



BRINGING RESEARCH TO LIFE | OUR DYNAMIC EARTH
EDINBURGH
3 OCTOBER 2017

PROGRAMME 2017



sicsa* **ScotlandIS**

SICSA DemoFest is the annual technology showcase of leading Informatics and Computing Science research in Scottish Universities.

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MEDICAL**

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12. Artificial Intelligence

15. Big Data

18. Cyber Security

20. Networking & The Cloud

21. Robotics & Autonomous Systems

22. User-Experience

29. MSc Research & Future Projects

AGENDA

16.00
Registration Opens

16.15
Welcome
Professor Kevin Hammond
SICSA Director

16.20
Welcome
Shirley-Anne Somerville MSP
Minister for Further Education,
Higher Education & Science

16.30
Keynote Talk
The Future is Depending on Us!
Gillian Docherty
Chief Executive Officer
The Data Lab

17.00
SICSA DemoFest 2017 Showcase
with Networking, Food & Beverages

19.00
Event Closes

WELCOME

To SICSA DemoFest 2017

The Scottish Informatics and Computer Science Alliance (SICSA) is a collaboration of 14 Scottish Universities. SICSA promotes international excellence in University-led research, education, and knowledge exchange for Scottish Informatics and Computer Science.

Our member institutions will come together at DemoFest 2017 to demonstrate the very best in cutting-edge research and innovation in Artificial Intelligence, Big Data, Cyber Security, Networks & The Cloud, Robotics and User-Experience.

DemoFest aims to open the door of the Scottish Universities

to businesses and the public sector. It has become the largest event of its kind in Scotland, highlighting the very best of current Computer Science research. The event is now in its tenth year!

This year's event promises to be bigger and more industry-focussed than ever, featuring 50 technology and product demonstrations from across Scotland.

Our demonstrations are designed to showcase the innovative work of researchers who are passionate about engaging with industry, public services, and third-sector organisations in applying their research and making a positive impact on society.

Our exhibitors will talk about their research, tell you why it's important to your organisation, and demonstrate their technology working in real-time.

I would like to take this opportunity to thank our co-organisers, ScotlandIS; as well as our sponsors, event partners, keynote speaker and exhibitors. I hope that you enjoy DemoFest 2017 and benefit from engaging with the exhibitors and fellow delegates; to make connections and to sow the seeds of future collaboration.

ALISTAIR LAWSON
SICSA Knowledge
Exchange Director
Edinburgh Napier University





JOIN US FOR

DataFest18

The UK's first week-long festival of Data Innovation comes back to Scotland from the 19th to 23rd March 2018.

Now in its second year, DataFest will offer an unprecedented networking platform where you can interact with local and international talent, industry, academia and data enthusiasts, to discuss how **#DataChangesEverything**

WWW.DATAFEST.GLOBAL



We're building a
World-Class Team for

AI Research
in Healthcare

...in Scotland.

With a 20 year history — from start-up to corporate R&D centre — **Toshiba Medical Visualization Systems** has recruited top talent from Scotland and beyond to create a 120-strong international team based in Edinburgh.

To support our rapid expansion into Machine Learning, we are actively recruiting doctoral level Data Scientists, students to join our PhD/EngD programme, Software Engineers and summer interns.

Get in touch with us now!

Toshiba Medical Visualization Systems Europe, Ltd.
Bonnington Bond, 2 Anderson Place, Edinburgh EH6 5NP

recruitment@tmvse.com
www.tmvse.com



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KEYNOTE TALK

The Future is Depending on Us

GILLIAN DOCHERTY
Chief Executive Officer,
The Data Lab

Gillian will take us on a journey to the future and discuss what our lives may be like in 20 years time; but the question is how do we best get there and how do we grow industry and academic innovative collaborations.

Gillian will explore some of the collaborations happening right now across Scotland in various industries and explain the impact these could have now and in the future.

Gillian Docherty is Chief Executive of The Data Lab, set up by the Scottish Government to enhance innovation and entrepreneurship across Scotland's key economic sectors. Already, under Gillian's tenure The Data Lab supports 55 data projects predicted to contribute £80m to the Scottish economy and create 260 jobs.

In March this year Gillian spearheaded Scotland's first ever DataFest which saw world-renowned international experts in data science descend on Edinburgh to share cutting edge practices to over 2,000 attendees.

Formerly of IBM, she's recently been named CEO of the year at the Digital Technology Awards and is also one of the UK's top ten most influential people in data according to DataIQ.

Gillian is on the Board of Tech Partnership Scotland and is also a Board member of Glasgow Chamber of Commerce.



EXHIBITING PARTNERS

#SICSADemoFest2017

SCOTLANDIS Event Co-Organiser

ScotlandIS represents and supports businesses and organisations creating and delivering digital products and services.

It underpins a thriving community which brings together the ambition, talent and expertise across the industry to grow the digital economy.

FURTHER INFORMATION
scotlandis.com

ScotlandIS

THE DATA LAB Event Sponsor

The Data Lab is an innovation centre focused on helping Scottish industry to capitalise on a growing market opportunity in data science.

It facilitates and enables industry, public sector and academia to innovate and develop new data science capabilities in a collaborative environment.

It provides resources and funding to kick-start projects, deliver skills through education programmes, and help to develop the local ecosystem by building a cohesive data science community.

Its core mission is to generate significant economic, social and scientific value from data for Scotland.

FURTHER INFORMATION
thedatalab.com



TOSHIBA MEDICAL VISUALIZATION SYSTEMS Event Sponsor

Toshiba Medical Visualization Systems offers a full range of diagnostic medical imaging solutions including CT, MR, X-Ray, Ultrasound and Healthcare Informatics across the globe.

In line with the Made for Life philosophy, patients are at the heart of everything.

The mission is to provide medical professionals with solutions that support their efforts in contributing to the health and wellbeing of patients worldwide.

FURTHER INFORMATION
tmvse.com

TOSHIBA MEDICAL

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CANON GROUP

EXHIBITING PARTNERS

#SICSADemoFest2017

ARIDHIA

Aridhia is the ground-breaking provider of AnalytiXagility, a cloud-based collaborative data analysis platform for medical and precision medicine research. Used by ground-breaking research organisations including Great Ormond Street Hospital NHS Foundation Trust, NHS Scotland, University of Glasgow, and the University of Edinburgh, AnalytiXagility is accelerating research projects to develop new, data-driven approaches to healthcare and improving patient outcomes.

FURTHER INFORMATION
aridhia.com

CENSIS

CENSIS enables industry innovators and university researchers to collaborate at the forefront of market-focused sensor system and Internet of Things innovation, developing products and services for global markets to create sustainable economic value in the Scottish economy.

FURTHER INFORMATION
censis.org.uk

CONSTRUCTION SCOTLAND INNOVATION CENTRE (CSIC)

CSIC exists to champion innovation and connect Scotland's construction industry to deliver transformational change, supporting Scotland's construction related businesses to innovate, collaborate and grow by matching innovation requirements with business support and academic specialists.

CSIC provides businesses in the construction sector with a 'one-stop shop' for accessing a team of experts and public support, to encourage and facilitate innovation within Scotland's construction industry.

FURTHER INFORMATION
cs-ic.org

THE HIGGS CENTRE FOR INNOVATION

The Science and Technology Facilities Council runs scientific campuses across the UK, hosting world leading research in Particle Physics, Astronomy, Space Science and Supercomputing.

The Higgs Centre for Innovation in Edinburgh is a facilities access centre and Business Incubator allowing companies to use STFC facilities and expertise to help their development and growth.

FURTHER INFORMATION
stfc.ac.uk

THE SCHOOL OF SIMULATION AND VISUALISATION (GLASGOW SCHOOL OF ART)

The School of Simulation and Visualisation (previously the Digital Design Studio) is a postgraduate research and commercial centre of The Glasgow School of Art.

Its intense learning and research environment exploits the interface between science, technology and the arts to explore imaginative and novel uses of advanced 3D digital visualisation and interaction technologies.

FURTHER INFORMATION
gsa.ac.uk/research/research-centres/school-of-simulation-and-visualisation

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INTERFACE

Interface connects organisations to the right academic expertise for increased R&D activity leading to the creation and development of new products, services and processes.

Their free and impartial service has helped hundreds of organisations to become more competitive increasing profits, maximising export potential and helping them become more sustainable.

FURTHER INFORMATION
interface-online.org.uk

URBAN BIG DATA CENTRE

The Urban Big Data Centre is a national data service, funded to support data owners, policymakers, researchers and everyday citizens in extracting useful information from urban-related data.

We help others harness the potential of big data to develop solutions for environmentally sustainable, economically resilient, and socially-just cities.

FURTHER INFORMATION
ubdc.ac.uk



Science & Technology
Facilities Council



FIND YOUR WAY AROUND

List of Exhibitors & Exhibition Plan

ARTIFICIAL INTELLIGENCE

1. John McCall
2. Emma Hart
3. Gopal Singh Jamnal
4. Kia Dashtipour
5. Kyle Martin
6. Ahsan Adeel
7. Mandar Gogate
8. Neil Urquhart
9. Saemundur Haraldsson
10. Sofiat Olaosebikan
11. Xue Li

BIG DATA

12. Chris Brown
13. Olivier Regnier-Coudert
14. Steven Owens & Christopher Lowe
15. Ulrich Germann
16. Walid Magdy
17. Xiao Yang
18. Iliia Lvov
19. Nilupulee Anuradha Gunathilake

CYBER SECURITY

20. Ana Serrano
21. Greig Paul
22. Fredrik Nordvall Forsberg & James Chapman
23. Maria Evangelopoulou
24. Sean McKeown

NETWORKING & THE CLOUD

25. Ibrahim Alghamdi
26. Michael Smyth & Ingi Helgason
27. Uchechukwu Awada

ROBOTICS & AUTONOMOUS SYSTEMS

28. Mary Ellen Foster
29. Heriot-Watt University Robotics Society
30. Peter McKenna & Ayan Ghosh
31. Xiaodong Liu

USER-EXPERIENCE

32. Adeola Fabola
33. Andrei Boiko
34. Augusto Esteves
35. Benjamin Gorman
36. Catherine Anne Cassidy
37. Daniel Rough
38. David Morrison & Patrick Schrempf
39. Laura Muir & Yafan Zhao
40. Euan Freeman & Stephen Brewster
41. Gözel Shakeri & Patrizia Di Campi San Vito

42. Hussein Bakri
43. Jamie Ferguson
44. John McGowan
45. Mark Dunlop & Andrew Kerr
46. Michael Quinton
47. Miguel Nacenta
48. Mona Alqassim & Maria Wolters
49. Rachel Menzies
50. Dharini Balasubramaniam & Uta Hinrichs
51. Andrea Scott

MSc RESEARCH & FUTURE PROJECTS

- Nikos Ntarmos
- Robert Hamlet
- Anna Lisowska
- Samar Farzand Najmuddin
- Shazibali Gesawat

EXHIBITING PARTNERS

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Scotland IS

B Event Sponsor

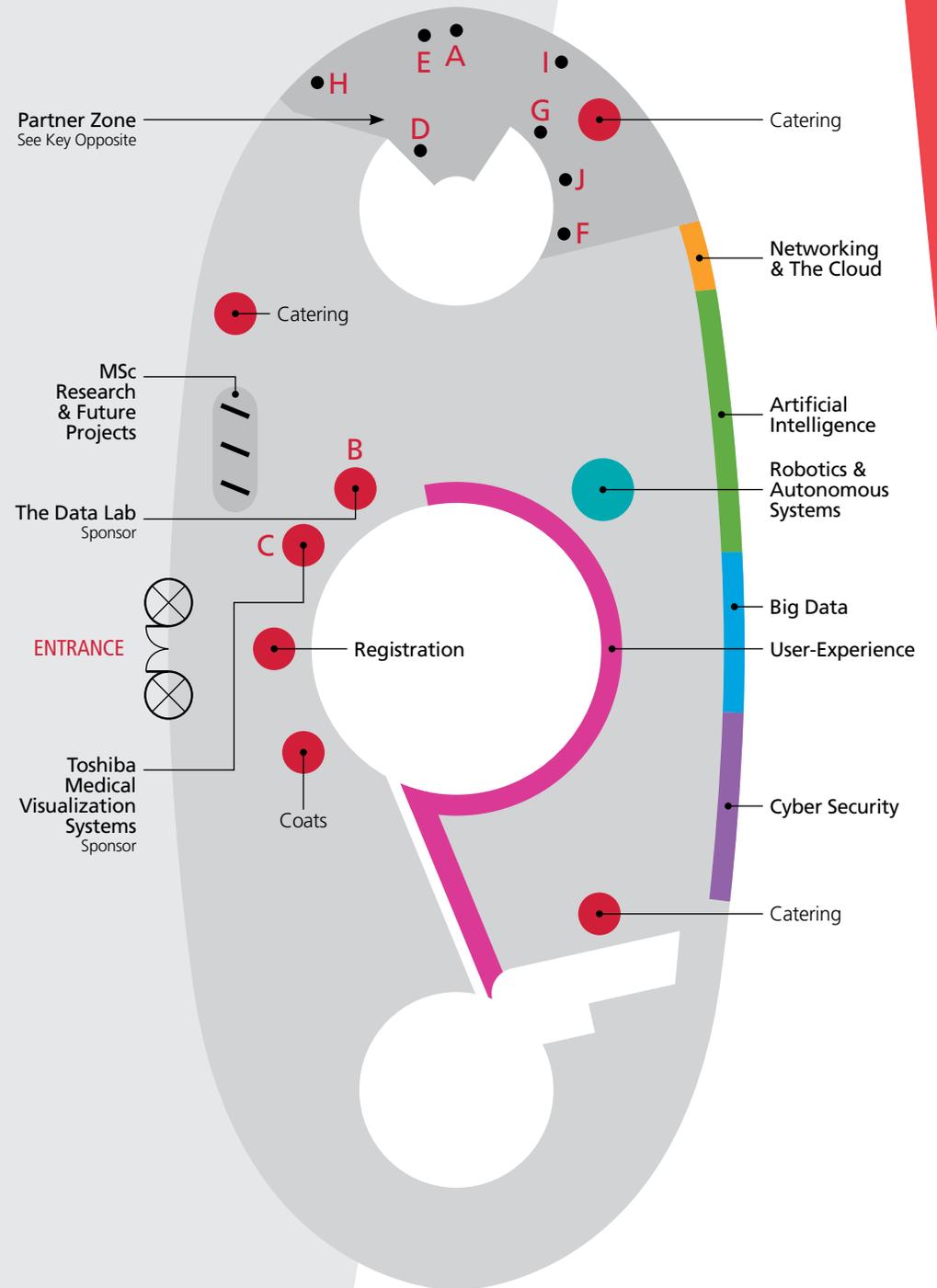
The Data Lab

C Event Sponsor

Toshiba Medical Visualization Systems

• Event Partners

- D Aridhia
- E CENSIS
- F Construction Scotland Innovation Centre
- G The Higgs Centre for Innovation
- H The School of Simulation & Visualisation, Glasgow School of Art
- I Interface
- J Urban Big Data Centre



EXHIBITORS

Artificial Intelligence

Artificial Intelligence
**1. SIMULATION-
OPTIMISATION APPLIED
TO ENGINEERING ASSET
MANAGEMENT**



EXHIBITOR
JOHN McCALL
Robert Gordon
University
E: j.mccall@rgu.ac.uk

The objective of this project is to tackle the complexity of optimising maintenance schedules using engineering-asset life-simulation models.

Artificial Intelligence
**2. LIFELONG LEARNING
IN INTELLIGENT
SYSTEMS**



EXHIBITOR
EMMA HART
Edinburgh Napier
University
E: e.hart@napier.ac.uk

Traditional development of intelligent-software involves training a system that is then deployed. In changing environments, systems can quickly under-perform or even become obsolete.

In contrast, humans learn from experience and use previously learned knowledge to adapt to new situations. Our work applies continual learning techniques to enable continual, autonomous adaptation of software to new situations.

Artificial Intelligence
**3. COGNITIVE IoT
APPROACH OF
AMBIENT-INTELLIGENT
SMART SPACE.**



EXHIBITOR
**GOPAL SINGH
JAMNAL**
Edinburgh Napier
University
E: g.jamnal@napier.ac.uk

CAiSH is a cognitive ambient-intelligent smart-home framework, which learns from its surroundings to recognise the hidden patterns of inhabitant activity.

The research approach combines Internet-of-Things with Artificial Intelligence, using the Hidden Markov Model and Fuzzy Rule Engine, to enhance the assisted living experience in a smart-home scenario.

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Artificial Intelligence
**4. PerSent: A FREELY
AVAILABLE PERSIAN
SENTIMENT LEXICON**



EXHIBITOR
KIA DASHTIPOUR
University of Stirling
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People need to know other people's opinions to make well-informed decisions to buy products or services. Most internet users are not English speakers, but many research papers in the sentiment-analysis field focus on English.

We introduce a Persian sentiment lexicon, which consists of 1,500 words. We have used two machine-learning algorithms to evaluate the performance of this resource on a sentiment analysis task.

Artificial Intelligence
**5. INCREMENTAL
PAIR CREATION IN
A SIAMESE NEURAL
NETWORK**



EXHIBITOR
KYLE MARTIN
Robert Gordon
University
E: 1106883@rgu.ac.uk

This research aims to streamline uptake of intelligent systems in organisations. Intelligent systems can offer numerous advantages to businesses, but their development can be expensive.

This project aims to optimise the generation of similarity knowledge using Siamese Neural Networks (SNNs). SNNs can be expensive to train, and require huge amounts of data to be effective, but our research aims to reduce this to manageable dataset sizes.

Artificial Intelligence
**6. TOWARDS
NEXT-GENERATION
LIP-READING DRIVEN
HEARING-AIDS**



EXHIBITOR
AHSAN ADEEL
University of Stirling
E: aad@cs.stir.ac.uk

Noisy situations cause huge problems for sufferers of hearing loss. Inspired by human speech processing, our technology leverages the audio-visual nature of speech to deliver enhanced speech intelligibility with a potentially reduced cognitive/listening effort.

The proposed invention will help future multimodal hearing-aid users in noisy environments, by exploiting a miniaturised camera that can lip-read and seamlessly switch between audio-visual cues.

EXHIBITORS

Artificial Intelligence / Big Data

Artificial Intelligence
7. TOWARDS
AUTOMATED
MULTIMODAL SENTIC
COMPUTING AND
OPINION MINING



EXHIBITOR
MANDAR GOGATE
University of Stirling
E: mandar.gogate@stir.ac.uk

Public perception of products and services has always been of great interest to companies. The process of tracking public opinion has usually been very time-consuming as it involves manual compilation of published articles and costly user surveys.

This ongoing research aims to develop an automated big data analytics engine to detect public perceptions in real-time.

Artificial Intelligence
8. MODELLING
THE EFFECTS OF
COMMUTING



EXHIBITOR
NEIL URQUHART
Edinburgh Napier
University
E: n.urquhart@napier.ac.uk

Every organisation and individual in the UK is affected in some way by the impacts of commuting. This research seeks to build a tool that will allow organisations to visualise these impacts and assess the effectiveness of possible interventions, such as changing work locations or policies, prior to implementation.

Artificial Intelligence
9. AutoProg: A TOOL
FOR AUTOMATIC
PROGRAMMING



EXHIBITOR
SAEMUNDUR
HARALDSSON
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Software lifecycles are dominated by maintenance, which includes bug fixing and various improvements. This is often labour intensive and very expensive. Improving multiple properties such as energy and memory use, execution time, and accuracy simultaneously is difficult. They compete for resources and usually there are multiple equivalent solutions. Human programmers are not well equipped do this manually.

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Artificial Intelligence
10. EFFICIENT
ALGORITHMS FOR
MATCHING PROBLEMS



EXHIBITOR
SOFIAT
OLAOSEBIKAN
University of Glasgow
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Matching problems involve a set of applicants (e.g. medical students) who seek to be matched to a set of objects (e.g. hospital posts). Applicants may have preferences over a subset of objects, and vice versa.

Due to the large number of applicants that appear in practical applications, efficient algorithms are needed to produce an optimal allocation of applicants to objects.

This research aims to investigate ways to address these issues.

Artificial Intelligence
11. EVOLVING LOGICAL
THEORIES BASED
ON AUTOMATED
REASONING



EXHIBITOR
XUE LI
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Edinburgh
E: xue.lee@ed.ac.uk

This research focuses on repairing faulty logical theories. When a reasoning failure is detected, we will repair the theory by changing the language in which it is written or adding/deleting one or more sentences.

Big Data
12. ParaFormance:
DEMOCRATISING
PARALLEL SOFTWARE



EXHIBITOR
CHRIS BROWN
University of
St Andrews
E: cmb21@st-andrews.ac.uk

As we seek faster, ever more reliable performance from our digital systems, the demand for parallelisation for multicore is growing inexorably.

Developing this complex software is hard and expensive, creating tough challenges for development teams and management.

We have developed ParaFormance to help developers build safer, faster code quicker so they can meet their customer needs and be more profitable.

EXHIBITORS

Big Data

Big Data
13. TRANSFORMING THE OFFSHORE OIL AND GAS SUPPLY CHAIN THROUGH OPTIMISATION AND SIMULATION



EXHIBITOR
OLIVIER REGNIER-COUDERT
Robert Gordon University
E: o.regnier-coudert@rgu.ac.uk

We present an innovative data-driven software solution, underpinned by advanced optimisation algorithms and simulations, to coordinate the oil and gas cargo supply chain as a whole, using pooled resources to realise transformational cost reductions.

The project will produce a convincing demonstrator using real operations data.

Big Data
14. BEINN BIKE: BETTER ROUTE PLANNING FOR YOUR MOUNTAIN BIKE ADVENTURES



EXHIBITORS
STEVEN OWENS & CHRISTOPHER LOWE
University of Strathclyde
E: steven.r.owens@strath.ac.uk

Beinn Bike is an application that addresses the problem faced by adventure cyclists wanting to explore new terrain. It does this using novel path routing techniques, high quality map data and crowd sourced activity information, to offer journey suggestions based on rider preferences such as distance, elevation, difficulty and ride type.

Big Data
15. THE SUMMA PLATFORM: SCALABLE UNDERSTANDING OF MULTILINGUAL MEDIA



EXHIBITOR
ULRICH GERMANN
University of Edinburgh
E: ugermann@inf.ed.ac.uk

The SUMMA Platform is new open-source software. Operating automatically and in real time, it can: monitor hundreds of live news sources; transcribe spoken content; translate content from other languages into English; organise news stories into storylines; recognise mentions of names, places etc.; and store extracted information in a data base for further use.

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Big Data
16. TweetMogaz: A NEWS PORTAL OF TWEETS



EXHIBITOR
WALID MAGDY
University of Edinburgh
E: wmagdy@inf.ed.ac.uk

TweetMogaz report news as shared and discussed on Twitter without any manual interception.

Trends and popularity are automatically extracted from social media dynamics, away from any news editorial bias.

Big Data
17. SocialWatch: EXPLORING VIOLENCE AND MALPRACTICE EVENTS IN ELECTIONS



EXHIBITOR
XIAO YANG
University of Glasgow
E: xiao.yang@glasgow.ac.uk

During elections, SocialWatch uses machine learning models to discover murder and bribery events from social media streams.

SocialWatch also provides rich contextual information to explore the events from a world map such as photos, mentioned names and locations, and related news articles where more detailed information can be accessed.

Big Data
18. MANAGING DATA SCIENCE PROJECTS WITH SCORECARDS



EXHIBITOR
ILIA LVOV
University of St Andrews
E: il23@st-andrews.ac.uk

Data science endeavours often have huge management overheads. They may involve interdisciplinary teams working with diverse data sources using evolving methods as well as complex infrastructures and software systems to satisfy requirements of multiple stakeholders.

The Data Science Scorecard Deck is an agile project management tool addressing core individual aspects of a data science project.

EXHIBITORS

Big Data / Cyber Security

Big Data
**19. CHANNEL
MODELLING &
PERFORMANCE
EVALUATION OF FSO
COMMUNICATION
UNDER DIFFERENT
WEATHER CONDITIONS**



EXHIBITOR
**NILUPULEE
ANURADHA
GUNATHILAKE**
University of the
West of Scotland
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Some frequency ranges from the electromagnetic spectrum are used to transmit data from one location to another. The dedicated range is now about to run out of space and this research focuses on how weather conditions affect the transmission signal in visible light communication.

Cyber Security
**20. SELF-PROTECTION
AGAINST DDOS
ATTACKS IN 5G
NETWORKS**



EXHIBITOR
ANA SERRANO
University of the
West of Scotland
E: ana.serrano@uws.ac.uk

The main goal of the research is the detection and mitigation of distributed attacks in 5G networks.

Our solution provides a self-managed network that detects a threat and decides which is the best action to carry out, and where it should be made in order to accomplish a trade-off between the global infrastructure security and quality of service.

Cyber Security
**21. SECURING
SYSTEMS IN AN
ERA OF CONSTANT
EXPLOITATION –
REDUCING TRUST**



EXHIBITOR
GREIG PAUL
University of
Strathclyde
E: greig.paul@strath.ac.uk

Cyber security is no longer a topic able to be ignored, for any size of business. Even companies investing in cyber security still suffer from large high-profile breaches.

Current approaches to security are flawed, due to systems being built upon excessive trust. Find out how exposed you may be, and how to minimise trust and protect your systems with smartcard technology.

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Cyber Security
**22. TRUSTWORTHY
SOFTWARE**



EXHIBITORS
**FREDRIK NORDVALL
FORSBERG &
JAMES CHAPMAN**
University of
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Bugs in software programs can be extremely costly, or have disastrous consequences. Testing can find bugs but only formal verification can prove their absence.

Our research facilitates an approach to programming where more aspects of safety are guaranteed intrinsically, through strong typing rather than additional proof labour.

Cyber Security
**23. DEFENDING
UK'S CRITICAL
INFRASTRUCTURE
FROM NATION STATE
CYBER-ATTACKS**



EXHIBITOR
**MARIA
EVANGELOPOULOU**
University of Glasgow
E: maria.evangelopoulou@glasgow.ac.uk

The aim of this project is to investigate and identify problems and solutions in order to defend the UK Critical Infrastructure from Nation State cyber-attacks.

The scope of this project is to think like an attacker and implement 'lessons learned' in order to enhance the infrastructure's proactive and reactive mechanisms.

Cyber Security
**24. COPIES AND
CONTRABAND:
FAST FORENSIC
IDENTIFICATION OF
DUPLICATE IMAGES**



EXHIBITOR
SEAN McKEOWN
Edinburgh Napier
University
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Identifying known images is central to copyright enforcement and digital forensics investigations. Existing techniques do not scale well to large datasets and modern high capacity storage media.

While traditional approaches process complete files, our approach analyses only a small percentage of the file. This reduces disk read and processing times, particularly on solid state drives.

EXHIBITORS

Networking & The Cloud / Robotics & Autonomous Systems

Networking & The Cloud
25. DATA PLACEMENT
AND MIGRATION IN
MOBILE EDGE CLOUD



EXHIBITOR
**IBRAHIM
ALGHAMDI**
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In this research, we investigate a series of real-time optimal decision makers to support mobile users and service providers. The objective is to achieve the best decisions for scheduling, placing and migrating mobile data/services among distributed data-centres.

The research focuses on helping companies to achieve their service level agreements, whilst also improving user-experience.

Networking & The Cloud
26. NETWORK
ROULETTE:
DEMONSTRATING
DO-IT-YOURSELF
NETWORKING TOOLKITS



EXHIBITOR
MICHAEL SMYTH
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University

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This research is carried out with **Ingi Helgason**. It addresses the development of toolkits to support ownership, empowerment and learning in the context of hyperlocal WiFi networking.

Digital products and services are changing, including networking and media sharing practices, and the rise of 'Do-It-Yourself' practices mean that the demarcation between producer and user is becoming increasingly blurred.

Networking & The Cloud
27. OPTIMISING
APPLICATION-
DEMONSTRATING
CONTAINER
ORCHESTRATION ON
CONTAINER-INSTANCE
CLUSTERS



EXHIBITOR
**UCHECHUKWU
AWADA**
University of
St Andrews

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This research aims to extend the existing application container orchestration systems by adding a cloud-based Container Management Service (CMS) framework, which offers increased deployment density, scalability and resource efficiency.

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Robotics &
Autonomous Systems
28. PEPPER THE ROBOT



EXHIBITOR
**MARY ELLEN
FOSTER**
University of Glasgow
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@glasgow.ac.uk

MuMMER (MultiModal Mall Entertainment Robot) is a four-year, EU-funded project with the overall goal of developing a humanoid robot that can interact autonomously and naturally in the dynamic environments of a public shopping mall.

Using co-design methods, we will work together with stakeholders including customers, retailers, and business managers to develop truly engaging robot behaviours.

Robotics &
Autonomous Systems
29. ROBOT BUTLER



EXHIBITOR
**HERIOT-WATT
UNIVERSITY
ROBOTICS SOCIETY**
Heriot Watt University
E: hwroboticssociety
@gmail.com

Building butler robot – collaborative framework for butler-like behaviours.

Robotics &
Autonomous Systems
30. SOCIALLY
COMPETENT
ROBOT FOR
HIGH-FUNCTIONING
ADULT WITH AN ASD



EXHIBITOR
PETER MCKENNA
Heriot Watt
University
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This research is carried out with **Ayan Ghosh**.

People with an Autism Spectrum Disorder (ASD) struggle to interpret social signals, leading to difficulties in securing and maintaining employment.

Behavioural Skills Training (BST) is an effective training approach for the effects of an ASD, but is labour-intensive. SoCoRo aims to use reduce the cost of applying BST through the adoption of robots.

EXHIBITORS

Robotics & Autonomous Systems / User-Experience

Robotics & Autonomous Systems
31. CONTEXT-ACTIVE RESILIENCE IN CYBER PHYSICAL SYSTEMS



EXHIBITOR
XIAODONG LIU
Edinburgh Napier University

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The project aims to develop a novel approach to context-active resilience in CPS, to ensure the best matching and optimal functions and QoS in real-time during the running of the CPS.

We will systematically analyse the very diverse contexts and the circumstances of resilience in CPS to extract practicable patterns to support the resilience in CPS.

User-Experience
32. VIRTUAL MUSEUM INFRASTRUCTURE



EXHIBITOR
ADEOLA FABOLA
University of St Andrews

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This research investigates how digital literacies can be leveraged to facilitate engagement with heritage content within and outside museum spaces.

The rise in smartphone ownership and games proficiency, and advances in computer graphics enable the development of online and onsite virtual museums and exhibitions that support the creation, curation and dissemination of heritage content in new and exciting ways.

User-Experience
33. SiViT: SIGNALLING VISUALISATION TOOLKIT FOR CANCER RESEARCH



EXHIBITOR
ANDREI BOIKO
Abertay University

E: a.boiko@abertay.ac.uk

This project aims to bridge the gap between biologists and computational scientists by developing a Signalling Visualisation Toolkit (SiViT) which provides a user-friendly interactive visualisation of cell signalling networks.

It is designed to help clinicians and biologist carry out research into anti-cancer drug development and can also be used to support teaching of biomedical science.

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#SICSADemoFest2017

User-Experience
34. SmoothMoves: AN INTERACTION TECHNIQUE FOR AUGMENTED-REALITY BASED ON SMOOTH PURSUITS HEAD MOVEMENTS



EXHIBITOR
AUGUSTO ESTEVES
Edinburgh Napier University

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SmoothMoves is a hands-free interaction technique for selecting graphical targets in Augmented-Reality interfaces.

Targets move in orbital trajectories and users make selections by matching these motions with movements of their head that are sensed by a worn inertial measurement unit.

It can be immediately implemented on a range of head-worn devices.

User-Experience
35. A FRAMEWORK FOR SPEECHREADING ACQUISITION TOOLS



EXHIBITOR
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360 million people worldwide have hearing loss which causes difficulties during conversation. Traditional technology (e.g. hearing aids) often fails to offer enough value and therefore has low adoption rates.

Speechreading (commonly called lipreading) can improve understanding, but can be challenging to learn. We developed a framework that can be used to develop tools to improve understanding when speechreading.

User-Experience
36. DIGITISATION FOR PRESERVATION



EXHIBITOR
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This research facilitates preservation of tangible and intangible heritage in remote community museums that face the direct threat of climate change.

Through advances in mobile and immersive technologies, a new type of Virtual Museum can be deployed that develops the collective narrative of the heritage, digitises the collections for preservation, and creates global links with other communities.

EXHIBITORS

User-Experience

User-Experience

37. JEEVES: HEALTHCARE APP DEVELOPMENT AT YOUR SERVICE!



EXHIBITOR
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Ecological Momentary Assessment (EMA) smartphone apps allow clinicians and researchers to monitor symptoms and experiences of patients and participants as they go about their everyday lives, but developing these apps is often outside their expertise. Jeeves is a 'visual programming environment' empowering researchers with no programming experience to design and deploy their own EMA apps.

User-Experience

38. RadarCat AND AquaCat



EXHIBITOR
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This research is carried out with **Patrick Schrempf**. Small, low-cost millimeter-wave radar systems may soon become ubiquitous for use in gesture detection. The RadarCat project demonstrates a robust object recognition system. AquaCat extends the project to the classification of liquids and powders. These technologies have a wide range of applications in domains such as pollution monitoring, public health and the creation of physical object dictionaries.

User-Experience

39. VISUAL SALIENCE FOR VIDEO SURVEILLANCE



EXHIBITOR
LAURA MUIR
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This research is carried out with **Yafan Zhao** (Robert Gordon University). Surveillance video data is a significant source of 'big data' with volumes predicted to increase rapidly each year as advanced camera technology becomes more accessible to all in a security-conscious world. Our research addresses the need for efficient and cost-effective intelligent analysis of visually important (salient) information in video surveillance footage for monitoring public spaces and events.

SPREAD THE WORD

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User-Experience

40. INTERACTION WITH LEVITATING OBJECTS



EXHIBITOR
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This research is carried out with **Stephen Brewster**. We are exploring a new type of computer interface based on levitating objects, held in mid-air by ultrasound. Our project is enhancing acoustic levitation and developing new types of human-computer interaction to enable this new technology.

User-Experience

41. MULTIMODAL FEEDBACK FOR IN-CAR INTERACTION



EXHIBITOR
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This research is carried out with **Patrizia Di Campli San Vito**. Touchscreens are moving automotive dashboards from the 'push-button' era to the 'tactile' era. However, these interfaces come at the cost of high visual demand, which raises concerns over safety during driving. Our research addresses these concerns through the development of new user interfaces and introduces new capabilities for in-car interactions.

User-Experience

42. INVESTIGATING PERCEPTION OF FIDELITY OF 3D MODELS ON THE WEB



EXHIBITOR
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This research investigates the subjective perception of the fidelity of 3D digital models in web browsers and how this affects the user experience. The models are hosted on the social repository Sketchfab.

EXHIBITORS

User-Experience

User-Experience
43. USING THE
PSYCHOLOGY OF
HEARING TO DESIGN
AUDIO INTERACTION



EXHIBITOR
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Sound is becoming a popular method of visualising data in many contexts. However, interface designers often don't consider how the listener's perceptions of how a data set should 'sound like' may affect the performance of the visualisation.

This research uses principles from hearing psychology to design better audio interactions – especially in the context of data visualisation.

User-Experience
44. CymaSense:
A REAL-TIME
3D CYMATICS-BASED
SOUND
VISUALISATION TOOL



EXHIBITOR
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Music therapy can be an effective way to improve communication for people with autism. This research looks at augmenting current practices with a real-time audio-visual tool that can be adapted to meet the requirements of clients with complex needs.

CymaSense encourages play and self-expression through musical exploration of acoustic or electronic instruments.

User-Experience
45. MOBILE
SIT-TO-STAND
SUPPORT SYSTEM



EXHIBITOR
**MARK DUNLOP
& ANDREW KERR**
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For many stroke survivors standing up from sitting is problematic. Recovering this important movement depends on practice. This can be carried out at home, however, it is difficult to get feedback on movement performance outside of therapy sessions.

We aim to support stroke survivors through the rehabilitation process using a chest-worn standard smartphone and leg-worn tactile feedback units.

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User-Experience
46. THE SONIFICATION
OF EXOSOLAR
PLANETARY SYSTEMS



EXHIBITOR
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The purpose of this study is to create and evaluate a sonification tool that represents exosolar planetary data, and can be used by astronomers.

Sonification is the use of non-verbal sound to represent data. Sonification could be an effective way of representing the time-spatial parameters of exoplanetary data that could allow astronomers to be able to detect various aspects instantaneously.

User-Experience
47. INFOTYPOGRAPHY



EXHIBITOR
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Although text can be a very expressive way to represent language to the people reading it, it is not generally able to represent additional information, such as verbal features of speech (volume, tone) or the person who wrote it.

It is possible to represent this information through the typographic features of the letter shapes themselves, which is what this project explores.

User-Experience
48. TECHNOLOGY
SUPPORT FOR
WOMEN WHO
HAVE EXPERIENCED
MISCARRIAGE



EXHIBITOR
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This research is carried out with **Maria Wolters**.

Miscarriage is the most common complication in the early stage of pregnancy. Women often suffer from physical and psychological problems after miscarriage and are sometimes dissatisfied with the care they receive.

This research examines the needs of women during and after miscarriage, with the aim of developing technology-based solutions.

EXHIBITORS

User-Experience

User-Experience
**49. VIRTUAL VIRTUOSO:
MAKING MUSIC IN
VIRTUAL REALITY**



EXHIBITOR
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This research examines how Virtual Reality can enhance the user experience of music creation for novice music creators.

We want to make music creation an engaging and motivating experience for newcomers. We achieved this through a fun, yet simple, interaction with exploration being a key theme of the experience.

User-Experience
**50. VILO: A VISUAL
INTERACTIVE
RESOURCE FOR
SUPPORTING
SELF-GUIDED
STUDENT LEARNING**



EXHIBITORS
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Teaching at university or other educational institutions is typically conducted in form of a linear sequence of lectures.

Our research investigates how to promote independent and self-guided learning by presenting the learning material in a visual and interactive way while enabling both targeted and open-ended exploration.

User-Experience
**51. STUDENT
EMPLOYABILITY
THROUGH INDUSTRIAL
COLLABORATION**



EXHIBITOR
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Research to-date has shown that students, regardless of prior work experience, are often unable to transfer academic and professional work-based learning to effectively form a unique professional identity.

Our mission is to address how to prepare students for CV preparation and secure successful employment; and to nurture a range of supporting placement opportunities.

MSc RESEARCH & FUTURE PROJECTS

#SICSADemoFest2017

Artificial Intelligence
**PRIMES: PERSONALISED
RECOMMENDATIONS &
INTERNATIONALISATION
FOR MOOCS IN
EUROPEAN SCHOOLS**

EXHIBITOR
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Project PRIMES, funded by the Erasmus+ Programme of the European Union, aims to produce a novel e-learning platform, combining the wide reach and popularity of MOOCs using advanced artificial intelligence and data summarisation algorithms.

The project aims to provide a truly personalised learning experience, fitted to the needs and characteristics of high-school students.

Big Data
**SCALABLE ONLINE
MACHINE LEARNING
WITH STREAMING DATA**

EXHIBITOR
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Although data is generated continuously by sensors, transactions, and human interactions, until recently it has been typical to collect it in 'buckets', and treat these as static data sources for periodic machine learning.

There is a growing interest in making use of this data as it arrives, reducing the 'time-to-insight' and increasing the relevance of predictions made.

This project lies at the intersection of two exciting areas of data science and engineering - extending these streaming data architectures with machine learning algorithms that improve and correct themselves as new data becomes available and global conditions drift.

The result is a scalable architecture for handling streaming data making use of the Apache Spark processing engine, that has been adapted to work with both logistic regression and anomaly detection methods.

Big Data
**PAIRING-BASED
ENSEMBLE CLASSIFIER
LEARNING USING
CONVOLUTIONAL
BRAIN MULTIPLEXES
& MULTI-VIEW BRAIN
NETWORKS FOR EARLY
DEMENTIA DIAGNOSIS**

EXHIBITOR
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Diagnosis of brain dementia, specifically early mild cognitive impairment, is critical for early intervention to prevent the onset of Alzheimer's Disease, where cognitive decline is severe and irreversible.

Since dementia affects brain connections, recent machine-learning approaches used structural and functional brain connectivity data to help distinguish between different stages of dementia and normal controls. However, how dementia affects cortical brain connections in morphology remains unexplored.

Our work proposes a learning-based framework for eMCI/NC classification by analysing morphological brain connections on different levels.

MSc RESEARCH & FUTURE PROJECTS

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Big Data

CLASSIFYING CRIME & TERRORISM TWEETS

EXHIBITOR

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This research uses different text classification techniques to label tweets as crime or terrorism related.

The objective is to analyse the volume of crime and terrorism tweets, to determine the relative safety of the city of London at any time.

Big Data

STONEKART: A HYBRID MULTIPLATFORM ECOMMERCE APPLICATION

EXHIBITOR

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Stone companies and freelance stonemasons predominantly sell their products directly to the consumer in-store. Stonekart provides a solution for buying these products online.

The aim of this hybrid application is to provide a multivendor e-commerce system, which provides interfaces for both buyer and supplier.

NOTES

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