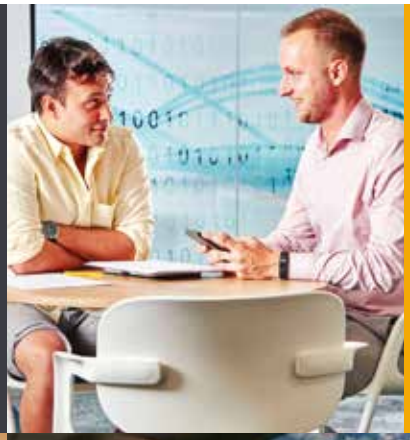
UNIVERSITY OF LEEDS



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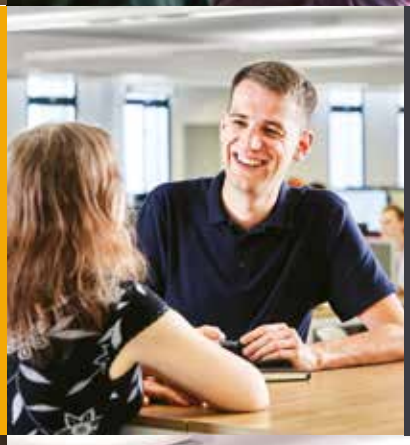
LEEDS *Institute for Data Analytics*



ANNUAL REPORT

Academic Session 2017/18

Contents

LEEDS *Institute for Data Analytics*

Welcome

Data science is changing the world. It is evident in every walk of life from medicine to manufacturing, service provision, or even law enforcement that future progress is now heavily dependent on the deployment of artificial intelligence, machine learning and data analytics. It is no surprise that the Government's new Industrial Strategy recognises "artificial intelligence and big data" as one of four grand challenges for future growth and prosperity of the UK.

The Industrial Strategy also highlights the importance of leading Universities playing a significant role in "turning ideas and research into products and services on which the industries of the future will be built."

We are responding to this emerging need in a number of ways – through world class research, new programmes for education and skills development, the provision of advanced computational infrastructures and the co-production of knowledge with key external partners. These ways of working are already well embedded at Leeds thanks to significant University and Research Council investments in the Leeds Institute for Data Analytics (LIDA), which has become rapidly established over the last four years as a Centre for Innovation in research, education, partnership and curation of big data.

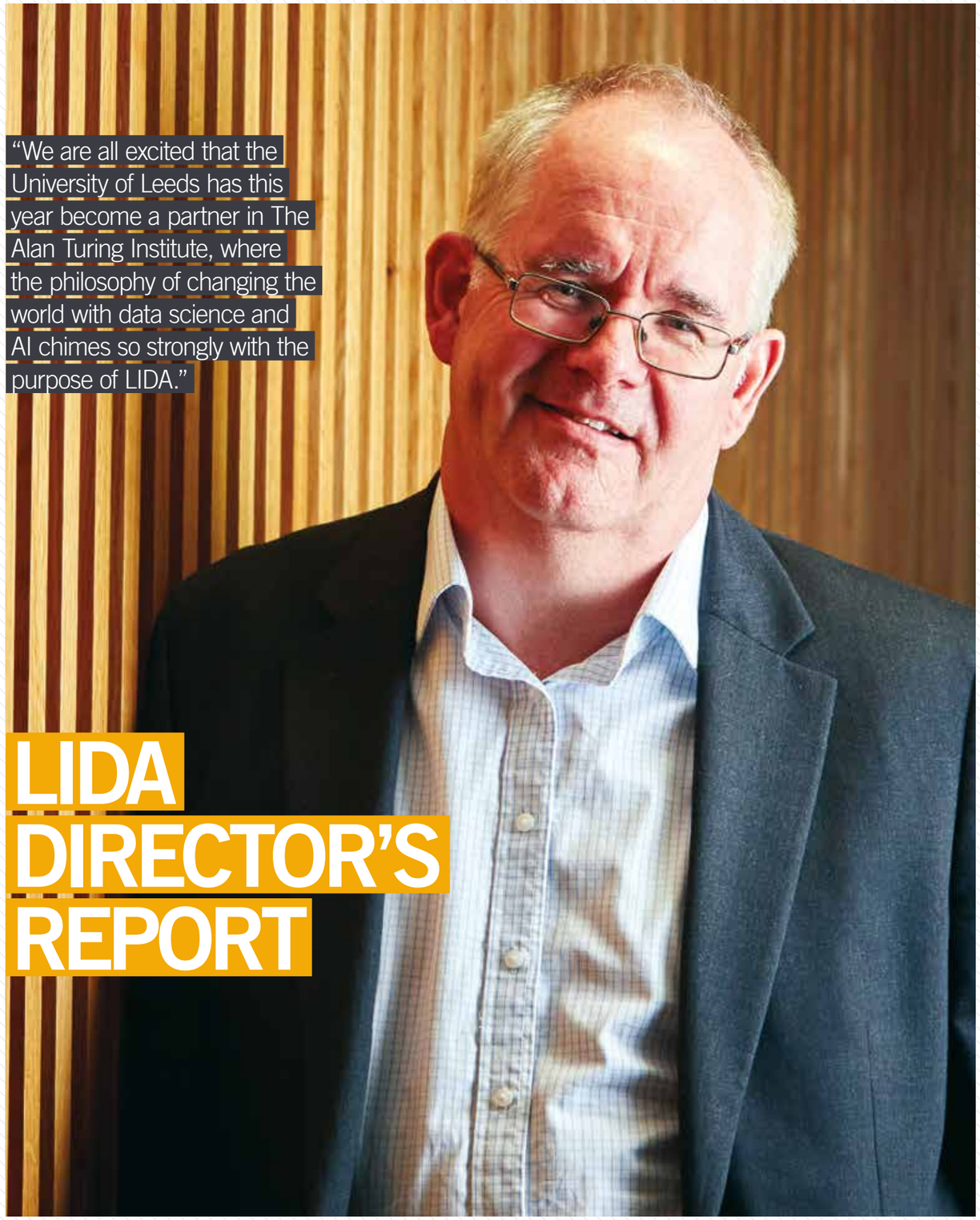
I am very proud of the fact that Leeds is a partner in The Alan Turing Institute which is now moving forward as the UK's beacon of excellence in this space. In response to the Industrial Strategy, independent reviews and a House of Lords report on the digital economy, the Turing Institute has this year extended its remit as a national centre for data science to include artificial intelligence. We are delighted that Leeds is playing a leading role amongst the partner universities in shaping the academic strategy and future development of the Turing. This relationship is further propelling LIDA's national leadership and research excellence in urban analytics, medical informatics and fundamental research in artificial intelligence and data science.

Major research investments can play an essential role in catalysing local economic growth as well as driving forward scientific innovation at national and international scales. This is certainly the case for the Leeds City Region, where future advances in Fintech, Medical Technologies, digital, creative and media will benefit from the creation of a shared ecosystem which promotes constructive and collaborative engagement between businesses, civic organisations, professional services and universities. LIDA is playing a key role in driving the Leeds City Region forward as a centre for digital innovation at a global scale.

Much progress has already been made, and the prospects for data analytics are bright. Nevertheless the future remains to be shaped. The University is fully committed to supporting the progression of LIDA through continued investment and strategic alignment across our academic disciplines and educational programmes. Whilst LIDA is already a major success story, it has probably only just begun to scratch the surface of its long-term potential and I very much look forward to the next few years and seeing what LIDA can achieve.

Professor Lisa Roberts

Deputy Vice-Chancellor
Research and Innovation, University of Leeds



LIDA DIRECTOR'S REPORT

Continued acceleration in the growth of LIDA over the last year is clear and quantifiable. From our initial base of two Research Council Centres, the Institute now houses more than 36 projects and programmes, with a combined value exceeding £50 million.

Between LIDA and the Consumer Data Research Centre (May 2017-2018), we have received 71,657 website visits from more than 47,000 unique users. In addition the CDRC alone has acquired 5,869 registered users and our data has been downloaded on 106,023 occasions. In this annual report you will find further detail on research, education, partnerships, and many other rich and diverse activities for which LIDA's reputation is now becoming established.

In order that LIDA can continue to expand and develop to new levels, I am delighted to welcome four deputy directors who will take up new posts on 1st September 2018. Mark Gilthorpe, Roy Ruddle, George Ellison and Luke Burns bring a variety of experience including visualisation, observational data research, demographic profiling and critical data studies. It is evident that these appointments will not only add capacity to the Senior Management Team and increase LIDA's control over key portfolios, but also increases the range of multi-disciplinary expertise, applied interests and technical prowess amongst our leadership. I am looking forward enormously to working with the new team.

Over several months stretching back into the last reporting period, a number of colleagues at all levels have supported LIDA Senior Management Team in the preparation of our first Strategic Plan. Following widespread consultation amongst stakeholders, five overarching themes will support the ambitious goal of **Shaping Our Future with Data**.

(1) World class research

World class research is the lifeblood of a Russell Group University. The national Research Centres at the heart of LIDA provide a powerful engine for innovation which are now generating novel research outputs and abundant publications through peer review. Our special emphasis on creating new academic collaborations addresses an important need for an interdisciplinary approach to complex social and environmental challenges which is increasingly recognised. It is a delight for me as director to work continually with colleagues in areas as diverse as climate change, smart energy systems, food informatics and cyber-crime.

In assessments of research excellence, external impact and the quality of the research environment are two other vital measures against which LIDA's influence is transformative. The platform which we are creating will provide substantial benefits for many future generations.

We are all excited that the University of Leeds has this year become a partner in The Alan Turing Institute, where the philosophy of changing the world with data science and AI chimes so strongly with the purpose of LIDA. Working alongside the national Centre of Excellence will provide an additional channel to collaboration with the very best organisations in this country and further afield.

(2) Training and Education

The skills gap in data analytics has been widely recognised at regional, national and global scales and has further highlighted the need for data analytics training and education at all levels. Government policy is becoming quickly attuned to the economic and market needs. Recent Parliamentary reports and the Industrial Strategy recommend the adaptation of the education system to meet these requirements.

Whilst I agree with the reports that it will take time to implement changes across the board, I was encouraged to see that a number of the areas highlighted for development, such as post-doctoral research, professional training and executive education are amongst those in which LIDA has already invested significant resources over the past few years.

As part of our commitment to build capability at all levels, Leeds pioneered the development of advanced training in data analytics through our Consumer Analytics and Marketing Strategy (CAMS) programme (see page 14). A successful model which has now been reproduced in health informatics and artificial intelligence.

The next step along this road is to embed data analytics within the undergraduate curriculum more deeply. I am confident that our established relationships with colleagues across all faculties will offer the perfect springboard for rapid and successful diffusion of new programmes and content.

(3) Research Technology

Considerable effort has been expended in the design and implementation of the systems and processes which are necessary for the secure management of data. In 2018, LIDA's Integrated Research Campus successfully retained accreditation to the international ISO standard for data protection and management. This robust information technology leaves LIDA ideally placed to adapt comfortably to increasingly demanding legal requirements amongst which the General Data Protection Regulation (GDPR) has been a notable development in 2018.

Of similar importance in our view are both ethical and public dialogues around the exploitation of data. Some of these questions are procedural, for example embedding data ethics into the research approval processes which govern release of data. Moreover, the involvement of academic colleagues with deep knowledge of the law and of the philosophical and ethical underpinning of data science, robotics and artificial intelligence provides an additional and uniquely valuable strand to our multi-disciplinary tapestry of collaboration.

LIDA exists because of our passionate shared belief that research with data benefits economy, society and the individual. Taking the public with us, alongside the institutions of government and law, is a fundamental prerequisite for future prosperity and social well-being.

(4) Partnerships

We do not undertake our research in isolation, external partnerships are crucial to our success. Our aim is to use data to tackle real world challenges and we recognise that to do this we need to work in partnership with the organisations facing those challenges. Our existing partners work with us in a variety of ways from shared supervision of an MSc project, postgraduate internship or PhD dissertation; data sharing for collaboration with Leeds or more widespread distribution; providing strategic advice to a research project, contributing to the design and delivery of taught programmes, attending short training courses or seminars.

These partnerships are mutually beneficial, not only do our partners benefit from our research expertise, we are increasingly seeing them turning to us in order to recruit the best graduate talent from our programmes. Some of our partners are also choosing to co-locate with us – earlier this year we welcomed Pinpoint Cancer to the group of organisations who are co-locating personnel within LIDA.

A growing recognition of the importance of geography, for example within the Strength In Places programme, is good news for LIDA and the city of Leeds. The coordination, exploitation and enhancement of our substantial digital assets is a longstanding civic agenda with commitment from the very highest levels. Our recent trade mission to the city of Boston was a good example of progress towards city-wide alignment between the council, health sector, universities and business, as well as an important opportunity to project the Leeds brand onto a global stage.

"LIDA exists because of our passionate shared belief that research with data benefits economy, society and the individual."

(5) Culture

LIDA brings together over 200 researchers, students, interns and support staff and since the Institute was established we have worked consistently to embed a culture of team working and collaboration throughout. This year we hosted our first corporate away day, bringing colleagues together in a relaxed and constructive environment to explore the topics of communication, purpose and teamwork.

Whilst successful organisations will always seek opportunities for improvement, I believe that LIDA is well along the road to creation of an ethos of collective endeavour, collegiality and team spirit which creates space for the celebration of achievement as well as its realisation.

Leeds is a great university, with research power in every major field of academic inquiry. In view of the foundations which have now been laid, and given the strategic global importance of data science and AI, combining these assets in a sympathetic and flexible way will give LIDA every opportunity for sustained international leadership in data analytics.

Professor Mark Birkin
LIDA Director

LIDA RESEARCH AND INNOVATION

Digital technology now touches nearly every aspect of our lives, and the challenge organisations face is rarely lack of data, but how to make best use of the data they have.

LIDA's data-driven research and innovation helps organisations meet this challenge, drawing on expertise from every Faculty across the University of Leeds. Our founding strengths of health informatics and consumer data still form a large part of our portfolio. We host major Research Council-funded centres in both fields: the MRC Medical Bioinformatics Centre and the ESRC Consumer Data Research Centre.

But our research touches many other fields as well. One of our fastest growing research areas is Urban Analytics, working with the wealth of data being made available through new technologies such as smart tickets, environmental sensors and smartphone applications for personal mobility and healthy lifestyles. This work supports local government and city planners to create a better environment for people in urban areas to live, work and play.

The ambition for all of our data-driven research is to help organisations generate useful insights from their data that will make a difference to people's lives, improving products and services and tackling a range of social and environmental issues.

A large proportion of our research projects are collaborations with external partner organisations (see page 18), who often both provide data and benefit from the insights drawn from it. The demand for this data-driven research is clear: since last year, the centres, projects and programmes based at LIDA have more than doubled, now numbering 36, and the total value of our research portfolio is now more than £50 million.

Key strengths

- Health Informatics
- Urban Analytics
- Statistical and mathematical methods

Urban Analytics

Using population data to inform infrastructure investment

So many of the services that we all take for granted – water, digital connectivity, transport, or energy – require huge amounts of planning to get right.

Because the systems underpinning these services are so complex, the business of making decisions about where to focus investment requires sophisticated analytical support.

This is where the MISTRAL programme, delivered by the UK Infrastructure Transitions Research Consortium (ITRC), is proving invaluable. ITRC brings together seven UK universities, including Leeds, to help utility companies, engineers and government organisations to understand the risks and benefits of different infrastructure investment approaches.

Key to delivery of any service is understanding how populations will change and grow, and this is where Leeds Institute for Data Analytics plays a vital role. A team comprising Nik Lomax, Andrew Smith and Mark Birkin, are producing highly detailed projections of population and household growth, based on sources such as the UK Census and the Land Registry.

The team use microsimulation techniques to prepare population estimates at the level of individual households. This information is provided to researchers within MISTRAL's different modelling teams. Projections generated by the team were also recently used as evidence in the National Infrastructure Assessment.

"We're working with MISTRAL researchers at LIDA because we need to understand where and how to plan our investment to effectively address future flood risks, and also how to tailor our services to meet the changing demographic of those at risk."

Jacqui Cotton
Principal Scientist in the Environment Agency's Flood and Coastal Erosion Risk Management Research and Development team

Read the full case study:
lida.leeds.ac.uk/mistral

Health Informatics

Data with the power to improve cancer care

Diagnosis, treatment and outcomes from bowel cancer vary significantly across different parts of the country and different groups of people. To see where change is needed to reduce inequalities and improve survival requires drilling down into data on thousands of bowel cancer patients. This is what LIDA's Bowel Cancer Intelligence UK (BCI UK), led by Professor Eva Morris, aims to achieve.

The project is seeking data on waiting times, GP appointments, hospital records, clinical trial outcomes, pathology reports, screening programmes, genetic analysis, radiotherapy and chemotherapy treatments, to name but a few. These data are linked together at patient level, for cross referencing and analysis, while remaining extremely secure.

The combined data will be held by the National Cancer Registration and Analysis Service, part of Public Health England. The BCI UK team are creating and running algorithms that enable these datasets to be linked to create an anonymised version that can then be made available for research use and reporting, subject to stringent approvals. Funded by Cancer Research UK (CRUK), this will be known as the Colorectal Cancer Repository, or CORECT-R. CRUK and Yorkshire Cancer Research are also funding BCI UK to carry out the first research using the combined datasets.

"What's most important is the opportunities the data provide to improve the outcome of people's health. This research won't be gathering dust on a shelf, and that's what motivates me to be part of it."

John Barnes
Member of the Programme's Patient-Public Group

Read the full case study:
lida.leeds.ac.uk/bciuk

Urban Analytics

Incentivising more sustainable transport choices using ICT services and smartphone

The problems of an oversaturated transport system and heavy reliance on single-occupancy car as a means of transport are well established. The consequences for the environment, energy demand (particularly where the car uses conventional petrol or diesel fuel) and for health, impact everyone.

Many of the measures previously used to reduce the use of single occupancy, conventionally fuelled vehicles (CFV) have been based on discouragement through regulation, taxation, restrictions and other punitive approaches. These have a number of disadvantages, particularly as they are largely based on 'one size fits all' and don't take into account individuals' travel needs, constraints and lifestyles.

The EU funded H2020 EMPOWER project takes a very different approach based around positive incentives delivered through smartphone apps, i.e. 'carrots rather than sticks'. The EMPOWER project has a consortium of 11 partners from across Europe (Netherlands, Sweden, Finland, Germany, Turkey), plus the United Nations Human Settlements Programme, with the University of Leeds leading the team. A wide range of positive incentives schemes have been designed and implemented 'in real life' with large numbers of the travelling public (between a thousand and fifteen thousand people) in each of eleven European cities or regions.

Positive incentives (points, prizes, rewards, information, social support) are offered in a tailored way to members of the public via an app, which they download onto their smartphone. With the individuals' consent, two-way data exchange takes place so that further incentives can be offered in a meaningful way.

The Leeds Institute for Data Analytics supports the research as the scheme generates very large volume individual location, mode choice and other micro-level data for each trip. These sensitive data need secure storage and research access protocols, such as those provided by LIDA infrastructure.

A team led by Professor Susan Grant-Muller has been applying new techniques to analyse these large volume data and produce meaningful insights into the travel choices people make in response to incentives. The data generated is rich in terms of completeness and context, however the datasets are complex to analyse as individuals engage and disengage with the schemes.

The analysis and modelling approaches developed are producing novel insights on the power of positive incentives in reducing the use of CFV. However as Professor Grant-Muller explains:

"The research is also demonstrating the immense value of new and emerging data forms in decision support for transport, health and the environment by city stakeholders."

Professor Susan Grant-Muller
Institute for Transport Studies
University of Leeds

Urban Analytics

Dynamic data will help planners tackle crime and pollution

Understanding how people move about within towns and cities could offer huge benefits for improving services such as crime prevention, traffic management or pollution control. But building dynamic models that can provide that kind of data poses a big challenge.

The SURF project (Simulating Urban Flows) is tackling this by harnessing new developments in big data collection and analysis. Using information from social media, mobile phone usage and other sources, LIDA researchers are building an 'agent-based model': a computer programme that can simulate the individuals (people in this case) who ultimately drive a system.

They would like to use their simulation to reveal information about how many people use the city, and where the biggest crowds form. Ultimately this could help planners to understand where social problems will have their biggest impact – for example where and when a pollution hotspot will impact on the most people.

This type of system is incredibly complicated to produce, so the team is working initially on a more contained project, focusing on commuter behaviour in the town centre of Otley, just outside Leeds.

The project is extremely ambitious, and has led to a further £1M award from the European Research Council to continue the work. The follow-on project, entitled DUST will focus on how to incorporate real time data into the simulation. Dr Nick Malleson, the lead researcher, was awarded the Gill Memorial Award for outstanding early career research in agent-based social geography from the Royal Geographical Society for his work on this and other projects.

Read the full case study:
lida.leeds.ac.uk/surf

Health Informatics

A personalised approach to lymphoma treatment

Each year, around 12,000 patients are diagnosed with lymphoma, a type of cancer that affects white blood cells. Some will respond to standard chemotherapy, while the remainder need to be treated with new types of therapy alongside conventional drugs.

The Precision Medicine Consortium, led by the University of Southampton and funded by the charity, Bloodwise, is developing methods of characterising large B cell lymphomas – the largest group of lymphomas – to help identify which patients will benefit from the new therapies.

Project partners analysed blood and tissue samples from over 1000 lymphoma patients to pinpoint particular genes, genetic mutations and chromosomal abnormalities that might be useful in identifying particular types of lymphoma.

A team at LIDA, led by Professor David Westhead, then used machine learning to understand which elements of the data provide the most accurate profile of the disease – and predict most accurately how it will respond to specific treatments.

The team created a digital platform that can be used to rapidly screen selected genetic information to identify subgroups of large B cell lymphoma to determine the best treatment.

Professor David Westhead, of Leeds Institute for Data Analytics explains:

"What's really powerful about the techniques we've developed is the speed at which we can analyse the data. We're able to produce genomic data for a patient in real time and turn it around quickly enough to be able to use that data to influence treatment decisions."

Professor David Westhead
Leeds Institute for Data Analytics

Read the full case study:
lida.leeds.ac.uk/lymphomatreatment

Urban Analytics

Informing Government cycling strategy

The Propensity to Cycle Tool (PCT) – a central part of the Government's Cycling and Walking Infrastructure Strategy (CWIS) – was developed by four UK universities, including academics from LIDA.

The tool, funded by the Department for Transport, uses 2011 Census data on journeys to work. It offers four scenarios for transport planners, cycling advocates and the public to help decide which areas and routes should be prioritised.

The tool is currently being utilised by transport planners at local authorities throughout the UK, with insights from the tool informing the Borough of Broxbourne Cycling Plan (£8.1m) and the Herts Local Transport Plan (£615m).

Roger Geffen, Policy Director at Cycling UK, the UK's largest charitable membership organisation promoting cycling use, commented on the inclusion of the PCT in the Local Cycling and Walking Infrastructure Plan (LCWIP) guidance:

"PCT is set to have a transformative impact on cycle planning in England. I believe it is the single best thing the Department for Transport has done for cycle planning.

The way PCT is featured in the LCWIP guidance will encourage local authorities to use the PCT to inform their cycle network planning processes.

I therefore expect most local authorities in England – and certainly any authority with serious ambitions to boost cycle use – will use the PCT to help develop their LCWIPs over the next few years."

Roger Geffen
Policy Director at Cycling UK

Find out more
www.pct.bike

EDUCATION & TRAINING

LIDA continues to invest significant resources in developing data science capability, at all levels, in both academia and industry – equipping academics with the skills to deliver impactful research and ensuring that the workforce has the skills to compete in the emerging and rapidly expanding area of data analytics.

Masters Courses

LIDA academics teach and supervise students on a number of MSc courses across the University including:

- MSc Consumer Analytics and Marketing Strategy
- MSc Advanced Computer Science (Data Analytics)
- MSc Data Science and Analytics
- MSc Epidemiology and Biostatistics
- MSc Business Analytics and Decision Sciences
- MSc Geographical Information Systems
- MSc Health Informatics
- MSc Health Data Analytics – new for 2018

MSc Consumer Analytics and Marketing Strategy

Consumer-facing organisations are generating data at an explosive rate, and require ways of integrating data, modelling behaviour and spatial analysis to produce user-friendly business insights.

This requires both analytics and marketing skills. The MSc Consumer Analytics and Marketing Strategy (CAMS) is novel in bringing together these domains effectively and, unlike other analytics programmes, we allow students to major in both areas.

The CAMS MSc had 83 full-time students, from 20 different countries in its second year of operation (2017-18).

Industry partners, from both LIDA and the Consumer Data Research Centre, are embedded throughout the programme with students attending guest lectures from analysts or senior decision makers in global companies including Jaywing, Callcredit, CACI and DLA Piper.

Current students are working on research projects for companies such as Arla, Cisco Systems and M&S. Two students from our first cohort were awarded the Society for Location Analysis Postgraduate Student Awards for the quality of their dissertations.

CAMS has proven able to open up a wide variety of career paths, with students taking graduate jobs at Autogrill, Dyson, GfK, Jet2, Nielsen, and other major employers. Other students have started digital businesses or have embarked on doctoral research.

NEW FOR 2018

MSc in Health Data Analytics

Autumn sees the launch of our new MSc in Health Data Analytics.

Developed by experts across LIDA and the School of Medicine, the programme will train a new generation of data scientists in the skills required for analysing large, real world data spanning the contexts of population health and healthcare delivery. Students will receive training in predictive modelling and estimating causal inference, using the latest techniques available – as well as gaining the critical and professional skills of a successful data scientist.

Our MSc graduates will be at the forefront of health data science, with advanced knowledge and skills appropriate to any career involving the analysis of real world health data.

Find out more at:
lida.leeds.ac.uk/healthdataanalytics

LIDA

Seminar Series

The LIDA seminar series provides a regular opportunity for colleagues to come together and hear about the latest developments in and applications of data analytics across a wide range of fields.

The seminars are open to all and we've welcomed over 695 attendees during the past year, including more than 140 colleagues from 40 external partners.

Training and Capacity Building

LIDA delivers an annual programme of training for both academics and non-academic researchers. The programme comprises introductory courses for postgraduate students through to advanced training for data scientists. In the past year we have delivered training to 255 attendees across 14 courses.

Find out more at:
lida.leeds.ac.uk/study-training

Leeds Data Science Society

The student-led Data Science Society, formed in 2015, now has more than 500 members across the University. Members include developers and data scientists, as well as those who are simply curious about data science but don't know where to start.

The society hosts regular training courses, networking and careers events for members and has also put forward multi-disciplinary teams to win national competitions such as the Hiscox University Challenge and the Npower National Forecasting Competition.

Find out more at:
www.leedsdatascience.com

Centre for Doctoral Training in Data Analytics and Society

Funded for seven years, the ESRC Centre for Doctoral Training will provide postgraduate research and training to more than 60 PhD students across the Universities of Leeds, Liverpool, Manchester and Sheffield.

Launched in 2017 and led by the team at LIDA, the Centre is a collaboration with a range of external partners including Leeds City Council, See.Sense, Home Office, Transport for Greater Manchester and YouGov.

The first cohort of students are coming to the end of their first year and have each covered core research training and domain skills for data science, as well as completing an internship with their external partner. The second cohort of students will join us in September 2018.

Find out more:
datacdt.org

DATA SCIENTIST INTERNSHIP PROGRAMME

Now in its third year, this programme offers graduates the opportunity to undertake an internship at LIDA working with multidisciplinary research teams across each of LIDA's key areas: Health Informatics; Consumer Data Research; Urban Analytics; Transport and Mobility; Crime Analytics; Data Visualisation; Statistical and mathematical methods.

The year-long programme enables interns to work alongside leading scholars, own delivery of a project, get hands-on technical experience using real data and establish links with external project partners. The 2017 cohort had the opportunity to work with external partners on projects exploring consumer vulnerability, post-surgical outcomes and safer gambling.

The majority of those who completed the programme in the first two years have gone on to doctoral research or employment in data science roles.

"I completed a LIDA Internship working with Sky Betting & Gaming to develop models to identify problem gamblers. My time at LIDA was essential to my transition from academia to industry.

Working in collaboration with academic and industry partners allowed me to develop my understanding of business challenges, while maintaining a solid academic grounding. Having the support of academic supervisors helped ensure my work was rigorous; an ethos I have carried over into my current role as a Data Scientist at Sky Betting & Gaming."

Ed Berry
Data Scientist, Sky Betting & Gaming

2017 Data Science Internship Projects

Health Informatics

- Predictive Analytics for Oncology
- Multidisciplinary working across perioperative medicine and primary care: a health informatics feasibility study
- Developing personalised nutrition: linking diet and health data
- What can routinely collected lifestyle data tell us? A case study at the University of Leeds

Urban Analytics

- SPENSER – a Synthetic Population Estimation and Scenario Projection model
- Textile Data Analytics: to enable Technology Innovations in the Fashion Industry
- Understanding Relationships between Variables in Population Data
- Understanding and Quantifying Uncertainty in Individual-Based Models for Smart City Forecasts

Statistical and mathematical methods

- Developing a visualisation tool for profiling event sequence data
- Using economic modelling and budget impact projections to inform performance-based risk sharing agreements

PARTNERSHIPS

We do not undertake our data-driven research in isolation. Our aim is to use data to tackle real world challenges and to do this we need to work in partnership with the organisations facing those challenges.

Our partners are involved in the research process every step of the way. Firstly, we work with them to define the questions or issues they want to address. Together, we then identify the relevant data that can provide the information they need to achieve their aims. We use our expertise in statistical and mathematical methodologies and in data science to put this data in the format needed for analysis. We then develop algorithms that can interrogate the data to provide the insights required.

Finally, we share these insights with our partners who are then able to make the necessary changes or develop the policy, processes, products or services that will bring the results they want.

This approach, coupled with the use of our safe data environment – which complies with ISO27001 – makes us a trusted research partner for many organisations.

We have no typical partner – we work with local government, medical charities, large high street brands and small start-up technology companies. Our partners include hospitals, utility providers and regional investment organisations. With such a variety of partners, we offer different ways to collaborate, so every partner, large or small, can find the best approach for them.

"LIDA is a prized asset of Leeds City Region and a key part of our thriving digital sector. The opportunity for prospective investors to work with LIDA is a compelling part of the region's offer."

Roger Marsh OBE
Chair of Leeds City Region Enterprise Partnership (LEP)

Partners can engage with LIDA through:

- **Co-location of partner staff within the institute,** either permanently or for a defined period relating to a particular project or activity. Whilst working at the Institute, colleagues benefit from direct access to members of the academic and technical teams, whilst also making use of our facilities, including the Integrated Research Campus.
- **Joint research projects,** from short proof-of-concept projects spanning a few weeks or months to long-term programmes over several years. Our flexible and adaptable approach allows us to structure projects and programmes to suit the needs of our partners.
- Our **Data Scientist Internship programme** to test new ideas, methods and techniques before committing to a longer term programme of work. As an intern project sponsor, our partners set the project brief and then receive regular updates and final report from the intern and their academic supervisors.
- **Co-design and sponsorship of PhD projects** for longer term research, enabling partners to access skills, strategic advice, data and networks. As a PhD project sponsor, our partners work with the academic supervisors to set the initial brief and remain engaged to help steer and inform the project throughout its duration.
- **Guest lectures and masterclasses** cover both real world applications of data analytics and related career opportunities and enable partners to help shape the skills of the future workforce.
- **Training and professional development** through our short courses. Our programme of short courses are open to our partners and we can also meet bespoke training requirements.

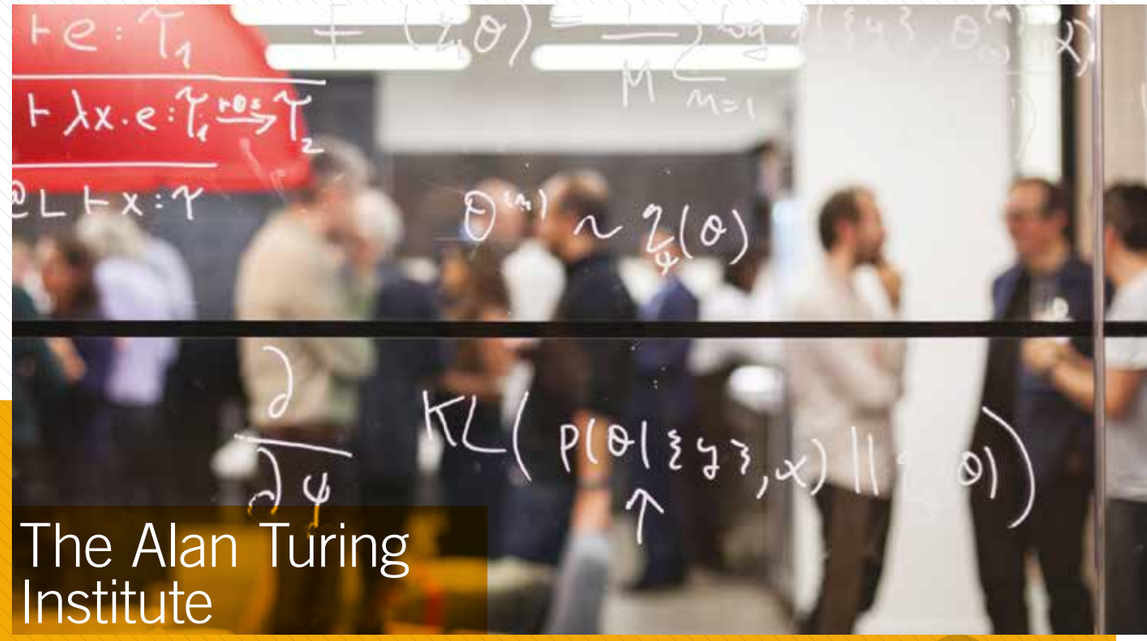
All of our partners can choose to engage in one or more of the above, so we can develop a bespoke package of research that addresses their needs. To discuss how your organisation could benefit from working with LIDA, please contact Paul Evans - Business Development Manager (**P.D.Evans@leeds.ac.uk**).

"LIDA plays an essential role in providing access to data driven research to the business community in the region and beyond. As our business advantage relies increasingly on complex data to guide insight, LIDA is an important partner to us."

Professor Adam Beaumont
CEO – aql

"We (ONS) provided two keynote speakers at LIDA seminars, reflecting the joint interests we have in Data Science and Crime Measurement and Analysis. Both sessions provided a great opportunity to share ideas with colleagues at LIDA and we are looking forward to further collaborations in the future."

Owen Abbott
Head of Big Data Team, Office for National Statistics



The Alan Turing Institute

This year, the University of Leeds became a member of the prestigious Alan Turing Institute, the UK's national institute for data science and artificial intelligence created in 2015.

The Turing and LIDA have a shared mission to make great leaps in research in order to change the world for the better.

With the benefit of strategic leadership from Professor Lisa Roberts, Deputy Vice-Chancellor, Research and Innovation, the University will work in tandem with the Turing to catalyse further growth in its capacity and capability for data analytics. LIDA will play a major role in the coordination of activity amongst researchers and data scientists across the University.

"Being a university partner of The Alan Turing Institute provides opportunities for the University's researchers to work closely with the Institute's academic, industry and policy partners and undertake the most ambitious, impactful research possible.

"I am confident that The Alan Turing Institute will benefit from LIDA's interdisciplinary approach and the fantastic engagement we have achieved with national partners across the retail, energy, transport and healthcare sectors."

Professor Lisa Roberts
Deputy Vice-Chancellor:
Research and Innovation, University of Leeds

LEEDS *Institute for Data Analytics*

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