



**Northumbria
University**
NEWCASTLE

INTERDISCIPLINARY RESEARCH THEMES

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This booklet contains QR codes to take you back to the related webpage which contains full details about the IDRT and its researchers.

FOREWORD

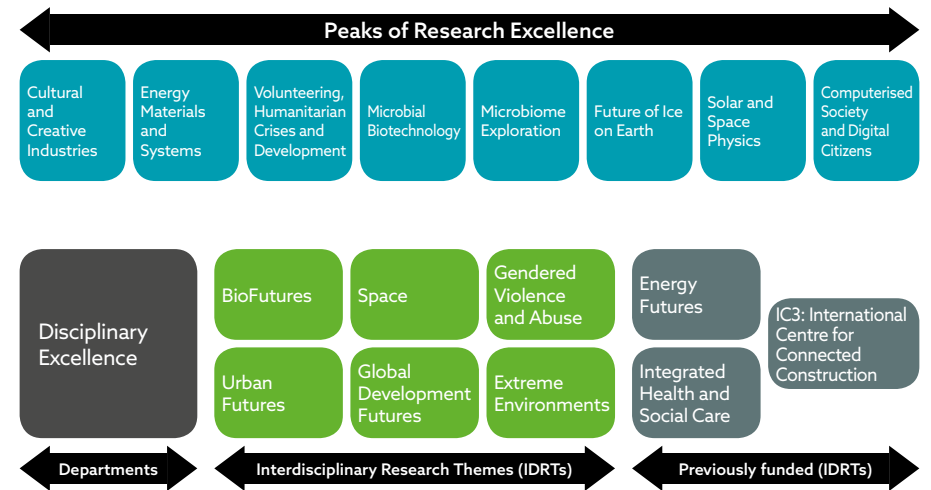


Thank you for wanting to learn more about our Interdisciplinary Research Themes (IDRTs), which are a vital part of our research landscape at Northumbria University. I hope that this booklet gives you an insight into what IDRTs are, what they do, how they work, and how they are funded.

We have a huge amount of truly excellent research in our Departments, most of which is focused on individual disciplines. IDRTs are specifically designed to create communities of practice which work across disciplines, enabling rich, collaborative discussions about research from a range of diverse perspectives to generate high quality research. We invest funding into the IDRTs to support these communities to get started and grow. At the same time, we have evolved our internal funding mechanisms to make them more transparent and inclusive, purposefully supporting the full range of research being undertaken at Northumbria.

Our intention is that IDRTs are funded for a maximum of six years, following which the communities and research undertaken becomes business as usual.

Our Research Landscape



Our Peaks of Research Excellence are more focused and cohesive areas of outstanding research, led by smaller groups who are leading research worldwide. Some have developed from IDRTs, others have grown from departmental research. The Peaks are areas that organically emerge from the high quality research that we do, we may support these strategically but mostly they are funded by external income.

Hopefully, this gives further insight into the way we are thinking about our research landscape.

Professor Louise Bracken

Pro Vice-Chancellor (Research and Knowledge Exchange)
Northumbria University



View our Peaks of Excellence



View our Interdisciplinary Research Themes

WHAT ARE INTERDISCIPLINARY RESEARCH THEMES?

Northumbria's Interdisciplinary Research Themes (IDRTs) are central to the research landscape of Northumbria University and deliver a wide range of research activities and outcomes.

IDRTs facilitate and generate world leading research programmes and activities to tackle global issues, pulling together interdisciplinary research spanning the breadth of departments to develop new communities of research. IDRTs operate at the intersections between departments and include more than one discipline to provide additionality to the high quality research being undertaken in departments and research groups.

IDRT Themes tend to align with the United Nations Sustainable Development Goals and provide a unique platform for collaboration to deliver cutting-edge, impactful research. IDRTs are funded for a maximum of six years. As IDRTs exit funding, competitions will be held to create new IDRTs.

WHAT DO IDRTS DO?

- Support, facilitate and generate world leading research programmes and activities to tackle global issues and turn interdisciplinary research into real-world solutions, often aligned to Sustainable Development Goals (SDGs).
- Provide additionality to research that is conducted routinely in departments.
- Raise the international, national and regional profile of these areas of research faster than would otherwise be possible, through the research environment of the IDRT, but also by working in collaboration with GM&B when appropriate.
- Attract external income in support of research, including large research grants, and the work of the IDRT.
- Facilitate strategic partnerships with individuals and organisations outside the university at regional, national and international levels.
- Deliver career development opportunities for staff and postgraduate researchers in line with the mission of the IDRTs and the concordat to support the career development of researchers.

BIOFUTURES

The challenge

Petroleum provides the majority of the world's energy and fuel requirements, accounting for approximately 90% of global transportation needs.

As a fossil fuel though it is a finite resource and contributes to pollution and climate change. Cost-effective, viable alternatives are crucially needed to replace the use of petroleum on a large scale.

Transitioning away from a petroleum society requires the creation of a competitive, innovative and sustainable bio-based economy.

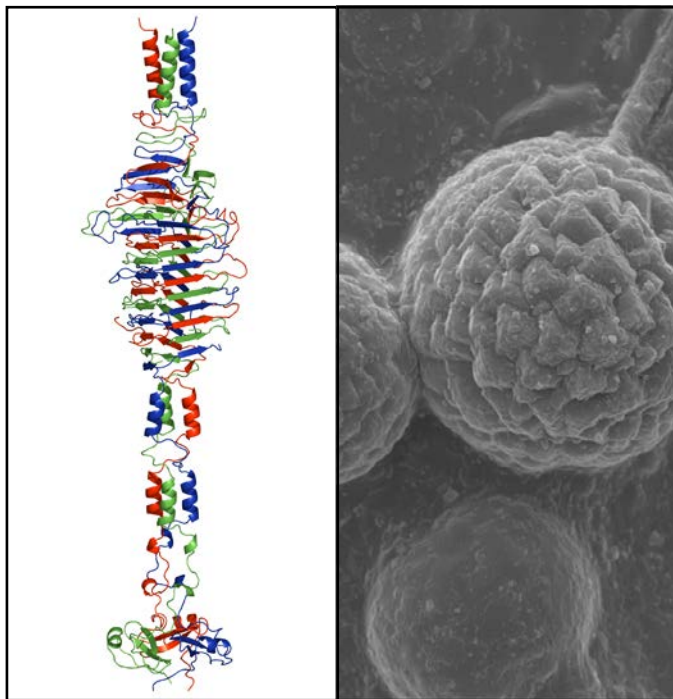


Image of the three-dimensional structure of a carbohydrate-active enzyme (Gary Black) and scanning electron microscope image of calcite crystals induced by bacterial cells (Meng Zhang), presented with permission.

What we do

The BioFutures IDRT explores and exploits biology to develop transformative solutions for a more economically and environmentally sustainable society. The research is challenge-led, incorporating design from initiation and developing solutions through biology-centred technology and engineering.

Currently we have strengths in

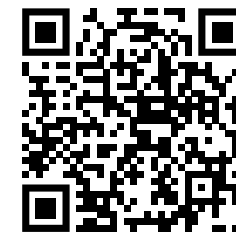
- AI for biological systems
- Sustainable materials
- Novel fabrication through biology
- Health technology innovation
- Smart wearables
- Waste valorisation
(any industrial processing activity that aims to reuse, recycle or compost waste materials so that they are transformed into useful products or sources of energy)

About us

The BioFutures IDRT works across departments to bring researchers from different faculties, particularly from the recently formed Peaks of Excellence, together to achieve truly interdisciplinary research and innovation. The BioFutures IDRT operates as a dynamic and fertile space to cultivate and test collaborations and ideas.

Find out more

northumbria.ac.uk/research/idrts/biofutures



EXTREME ENVIRONMENTS

The challenge

While human adaptability has enabled us to inhabit most of the Earth's surface, environments have always existed in which our survival is unviable without technological aid. We think of those environments as extreme but must recognise that the definition is an anthropocentric one; even the environments considered most extreme from a human perspective host some life, while many organisms struggle to survive in conditions humans might regard as benign.

The challenge for all species, including our own, lies in their ability to adapt as conditions change, making once habitable environments extreme.

What we do

The key to sustaining the future habitability of our planet for all life rests on our ability to understand environmental change and how, where and when such change causes a transition to extreme conditions. To address that challenge requires a systematic study of environmental extremes and how they have evolved in the past, combined with the development of techniques and technologies that can function under extreme conditions.

These developments will enable us to access and sample extreme environments and thereby undertake the research that will allow us to understand and quantify future changes.

The Extreme Environments IDRT brings together expertise from across research groups, departments and faculties to tackle all aspects of the problem including:

- The processes that create and alter extreme conditions
- How those processes drive wider environmental change and extreme events
- How humans and other organisms cope with extremes and adapt to change
- How the technology that we depend on can be made to function in extreme conditions

About us

We are a diverse collection of researchers, currently numbering around 90, drawn from across the University, working towards a varied range of science goals under the broad theme of environmental extremes and change. By working together across a wide range of disciplines, we are able to share ideas and expertise, gaining from the distinctive ways of thinking about and tackling common problems, and identifying and exploiting synergies that can enhance our research outcomes and open up new avenues of investigation.

Find out more

[northumbria.ac.uk/research/idrts/
extreme-environments](http://northumbria.ac.uk/research/idrts/extreme-environments)



GENDERED VIOLENCE AND ABUSE

The challenge

Violence against women – particularly intimate partner violence and sexual violence – “is a major public and clinical health problem and a violation of women’s human rights” (World Health Organization). One in three women across the planet experiences this type of violence. Its ripples also affect many others, including family and community members of perpetrators and victim-survivors, practitioners in support services, and all the institutions and workplaces in which it occurs such as the law, education, health, politics and entertainment industries. As well as having significant, lasting effects on their health and well-being, it also prevents women playing an equal part in society and restricts their freedom.

We are in the midst of unprecedented public and political attention to forms of gendered violence such as intimate partner violence, coercive control, sexual abuse, and digital gendered violations. The time is ripe for developing research-based innovations that improve responses and prevent it from happening.

‘Speak Up Leeds’ wall art by Harriet Wood in collaboration with Get Away Girls Leeds and Leeds City Council



What we do

Our researchers fuse academic and practice-based disciplines and work with practitioners and policy-makers to better understand the complexities of these forms of violence and to design feasible, effective solutions to gendered violence and abuse that have meaningful impacts. We have particular strengths in researching an emerging form of gendered violence - digital gendered violations - and a ‘wicked’ problem - domestic abuse. We recognise that no single discipline has the answers to the complex problems of gendered violence and abuse and so develop inter-disciplinary collaborations to analyse and address the social, political, and cultural structures and technological systems that enable and perpetuate GVA.

About us

We are a diverse group of around 65 academics at Northumbria University from across a wide range of disciplines. We have varied backgrounds in academic research, professional practice, policy-making and activism. Many of us are involved in volunteering and are on Boards of organisations in the violence against women sector. We devise effective collaborations with a range of partners to find meaningful solutions to gendered violence and abuse. This includes involving victim-survivors as co-producers of research outputs and centring lived experience as a priority.

Find out more

northumbria.ac.uk/research/idrts/gendered-violence-and-abuse



GLOBAL DEVELOPMENT FUTURES

The challenge

Communities across the world, and the planet itself, are facing the intersecting challenges of inequality, poverty, conflict and the climate emergency.

There is an urgent need for a step change in the ways the world seeks to tackle these challenges in order to improve the lives and livelihoods of vulnerable communities and build more equitable and sustainable models of development.

Attempting to tackle these global challenges is not new. But historic inequalities have not been addressed, while social, economic, political and cultural ideas from the Global North have dominated thinking about how to address inequality and promote sustainable development. As a result, the knowledge, ideas and experiences of communities in the Global South have often been relegated to the margins. The production of research and knowledge has not taken place outside these inequalities, and has often taken place in silos that limit the innovations and transformations needed to tackle the world's pressing global challenges.

What we do

The Global Development Futures IDRT focuses on enabling and promoting research, knowledge and learning that supports the lives, livelihoods, economies and environments of countries in the Global South.

The IDRT has three interconnected priority areas which bring together Northumbria expertise from across faculties:

- Climate, crises and disasters
- Mobilities and displacement
- Community action and innovation

To ensure Northumbria's Global Development research in these areas is ethical, relevant and has impact, the IDRT particularly supports and enables equitable partnerships with communities and stakeholders in the Global South, bringing groups together to collaborate across disciplines and sectors.

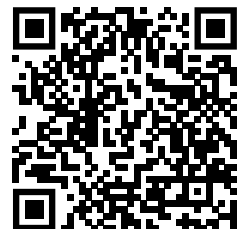
About us

The Global Development Futures IDRT is an inclusive community of Northumbria academic and professional services staff, students and partners working collaboratively together to create high quality research, knowledge exchange and learning in global development.

We work closely with leading global actors to shape policy, including the United Nations and International Federation of Red Cross and Red Crescent, as well as with vulnerable communities, civil society organisations and governments in Latin America, Global South and South East Asia, Africa and the Middle East.

Find out more

northumbria.ac.uk/research/idrts/global-development-futures



Art on the walls of the Antonio Guterres Urban Refugee Centre in Kampala. Source: Matt Baillie Smith

SPACE

The challenge

Space is essential to modern life. Smartphones, GPS navigation, aviation and weather forecasting are instances from the myriad of daily-life interactions enabled by space-based technology. Humanity's present and future security and prosperity depend on satellites.

New technologies and cheaper access to space enable us to more deeply explore Earth, the solar system, the Universe and deliver new global services like space-enabled internet, and make new scientific discoveries in zero- and partial-gravity.

Our immersion in space-related technology is changing how we think and govern. Humanity is exploring the solar system using robotic probes and crewed missions, and the Universe using space-based observatories. Space is also a bioscience laboratory, providing a unique environment for insights into human health and developing new therapeutics. Microgravity presents both challenges and opportunities for efficiently creating the food, medicine and organic materials needed for crewed solar system exploration, which may help address Earth's sustainability crisis.

However, space is a harsh environment, fizzing with high-energy radiation and rapid streams of particles. As space becomes more accessible, the complexity of protecting an astronaut's health upon returning to Earth extends beyond just rehabilitation from weightlessness. It proliferates into progressing legal and political frameworks and evolve societal and cultural responses to protect astronauts and technology. As a consequence, the Space IDRT includes researchers from across the arts and humanities to develop critical and creative approaches to space science and technology that yield constructive provocations and new perspectives.



What we do

Northumbria has a diverse and excellent portfolio of research with applications to space. Our community includes engineers, physical and mathematical scientists, and experts in our natural environment, human society, biology, economy, law and politics. We are also home to the North East Space Skills and Technology centre (NESST), opening up diverse opportunities for space-related and space technology research.

There are already many examples of inter-disciplinary successes across the University including in Communications Technology, the Aerospace Medicine and Rehabilitation Laboratory, Space Law, Cultural Negotiation of Science, Geography and Earth Sciences, and the Solar and Space Physics Peak of Excellence.

About us

The Space IDRT is a year old and is open for interested researchers to join and find out about what we do and help shape the future of space-related science at Northumbria and beyond.

Space brings together researchers with diverse interests in emerging space research areas, to stimulate new ideas, enhance excellence and drive innovation in the exploration and use of space for humankind.

Find out more

northumbria.ac.uk/research/idrts/space

Copyright ESA (European Space Agency)

URBAN FUTURES

The challenge

The majority of the world's population is now located in urban areas. Cities are engines of value creation, innovation, and creativity, but urbanisation also presents significant challenges, including the availability of affordable/accessible housing, uneven development, mobility constraints, rapid scaling of service provision and infrastructure, public health risks associated with urban living, public order, community cohesion and inclusiveness, and environmental footprint. Cities can also play a critical positive role in addressing broader challenges such as the climate emergency, sustainable development, and ageing. None of these challenges can be addressed without a multi-disciplinary approach that inspires critical thinking, innovation, inclusivity, and collaboration.

What we do

Urban challenges are complex and interrelated, and they are often exacerbated by inequalities. They require multifaceted, innovative solutions and coordinated efforts from governments, local authorities, academics, and local communities. We take an inclusive approach

that focuses on the collective aim of creating liveable, equitable, and resilient cities. Fundamentally, we work to improve quality of life and sustainability in urban areas, taking a human-centred approach – summarised as “People, Place, and Planet”.

To facilitate and nurture interdisciplinary dialogues, Urban Futures is structured around several challenge-based thematic communities:

- Safety and security
- Democracy and governance
- Resilience and sustainability
- Health and wellbeing
- Mobility and transport

These thematic communities are underpinned by four “horizontal” cross-cutting themes which lie at the heart of our overall approach:

- Digital, data, and technologies
- Policy making
- Design
- Co-production

By emphasising a range of impact types (policy, scientific, technological, cultural, economic, social, intellectual, etc), grassroots co-production, technological innovation, and a range of critical and interpretive perspectives and methodologies, we ensure that Urban Futures is inclusive, distinctive and robust.

About us

Urban Futures draws on world-leading research and practice across a wide range of disciplines and specialisms, across all University Faculties, and has a well-established network of external partnerships with grass-roots community groups, local authorities, government bodies, businesses, health agencies, police authorities, professional bodies, research centres, charities, and policy groups.

Find out more

northumbria.ac.uk/research/idrts/urban-futures



Photo Credit: Andre Benz

PREVIOUS IDRTS

Previous funded IDRTS include Energy Futures, Integrated Health and Social Care and The International Centre for Connected Construction (IC3). These groups are no longer funded, instead their activities have been absorbed into Departments and Research Groups.

ENERGY FUTURES

Energy Futures is a community of research excellence in renewable and sustainable energy, recognising that achieving clean growth is fundamentally a multidimensional challenge which transcends disciplines and requires research with impact. Energy Futures drove forward innovative research-driven approaches to create a cleaner energy future, spanning photovoltaics, thin film materials, batteries, materials characterisation, electrical power engineering, heat, sustainable design, bioenergy and the built environment.

northumbria.ac.uk/research/energy-futures



INTEGRATED HEALTH AND SOCIAL CARE

Integrated health and social care addressed the challenges of wellness, healthy ageing and health inequality, supporting every sector of the community by promoting health equity to achieve five extra healthy years of life while promoting higher quality of life. The Theme worked to manage prevention of long-term conditions via tech-enabled and non-tech interventions. Engaging with marginalised groups and optimise social, physical and mental determinants of wellbeing across all life stages.

northumbria.ac.uk/research/integrated-health-and-social-care



IC3: INTERNATIONAL CENTRE FOR CONNECTED CONSTRUCTION

IC3 addressed the central challenges recognised by the construction industry, with the mission of developing, exploiting and connecting technology to address the persistent sector challenges. Enabling the creation and adoption of smart and sustainable whole-life strategies across all aspects of the construction industry.

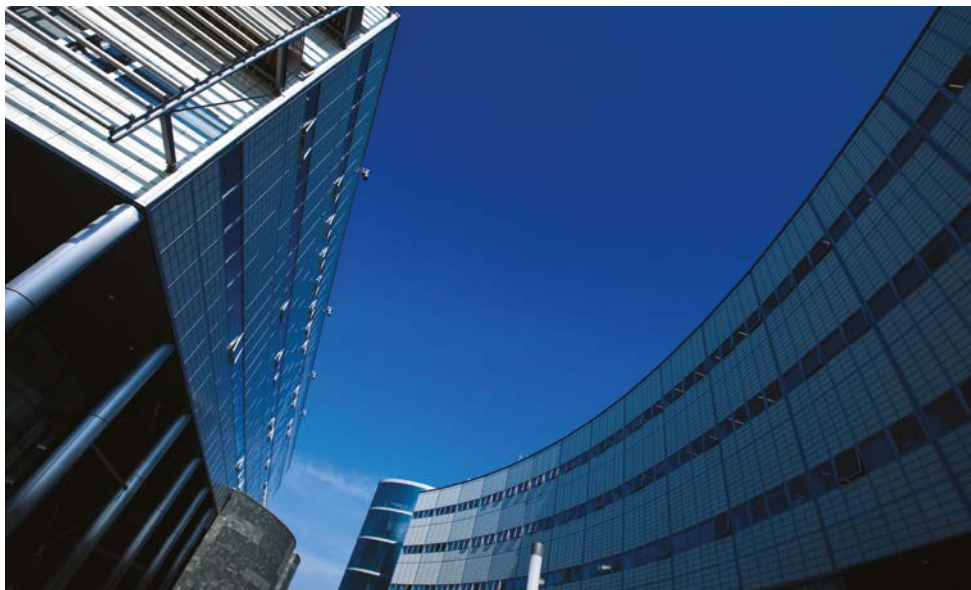
northumbria.ac.uk/ic3



IDRT INVESTMENT

The University enables IDRTs to achieve success by offering the following support:

- IDRTs are usually funded for a period of six years subject to successful completion of a periodic review.
- A PhD student from Research Development Fund (RDF) funding will usually be provided annually.
- A small annual budget is available to support research activities.
- Support from Research and Innovation Services (RIS) to organise events, manage spend, develop research grant applications and help deliver impact. Each IDRT will be supported by a nominated contact person in RIS.
- Support to publicise the research and activities undertaken within the IDRT.



IDRT GOVERNANCE

IDRTs have three-year strategies which include their mission, goals and objectives, supported by an annual operational plan of activities.

IDRTs are evaluated through a periodic review undertaken every three years and by a light touch annual monitoring process.

Core Management principles

- The PVC(R&KE) oversees IDRT performance.
- IDRT Leads receive a 0.2FTE recognition on their departmental administrative workload.
- An IDRT Management Group supports the IDRT Lead in delivering the Operational Plan and IDRT Strategy. This should have representation from each Faculty and ECRs.
- IDRTs offer strategic opportunities for staff to increase management experience and support career development.
- There are significant benefits to departments from having staff involved in IDRTs (e.g. income generation, developing new research collaborations, new opportunities for impact).



GET INVOLVED

Visit the webpage below to:

- Contact IDRT lead(s) to express your interest in getting involved.
- Join IDRT mailing lists to receive updates.
- Find out how to apply to establish a new IDRT.

northumbria.ac.uk/research/idrts





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