

Data Science



Today's business systems generate unprecedented amounts of data. Within this data is vital information about customer behaviour, resource usage and business patterns. Companies that exploit the opportunities presented by 'Big Data' will gain an advantage over their competitors. It is clear, however, that there is a shortage of skills to enable data to be brought together from multiple sources, correctly interpreted and exploited commercially. Lancaster University is collaborating with businesses in providing a suite of innovative Data Science Masters programmes to produce the next generation of data scientists who can transform business data into business advantage.

What Can Data Science Offer Business?

- How can you maximise return from marketing spend?
- How satisfied are your customers?
- How can you detect fraudulent transactions?
- Are you using your infrastructure efficiently?

Information technology has made it possible to amass vast data sets covering social trends, public opinion, purchasing habits, medical profiles and environmental records.

Computer science and statistical analytics provide the techniques necessary to bring together data from these sources and generate the knowledge that can drive better business decisions. From understanding which products appeal to which customers, to optimising fleet logistics: data analytics can provide organisations with the ability to use their data to their best advantage. A partnership with Lancaster University's Data Science programme offers organisations access to the latest analytical technologies and techniques, backed by a global top 1% university.

You have the data – a Data Scientist can bring you the knowledge.

Why Big Data?

- A report by PWC revealed that 62% of business leaders believe that big data has significant potential to create business advantage
- McKinsey reported that efficient use of big data could increase a retailer's operating margin by 60%
- A recent government report highlighted that a new generation of skills are needed to extract this value for UK businesses
- A Home Office report identified that companies that lack the capability to perform appropriate analysis of large data sets are vulnerable to repeated cybercrimes

Activities and Benefits

Programme Of Collaborative Activities

- **Three month student placement:** working on a research project to improve your company's profitability and productivity by making the most of your company's data
- **Lancaster University Data Science Partner Accreditation**
 - Membership logo and company profile on our website
 - Access to Data Science logo
- **Two day data science workshop:** gain experience and understanding on how data science can help your company with speakers from the cutting-edge of Data Science
- **Data clinics:** get your datasets reviewed by our students
- **Guest lectures:** attend lectures provided by senior public and private sector speakers, give guest lectures to our student body
- **Hackathon:** set challenges for our team of students to tackle

Benefits Of Collaboration

- Gain resources and time to develop insight into your data and a new competitive advantage
- Work with a global top 1% university and tap into our global networks
- Interact with leading academic and commercial data science researchers
- Access skills in data mining, programming, statistical modelling, statistical inference
- Increase profitability through new the introduction of new innovative products, processes and/or services
- Gain an early view of talented data science professionals
- Trial a new role and give a student valuable industry experience



Multi-disciplinary Approach to Big Data

Unlike other Data Science MSc offerings in the UK, the Lancaster programme combines interdisciplinary teaching from three world-leading departments. Collaborating businesses will benefit from expertise from the School of Computing and Communications (SCC), the Department of Mathematics and Statistics, and the Lancaster Environment Centre (LEC) through one unique programme.



The School Of Computing And Communications

The School of Computing and Communications is internationally recognized for its leading-edge contributions to communication systems, theory and applications, and its expertise in developing networked systems and associated communication protocols. One of our strengths is our focus on pragmatic systems research, and our ability to conduct research "in the wild", e.g. the rural networking testbed in Wray. Our work has attracted strong support from industry, with direct funding from BT Labs, Microsoft, Orange, Cisco, HP Labs, France Télécom, Lucent, Intel, Agilent Labs, Telekom Austria and ETRI, and recently a data science collaboration with the Williams F1 Team.



The Department Of Mathematics And Statistics

The Department of Mathematics and Statistics is a UK leader in developing statistical theory in collaboration with industry. Current collaborative partners include Shell Research, Unilever Research, Google, the Met Office, AstraZeneca, and various local and national small and medium enterprises (SMEs). Statisticians in the department will equip data scientists with methodological expertise in modelling and inference. Most importantly, students will develop an ability to think creatively and independently about data. Our statisticians currently work with Google, Yahoo!, and a marketing SME, to develop and implement algorithms for online optimisation and customisation of websites.



Lancaster Environment Centre

LEC is a vibrant community of over 450 university and government scientists. One of Europe's top environmental research centres, LEC has housed more than 50 companies since 2007, and worked with large businesses like Waitrose and Unilever Research, and over 1000 SMEs since 2005. Analysis of Big Data presents opportunities to transform the use and exploitation of environmental data. LEC researchers will train data sciences in environment science and research methodologies to provide skills in the collection, manipulation, and analysis of large amounts of data, and of a great diversity of data types.

Student Placements



We recruit the brightest minds onto the Data Science MSc Business Engagement programme and train them in the latest technologies and analytical techniques.

We work with innovative organisations to offer business-relevant challenges for our students to address over a placement of around 12 weeks full time or part time. Students can be based either on-site with the partner business, at the University, or a mix of the two.

What Expertise Is On Offer?

- Investigative and analytical expertise in processing data and in the extraction of meaning from complex datasets
- Techniques for the storage and processing of diverse datasets
- Approaches to interpreting and integrating information from heterogeneous data sets using methods such as natural language processing, anomaly detection and computational analytics, statistical forensic approaches
- Understanding the psychological correlation between the recorded action and the human and/or social behaviour

What Should Projects Be About?

The content of the project will be agreed in advance to confirm that it is both beneficial for the hosting organisation and contains suitable data science academic content. Each project will be undertaken by an appropriately skilled graduate with a background in advanced statistical modelling, computing or environmental applications.

Potential Project Examples

- Extracting novel information from existing host data sources (e.g. profiling customers from resource utilisation)
- Creating insight from bringing together diverse data sources (e.g. generating insight from the synthesis of public demographic data with host data)
- Investigating the improvement of existing data analysis solutions
- Improving data visualisation and communication
- Capturing insight from public sources (e.g. scraping Twitter to allow inferences about public perception of companies and products)
- Improving business decision support through enhanced modelling and inference

How Do We Manage IP?

Hosting organisations will own the output of the work performed by the student in the course of the project. Hosting organisations will be expected to provide consent for the student to produce a dissertation based on the work performed during the project.

How Are The Students Supported During Their Placement?

The scheme provides a graduate researcher as the project lead, each placement will be supported by a named academic. There is also a substantial added value in the involvement of the whole university team behind the student to guide and contribute as required.

What Is The Process And Timeframes?

Each partner organisation will be expected to provide an agreement in principle to the university of their wish to participate in the programme in Spring 2015. This agreement will give an indication of the number of students wanted and, in broad terms, the likely focus of offered placement projects.

University staff will work with the hosting organisations to produce a profile of the skills and characteristics required from placement students and a more detailed project specification. Events will be held December 2014 to March 2015 to allow organisations to explain their proposals to students. Partner organisations will be invited to meet with interested students to ensure compatibility and university staff will assist in the matching process of businesses and students.

Inductions for the students will start in May 2015 and placements ideally will run from June-September 2015, although there is some flexibility on start dates.

Programme of Collaborative Activities

Exploring Big Data Workshop

All participating organisations will be invited to attend a 2-day workshop, featuring lectures from leading data science academics, demonstrations from key technology vendors, and hands-on big data laboratory sessions. Separate lab sessions will be available for expert and less-experienced big data users to enable the exploration of advanced analytics or data science fundamentals as appropriate.

The event will include Big Data Visualisation sessions to allow attendees to appreciate how meaning can be extracted from the most diverse or sizeable data sources, and break-out discussion sessions covering a range of data science topics and applications, where participants will be encouraged to share ideas and explore data science together.

Partner organisations will also be invited to attend a gala dinner with senior representatives from government, technology companies and the university.

Invitation To Guest Lecture At Lancaster University

Partners will be invited to speak to our students about the challenges that they have faced in employing data science technology and the solutions that they developed, confirming their reputation as an advanced user of data science.

Knowledge Transfer Evening Events

Partners will be invited to attend a series of talks by recognised leaders in data science on new technologies or new techniques and how they may be applied in the business environment. These events will feature Q&A and discussion sessions.



Data Clinics

Throughout the year partner organisations will be invited to bring their data science problems to be examined by the students with a view to building a range of possible solutions. The problems will be tackled by the students as group coursework projects, leading to a variety of innovative solutions for businesses to consider.

Joint Student And Business Hackathon

In the summer of 2015, sponsoring organisations will be invited to agree a series of more challenging data science problems to be tackled by teams comprised of students and company employees. Prizes will be offered for the most innovative use of data science techniques, the most impressive demonstration of analytics and visualisation, and the most effective overall solution.

Lancaster University Data Science Partner Accreditation

Participating organisations will be recognised as Lancaster University Data Science Partners. This will allow access to the Lancaster University Data Science partner logo, branding and promotional materials. A profile of all participating organisations will be added to the Lancaster University Data Science website, augmenting the reputation of each company as an innovator in the data science space.

Programme Cost

A minimum contribution of £3,000 is sought from partner organisations, paid in instalments. This will be paid to the student as a bursary for their upkeep during their placement.

For further information contact:

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