf_file/0020/53327/scival-metrics-guidebook-v1_01-february2014.pdf

this mobility. Currently, Exeter has 548 European staff (14%) and 1,328 European students (8%) working and studying here with 106 academic staff directly employed on EU awards, and an estimated further 140 research staff working on EU projects within research groups. Overall, EU funded research accounts for nearly 25% of our research portfolio. We are particularly concerned that, the recruitment environment is stable as itis essential for retention of very high-performing EU staff currently employed in UK universities and affects not only our research but the high quality of our teaching which is so crucially needed by the UK to address skills shortages for areas such as the high tech industries. Whilst the full impacts are yet unclear, we have already experienced reticence in recruitment to current positions in our strategic areas.

Access to funding: ***The levels and structure of funding is critical to the role of Exeter University for world class research and the place based economy.*** The value and structure of EU funding arrangements is critical to the UK; we are a net beneficiary of research funding streams such as the Horizon 2020 programme, standing at £8.8 billion to date for the UK and €31.6M/approx. £40M for Exeter. EU collaborative projects bring together project partners and consortia to create research synergies that are not possible within the funding resource or mechanisms that exist in the UK alone. Similarly, ERC funding schemes support ground breaking blue skies research projects, hence supporting leading researchers and their teams if required. RCUK currently cannot fund to such scale (in terms of project values and volume). For example Exeter's astrophysics department currently has 8 ERC grantees. Finally, structural funds are critical to our role in the regional economy: our Environment and Sustainability Institute (ESI), supported by £23m of ERDF investment, is a world class centre of research in the environment and sustainability fields. The ESI focusses on knowledge transfer and the commercialisation of intellectual property, developing the priority, identified by the Cornwall Economic Partnership[2], environmental technologies sector to help grow the economy of Cornwall and the Isles of Scilly by creating jobs and businesses.

Access to EU-funded research facilities. ***Exeter recognises the integral role of facilities in enabling research that can only be undertaken at critical mass.*** As a medium sized Russel Group University, we recognise the value of shared facilities. A reduction could have a severe long term impact as such facilities are only effective if shared on an international basis, enabling fundamental research at a scale that is un-fundable as a single entity. The long term and strategic nature, in relation to national investments, has also been highlighted by the Royal Society (The Royal Society, 2016).

Question 2: What the science and research priorities for the UK Government should be in negotiating a new relationship with the EU.

At this juncture, the University of Exeter believes that the UK Government should focus on counteracting uncertainty; securing access to future EU funding; and negotiating the UK's ability to influence the shape and direction of programmes. HM Treasury has now clearly stated that where UK organisations bid directly to European Commission funds (e.g. Horizon 2020) the Treasury will underwrite the payments of such awards even when specific projects continue beyond the UK's departure from the EU. This is an excellent step to reassuring our research community of the UK's commitment to its critical research base for the future development and prosperity of the UK.

[2] http://www.cioslep.com/assets/file/LEP%20Strategy%20summary.pdf

Now, pro-active steps to demonstrate that science is a critical part of the BREXIT negotiations is important to assure both UK and EU scientists that there will be continued ready access to critical funding mechanisms for research such as Horizon 2020 once the UK has left the EU.

A key priority will be our ability to influence the shape and direction of programmes. If removed it will effectively side line UK science from international discussions and deliberations. This will inevitably also impact on UK science policy and associated investment areas, where the current shape of EU funding complements UK investment. Influencing the shape of the future programmes is fundamental and critical to STEMM research, but of equal importance to the fundamental research of our humanities and social sciences communities. Consider for example the need for the UK to input to climate change sciences but also to the understanding and direction of social science research in this area as global change is required both in terms of technological developments but also our societies and cultural ability to assimilate necessary change effectively.

Question 3: What science and technology-related legislation, regulations and projects will need to be reviewed in the run up to the UK leaving the EU.

The University of Exeter recognises national and regional concerns for innovation, patenting, export and existing projects. The University of Exeter's portfolio of EU funded research, accounting for almost 25% of our research by value, is critical to our research competiveness and diversification of income as RCUK funding has become more constrained**.** Currently we have 131 live EU projects, where we lead 10 collaborative research and innovation projects. We currently hold 27 ERC awards, supporting disciplines exploring world leading exo-planet identification in Astrophysics to Amazonian Archaeology. The numbers demonstrate a raw value, but specific projects demonstrate the breadth. For example we lead key projects such as Helix (High-end Climate Impacts and Extremes) that will help industry and governments adapt to changes in climate under higher levels of global warming; and BlueHealth a multi-disciplinary consortium, across 28 countries, investigating how aquatic environments affect the health of Europe's population.

We are extremely concerned that companies with whom we currently have good relationships with may find the UK a less attractive place to undertake R&D. Already a significant proportion of R&D expenditure by industry in the UK is undertaken by companies not based in the UK. Without regional funding we doubt these companies will place their R&D centres in the UK. Without access to the H2020 SME programme the UK's ability to support the growth of innovative SMEs using schemes for proof of concept and validation of ideas will be much reduced. New programmes for innovation finance that are being proposed in the EU will also not be available to the start-ups in our incubators. This could be a major blow to high performing incubators such as the SETsquared partnership of which we are a member.

At a practical level, it would add a significant burden if we had to support export control procedures for all EU countries as well as for our partners wider afield. This is often required for collaborations that share materials for example.

Our inability to use the planned European wide patent framework could well be a disadvantage to UK universities who work with businesses across Europe, we believe access to this framework should be negotiated. Otherwise patenting for the UK in EU countries will be disproportionately high for the UK.

Question 4: The status of researchers, scientists and students working and studying in the UK when the UK leaves the EU, and what protections should be put in place for them.

Full rights are critical for existing residents and students. With 548 European staff and 1153 European students currently working and studying here, the University of Exeter urgently requires clarification on their rights (and those of their families) to stay and work in the UK, including their rights post retirement and the rights of students to work after their studies complete. In particular, we would urge the UK Government to issue unequivocal confirmation that individuals who have already acquired Permanent Residency will, after the UK leaves the UK, be treated exactly the same way as non-EEA nationals who have been granted indefinite leave to remain. We would also urge the UK Government to take early steps to reassure other individuals who are exercising their treaty rights working in the UK but who are unlikely to have acquired Permanent Residency by the time the UK leaves the EU that their position will be protected. Many of these individuals are engaged in academic activity which contributes to the UK's knowledge economy and it is essential that the Government commits to protecting their right to live and work in the UK; without this reassurance there is a risk that these highly skilled individuals will be attracted to move to other countries outside the UK. This assurance is also necessary ensure that the HE sector can continue to attract new highly qualified academic staff to the UK in the interim period while the UK negotiates the terms of its exit from the EU. Post Brexit, we expect full consideration for the needs of both employees and employers and controls must be designed so as to minimise the disruption and volume of work required so that the UK remains "open for business" and able to attract the brightest and the best to work and study here.

Question 5: The opportunities that the UK's exit presents for research collaboration and market access with non-EU countries, and how these might compare with existing EU arrangements.

The University of Exeter recognises the global nature of research collaboration and the opportunities for market access with non EU countries. Scientific excellence will continue to drive mobility and opportunities for further global collaborations may be an indirect result of Brexit, however the impact of legislation (visa's, taxation) and the perceived "openness" of any country will play a significant part.. As such, we cannot determine the opportunities at this point. What is clear is through forging partnerships and mechanisms as part of the EU, we are more influential and cost effective than as a single entity.

What other measures the Government should undertake to keep UK science and research on a sound footing, with sufficient funding, after an EU exit.

The critical measure for a post Brexit funding environment is to enable collaboration with equitable levels of funding to international competitors. However consideration to the methodologies for calculating full economic cost (FEC) rates in the future may be appropriate.

Appendix One – Exeter live EU Projects: FP7, Horizon 2020 and other schemes

Summary Table

Programme		Value(€,000)	numbers
FP7	Co-ordination	2,412	6
	partnering	9,135	30
	MC fellowships	1,568	10
	ERC	27,461	18
Horizon 2020	Co-ordination	3,350	4
	partnering	10,532	32
	MC fellowships	2,090	11
	ERC	15,663	9
Other	Co-ordination	0,655	2
	partnering	3,377	9
total		76,243	131

Project
Abandonment: People under Pressure: Settlement Abandonment and Human Responses to Environmental and Socio-Economic Stress during the Medieval and Post-Medieval Periods
ABIOMATER: Magnetically actuated bio-inspired metamaterials
ASYFAIR: Fair and Consistent Border Controls? A Critical, Multi-methodological and Interdisciplinary Study of Asylum Adjudication in Europe
Atlantic Climate: Variability and Trends in Atlantic Climate
AtlantOS: Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources
AtmosOcean: Response of the Atmospheric and Oceanic Circulation to a Warming Climate
AURES: Auctions for Renewable Energy Support: Effective use and efficient implementation options
AWESoMeStars: Accretion, Winds, and Evolution of Spins and Magnetism of Stars
BAMI: The Effect of Intracoronary Reinfusion of Bone Marrow-derived Mononuclear Cells (BM-MNC) on All-cause Mortality in Acute Myocardial Infarction
BASE:Bottom-up Climate Adaptation Strategies towards a Sustainable Europe
BEAt-DKD: Biomarker Enterprise to Attack DKD. Diabetic kidney disease
BLUEHEALTH: Health promotion and disease prevention
CANTOR: Carbon Nanotube Based Terahertz to Optics Rectenna
C-CASCADES : Carbon Cascades from Land to Ocean in the Anthropocene
CEFOW: Clean energy from ocean waves
CEReS:Co-processing of mine and electronic wastes: Novel resources for a sustainable future
CHASM: Convective Heat Transport and Stellar Magnetism
CHRISLAS: Christian Diversity in Late Antique Sirmium (ca 350 – ca 450): A Historical, Literary and Theological Study
CISGLA: Architecture and Asceticism: Cultural Interaction Between Syria and Georgia in Late Antiquity
C-LEAK: Rivers as leak in the terrestrial C sink
CLIMBER: Cross-layer Investigation and Integration of Computing and Networking Aspects of Mobile Social Networks
CoExAN: Correlations and superconductivity in layered materials
Connecting GEO: Coordinating and supporting Earth Observation research and innovation in the EU

CREATES: Classifying the Range of Exoplanet Atmospheres Using Transmission and Emission Spectroscopy
CREATIONS: Developing an Engaging Science Classroom
CRESCENDO: Advanced earth-system models
CRITICS: Critical Transitions in Complex Systems
DATASCIENCE:The Epistemology of Data-Intensive Science
DEBUNKER: The Problem of European Misperceptions in Politics, Health, and Science: Causes, Consequences, and the Search for Solutions
DIRECT: Diabetes REsearCh on patient straTification
DISKIMAGING: Imaging the Signatures of Planet Formation Using Spectro-interferometry
DTOcEAn: Design Tools for Ocean Energy Converter Arrays
ECOFLAM: The Impact of Plant Evolution on Fire Behaviour in Ancient Ecosystems
EMIF: European Medical Information Framework
EO4wildlife: Platform for wildlife monitoring integrating Copernicus and ARGOS data
E-TEX: All-organic devices in textiles for wearable electronics
EU-CIRCLE: A pan European framework for strengthening Critical Infrastructure resilience to climate change
EVOCOGN: Evolution of Cognitive Performance
EXTRABRAIN: Extracellular Brain Proteolysis in Neuronal Plasticity and Neuropsychiatric Disorders
FairTax: Revisioning the 'Fiscal EU': Fair, Sustainable, and Coordinated Tax and Social Policies
FAME: Flexible and Mobile Economic Processing Technologies
FixO3: Fixed Point Open Ocean Observatories Network
FLAIR: Flexible Hyperspectral Infrared Detectors
F-Pole: Significant or trivial: Fungi in Polar Ecosystems
FUNCTION: Deterministic Processes, Community Organisation and Ecosystem Functioning
GECO: Dynamics of Phase Oscillator Networks with Generalized Coupling
GENBLAST: Functional Genomics of Plant Infection by the Rice Blast Fungus Magnaporthe Oryzae
GIFTS:Genomic and Lifestyle Predictors of Foetal Outcome Relevant to Diabetes and Obesity and their Relevance to Prevention Strategies in South Asian Peoples
GLUCOSEGENES: The Causes of Hyperglycaemia in the Face of Rising Obesity
GRASP: Graphene-based Single-photon Nonlinear Optical Devices
GUIDEnano: Risks on Human and Environmental Health: Development of New Strategies and Creation of a Digital Guidance Tool for Nanotech Industries
GUPPYSEX: The sexual antagonism hypothesis and the evidence from guppies - an integrated programme of molecular genetic studies to fill fundamental gaps in our knowledge of sex chromosome evolution
H2S in Diabetes: Preclinical Efficacy Testing of Hydrogen Sulfide Donors Against Diabetic Complications
HELIX: High-end Climate Impacts and Extremes: Impacts of higher-end scenarios (global average warming & 2ºC with respect to pre-industrial level)
HENNOVATION: Practice-led innovation supported by science and market-driven actors in the laying hen and other livestock sectors
HiTech AlkCarb: New geomodels to explore deeper for High-Technology critical raw materials in Alkaline rocks and Carbonatites
I4S: Research and Competence Training Network for Sustainability-driven Innovation
ICARUS: Integrated Climate forcing and Air pollution Reduction in Urban Systems
ICE: Intelligent Community Energy
ImagePlanetFormDiscs: Imaging the Dynamical Imprints of Planet Formation in Proto Planetary Discs
IMPaCT: Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits
INHERIT:INter-sectoral Health Environment Research for InnovaTions
InterNom: Interaction Phenomena in Novel Materials

INTRAW: International Cooperation on Raw Materials
iPIE: Intelligence-led Assessment of Pharmaceuticals in the Environment
LAWALISI: LAWALISI: Law, Authority and Learning in Imami Shi'ite Islam
LOCALSTAR: Modeling Star Formations in the Local Universe
LUC4C: Land Use Change - Assessing the Climate Forcing and Options for Climate Change Mitigation and Adaptation
MagIC: MagIC: Magnonics, Interactions and Complexity: a multifunctional aspects of spin wave dynamics
MathModExp: The Evolution of Competition and Cooperation: How Polymorphisms in Microbial Populations Optimise Virulence and Mediate Drug Resistance
MATRICS:Multidisciplinary Approaches to Translational Research In Conduct Syndromes
MEDIT-AGEING: Investigating the impact of meditation training on mental health and wellbeing in the ageing population
MERIDA2: Management of Environmental RIsks During and After mine closure
MicroEcoEvol: Ecological and evolutionary forces shaping microbial diversity in freshwater blooms
Mid-TECH: detector system for DIAL and IPDA trace gas detection
Minerva: Research and Competence Training Network for Sustainability-driven Innovation
MONICALC: Integrated system for Monitoring and Control of Product quality and flexible energy delivery in Calcination (in the Minerals and Raw Materials Industry).
MooDFOOD: Multi-country Collaborative Project on the Role of Diet, Food-related Behaviour and Obesity in the Prevention of Depression
NANOMILE: Engineered Nanomaterial Mechanisms of Interactions with Living Systems and the Environment - a Universal Framework for Safe Nanotechnology
NatureEntangled: Entangled Histories of "Nature" in the Lanscape of Early Modern China and Europe
NeoMILK: The Milking Revolution in Temperate Neolithic Europe
NEWSPEC:New Cost-effective and Sustanable Polyethylene Based Carbon Fibres for Volume Market Applications
NOTEDEV: Novel Type of Terahertz Devices
OceaNET: floating offshore wind & wave energy
OPERA: Open Sea Operating Experience to Reduce Wave Energy Cost
OPERAS: Exploration of the operational potential of the concepts of ecosystem services and natural capital to systematically inform sustainable land, water and urban management.
OptimOre: Increasing Yield on Ore Production by Means of Advanced and Flexible Adjustment on Crushing and Separation Process
P450RESIST: Understanding and exploiting the insect P450 resistome
PAST: Pre-Columbian Amazon-Scale Transformations
PASTPLACE: The Past in its Place- Histories of Memory in England and Wales
PEARL: Prearing for Extreme and Rare Events in Coastal Regions
PEATmod: PEATland modelling for global carbon cycle and climate models
PEGASUS: The makeup of the modern horse: a history of the biological changes introduced by human management
PERFUME: Key to Cell Performance and Health
PHAGECOM: Complex parasite communities as drivers of bacterial immunity
POLPART: How Citizens Try to Influence Politics and Why - International Comparisons of Movement and Party Politics
PRISM: Psychiatric Ratings using Intermediate Stratified Markers
ProBio: A Process Ontology for Contemporary Biology
PRO-BONE: Effect of a Program of Short Bouts of Exercise on Bone Health in Adolescents Involved in Different Sports
PROTEGO: Procedural Tools for Effective Growth: H2020
PYROMAP: Palaeofire Danger Rating Maps and Earth's Last Major Global Warming Event
QOCaN: Quantum Optics of Carbon Nanostructures
QUESSA: Quantification of Ecological Services for Sustainable Agriculture

QUICK: Quality-of-Experience Improvement for Mobile Multimedia Across Heterogenous Wireless Networks
REGUCB: Regulating Umbilical Cord Blood Biobanking in Europe
RRI Practice: Responsible Research and Innovation
SARASWATI: Supporting consolidation, replication and up-scaling of sustainable
SIM4NEXUS: Sustainable Integrated Management FOR the NEXUS of water-land-food-energy-climate for a resource-efficient Europe
SIMOVET: Smart Innovation Models to adequately adapt vocational training to the labour market needs
SINGEK:Promoting SINgle cell GEnomics to explore the ecology and evolution of hidden microeuKaryotes
Slopes: Smarter Lignite Open Pit Engineering Solutions
SOCODEV: Social Development and Life History Evolution in Cooperative Mammals - an Integrated Approach
SOS-Nano: Structure – Oxidative Stress Relationships of Metal Oxide Nanoparticles in the Aquatic Environment
SPECS: Seasonal to Decadal Climate Prediction for the Improvement of European Climate Services
STAMS: Long-term STability Assessment and Monitoring of flooded Shafts
STATEMIG: Fitness Drivers in Long-distance Migrants - the Interacting Roles of Physiology, Social Biology, Ecological and Physical Environment
STATORG: State Encroachment on Civil Society? A Comparative Study of Parties, Interest Groups and Welfare-Providing Organizations in Contemporary Democracies
STELLARPROP; The Origins of Stellar Properties
STOICISM: Sustainable Technologies for Calcined Industrial Minerals in Europe
StratoClim: Stratospheric and Upper Tropospheric Processes for Better Climate Predictions
TEMPDEP: Biogeochemical responses to global warming: linking physiological, ecological and evolutionary mechanisms
TERMS Ocean: Transgenerational Ecophysiological Responses to Multiple Stressors in a changing Ocean
TOFU: Toward a New Generation of Multi-dimensional Stellar Evolution Models: the Tool
TRuStEE: Training on Remote Sensing for Ecosystem modElling
UTM: Updating the mind: The mechanisms behind behavioural change
VET-EDS: Effective forecasting as a mechanism for aligning VET and Economic Development Strategies
VIALACTEA: The Milky Way as a Star Formation Engine
VISION: Validation of Integrated Safety-enhanced Intelligent flight Control.
VOTEADVICE: Industry and Doctoral Training in Vote Advice Applications
WATER4INDIA: Smart, Cost-Effective Solutions for Water Treatment and Monitoring in Small Communities in India
WIDEST: Water Innovation through Dissemination Exploitation of Smart Technologies