Images of Research at City 2015
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I am delighted to welcome you to Images of Research 2015: the inaugural visual exhibition of City University London’s research activities. This exhibition showcases in thought-provoking ways the application of some of the world-leading research being carried out across the five discipline-based Schools which make up City.

City prides itself on academic excellence for business and the professions. In essence, this means that our research not only results in the generation of new knowledge but, invariably, knowledge which can be applied in many ways – for example in the creation of new products, new services, to inform decision making and to support economic growth.

We are passionate about working collaboratively with business, industry, government and the community to tackle the most important challenges affecting society. The range and depth of research topics, methods and approaches illustrated here shows that City is making a difference and we could not do this without our valued research partners. To this end, we extend a special welcome to all business and professional contacts from across London and the wider region.

The Images of Research exhibition is happening alongside Made@City 2015 which is our end of year show celebrating student project work. We are very proud of the exciting contributions made by our students and I hope that you will take a little time to join us and meet the exhibitors so that they can tell their own stories and, in return, benefit from your wisdom and experience.

Mutual creativity, discovery and making is part of the special recipe that City offers and we warmly appreciate your interest, ideas and engagement.

Dr Karen Shaw
Director, Research & Enterprise
Leading Management Research from Formula 1
Dr Paolo Aversa, Cass Business School

Dr Paolo Aversa's research explores the determinants of firms’ superior performance in turbulent competitive environments. This topic is important given the firms’ current challenges derive from unstable and fierce competition in international markets. Paolo's theories are developed in the fascinating and innovative setting of Formula 1, a highly technological and fast-paced industry where firm-level decisions to improve financial and sport performance have to take into account a turbulent competitive environment. Formula 1 is a £2 billion industry and is a leading UK manufacturing sector.
Life Start Trolley
Professor Susan Ayers, Dr Alexandra Sawyer, School of Health Sciences, and Dr Bill Yoxall, Liverpool Women’s Hospital

In hospitals it is common for a baby’s umbilical cord to be cut very quickly after birth. However, by doing this the baby is deprived of vital blood that could be important to their health, especially for preterm babies who are small. As part of a UK-wide research program with the University of Liverpool we developed a mobile resuscitation trolley (LifeStart) that can be put next to the mother so the baby can be resuscitated without cutting the umbilical. Our research shows it is easy to use and acceptable to parents.
Optical Biopsy of Brain Tumours
Dr Greg Slabaugh and Muhammad Asad, School of Mathematics, Computer Science and Engineering

Our medical image computing technique characterises brain tissue (as normal, low grade tumour, or high grade tumour) using Magnetic Resonance (MR) Spectroscopy imaging. The left two images show a patient’s brain using different MR modalities, and the right three have our technique overlaid, as maps indicating tissue grades. Red indicates more of a tissue type; this patient has a high grade tumour.

Our method may allow non-invasive imaging and diagnosis to investigate suspected tumours instead of the current standard practice of needle biopsy/tissue analysis, which has distinctive risks and complications.
Miniaturised Sensors in Paediatric Care

Professor Panicos Kyriacou and James May, School of Mathematics, Computer Sciences and Engineering

Miniature optical sensors are being developed by City’s biomedical engineers at a scale so small they can enter places in body we have never been able to go before.

The team, led by Professor Panicos Kyriacou, has projects including one that can allow non-invasive monitoring of blood oxygen levels in organs and tissues of critically ill babies (such as the oesophagus) to ascertain their condition and track progress during surgery or in intensive care. The innovation challenges the status quo on what is possible without invasive blood extraction.
Digital Creativity for Risk Management
Professor Neil Maiden, School of Mathematics, Computer Science and Engineering

Employees in a manufacturing plant are using a new digital app to support creative thinking to resolve health and safety risks. City University London is a leading partner of the EC-funded COLLAGE project, which is developing new software to support creative thinking in design, management and manufacturing. The CNH Industrial plant, which manufactures tractors, has adopted a new tablet app that automatically generates then recommends creative ideas to employees to resolve to newly encountered risks.
Smart Pantograph for Electric Trains

Professor Tong Sun, School of Mathematics, Computer Science and Engineering

This is a joint project with engineering company Brecknell Willis, funded by Rail Safety and Standards Board (RSSB), to explore the creation of an active pantograph, a current collector for electric trains, into which optical fibre sensors are integrated for real-time condition monitoring. They can also allow control to enhance reliable train operation. The success of the project could lead to minimised traffic disruption and improved safety due to the early warning systems built into such devices.
The Early Sociocognitive Battery
Professor Penny Roy and Professor Shula Chiat, School of Health Sciences

On average, more than one child in every UK classroom experiences significant difficulties with speech and/or language and communication. The Early Sociocognitive Battery offers clinicians a means of assessing very basic skills i.e. social responsiveness, joint attention and symbolic comprehension involved in engaging with other people, and inferring intentions behind their actions and words. Watching and systematically scoring how a child behaves in certain scenarios reveals vital information to clinicians on deficits in sociocognitive skills so they can be targeted early on in the hope of improvement.
Making a Voiceless Population Heard

Abi Roper, School of Health Sciences

GeST is a computer-based therapy tool made at City University London. It aims to help people with little or no speech, as a result of stroke (and resulting aphasia), learn gestures to help support their communication. The project combines methods from computing and communication research and aims to make a voiceless population heard.
Sentence Reading in Aphasia
Line Huck, School of Health Sciences

In this project we use eye tracking to study sentence reading by individuals with aphasia to find out what kind of probabilistic cues (such as word frequency and context) can be accessed during reading, and whether individuals with aphasia use the same cues as neurologically healthy individuals. Knowledge about probabilistic cues in aphasia can inform models of written language comprehension and may help us develop new methods of reading therapy.
Gestures in Aphasic Conversation

Judith Kistner, School of Health Sciences

Gestures are hand and arm movements that accompany everyday speech. They are important in communication. People with aphasia (a language disorder due to brain damage) use gesture both as accompaniment to speech and as a compensatory modality. However, their gesture is often impaired. By studying gesture in aphasia, we can illuminate theoretical debate about the relationship between speech and gestures and also inform communication therapy.
Heat Map of Optimal Nuclear Accident Strategies
Professor David Collins, The City Law School

This graph uses colours to demonstrate the most effective decisions that can be made in dealing with the immediate aftermath of a large nuclear accident. In particular, it considers the costs in money terms of evacuation of a population based on their distance from the accident. Lighter shades demonstrate less expensive courses of action and darker ones more expensive. Costs are assessed based on formulae which consider the value of life based on factors such as life expectancy, health, wellbeing and future earnings.
European Social Survey
Dr Lorna Ryan, School of Arts Social Sciences

The European Social Survey (ESS) is an academically led biennial social survey of social attitudes and behaviours. It became a ‘European Research Infrastructure Consortium’ in November 2013. ESS topics include: citizen involvement and democracy; family and working life; personal and social wellbeing; attitudes to and experiences of ageism; trust in institutions. New topics can be introduced, so in a forthcoming round ESS will also investigate attitudes to climate change and energy preferences. The topics of the survey are of academic, policy and public interest, and ESS provides online training and analysis tools.
Photographic Attractiveness
Professor Jo Wood and Alex Kachkaev, School of Mathematics, Computer Science and Engineering

Mining of one million georeferenced photographs from the web allows us to build a picture of the parts of a city that people find attractive. Using visual analytics, the giCentre developed methods for filtering images so only those most indicative of urban attractiveness are selected. Here photographic metadata are used to distinguish day and night as well as indoor and outdoor photography in London.
Uncertainty in Output Area Classification in London

Professor Jason Dykes, Professor Jo Wood and Dr Aidan Slingsby, School of Mathematics, Computer Science and Engineering

Population in each area is reflected by its Output Area Classification (OAC) super-group to different degrees. This ‘choropleth’ map uses hue to show category, and lightness to show the degree to which the category reflects the local population.
Stenomaps: Minimalist Mapping

Arthur van Goethem, Andreas Reimer, Bettina Speckmann, TU Eindhoven, and Professor Jo Wood, School of Mathematics, Computer Science and Engineering

Using computational geometry, researchers at TU Eindhoven and City’s giCentre developed an automatic polygon-to-line transformation to create minimalist ‘stenomaps’. This allows uncertain geospatial data or continuous regions to be mapped with discrete symbols. Here, energy consumption is shown for the 22 regions of France.
Automatic Sketch Simulation

Professor Jo Wood, School of Mathematics, Computer Science and Engineering

Using machine vision techniques, photographic images are processed to identify major structural characteristics. These are used to automatically simulate ‘sketchy’ graphics by generating thousands of curved splines. The appearance of the sketch can be parameterised to mimic different drawing styles.
Role of Gender in Urban Cycling

Professor Jo Wood and Dr Roger Beecham,
School of Mathematics, Computer Sciences and Engineering

Work by the giCentre with Transport for London examined the London Cycle Hire ‘Boris Bikes’ scheme to reveal usage patterns of men and women. Using visual analytics, clear differences in behaviour were identified and explained with reference to workplace location, road layout and attitudes to urban cycling.
Happy and Sad Faces
Rebecca Webb and Professor Susan Ayers,
School of Health Sciences

Mums and babies need to interpret each other’s emotions in order to respond appropriately. Research shows that if women have postnatal depression they can be less responsive to their babies. Our research examines how mums and babies perceive different emotions, and whether mental health problems result in unconscious biases towards particular emotions. In this study, a baby is being shown photos of happy and sad faces so we can film how long the baby spends looking at different emotional expressions.
Epic Avant-garde Piano Recording
Ian Pace, School of Arts and Social Sciences

Internationally renowned concert pianist, City University Lecturer in Music, and Head of Performance Ian Pace released a 5-CD set and accompanying 291-page monograph of leading avant-garde composer Michael Finnissy’s five-and-a-half hour piano work *The History of Photography in Sound* in 2013. The project was supported by a research grant from City University London and an earlier AHRC research fellowship. The recording has received rave reviews and was a Sunday Times Album of the Year in 2013.
Cappella Romana at Stanford University
Dr Alexander Lingas, School of Arts and Social Sciences

Reader in Music Dr Alexander Lingas presents his research on the ancient musical traditions of Eastern Orthodox Christianity both in traditional academic settings and through live performances, broadcasts and recordings with his American-based vocal ensemble Cappella Romana. His two most recent discs — Good Friday in Jerusalem and Maximilian Steinberg: Passion Week — entered the Top 10 of Billboard magazine’s classical charts upon release.
Introducing Children to Iranian Music and Culture
Dr Laudan Nooshin, School of Arts and Social Sciences

Between November 2011 to May 2012 Dr Laudan Nooshin led a project introducing key stage 2 children to Iranian music and culture through workshops and teacher-led activities. The project partners included the London Philharmonic Orchestra and composer David Bruce and resulted in a specially-commissioned piece for orchestra, Iranian instruments and narrator, *Prince Zal and the Simorgh*, which was premiered at two LPO BrightSparks schools’ concerts at the Royal Festival Hall.
VØ1CE
Dr Newton Armstrong, Dr Miguel Mera and Dr Diana Salazar, School of Arts and Social Sciences

The internationally renowned contemporary vocal ensemble EXAUDI, directed by James Weeks, is currently an ensemble-in-residence at City University London. Composers Dr Newton Armstrong, Dr Miguel Mera and Dr Diana Salazar from the Department of Music are working closely with the ensemble to develop new musical compositions that involve innovative use of new technologies with the voice. The practice-led research project is developing cutting-edge music that examines interactivity, embodiment and hyper reality in performance.
Are We There Yet?
Professor Jenny Harrow and Visiting Professor Cathy Pharoah, Cass Business School

We know, intuitively that we live in generous communities. People give time, energy and money; charities play huge roles and are expected to do more. But to understand this powerful resource means thinking beyond charity as personal choice, or ‘philanthropic journey’ as self-discovery, and reaching into evidence and data on its realities. Discovering, examining, sharing and exchanging new knowledge on organisational and individual giving with purposeful practitioners is the core of our research challenge in Cass Centre for Charitable Giving and Philanthropy. This image shows how we connect knowledge and know-how on charitable giving and philanthropy.
Images of Research is organised by City Research and Enterprise. To find out more please contact:

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