In this issue we're featuring The MK:Smart Project which after three and a half years concluded in June. This was a large collaborative initiative partly funded by HEFCE that through its duration won a number of awards, including most recently three awards at Smart Cities 2017.

Our multi-award winning flagship project

MK:Smart is a large collaborative project, involving partners from industry, academia, local government and the nonprofit sector, partly funded by HEFCE (the Higher Education Funding Council for England) and led by The Open University under the direction of Prof Enrico Motta. Prof Motta was supported by a large team in KMi, including researchers, developers, IT and admin support staff, who worked in conjunction with another large team in Computing and Communication.

Milton Keynes is one of the fastest growing cities in the UK and a great economic success story. However, the challenge of supporting sustainable growth without exceeding the capacity of the infrastructure, and whilst meeting key carbon reduction targets, is a major one.

MK:Smart specifically addressed this challenge by delivering pioneering...
solutions in key areas that are affected by such fast growth, including water, energy and transport. These included solutions for optimized energy management in households with solar panels, battery storage in the home and electric vehicles, as well as solutions for sustainable management of water resources (http://www.mksmart.org/water/). The project also developed MotionMap, an app that provides travellers with information on the “busy-ness” of an intended destination and the transport options available. Based on this information, the traveller can evaluate the options available for walking, taking the bus, taking a bike, or taking the car. The mode of transport may be selected on the basis of the time required to make the journey, the carbon footprint of the journey, or a combination of both. A commercial large-scale deployment in Milton Keynes of the solutions for intelligent mobility developed in MK:Smart will take place early in 2018.

While the initial motivation for MK:Smart was to address the aforementioned key demand issues, an essential element of the design of the project was defined by its broad agenda, which also covers the computational infrastructure, which is needed to support smart city solutions.

Hence, central to the project was the creation of the state-of-the-art MK Data Hub (https://datahub.mksmart.org/), a computational infrastructure which supports the acquisition and management of vast amounts of data relevant to city systems, from a variety of data sources. These include data about energy and water consumption, transport data, data acquired through satellite technology, social and economic datasets, and crowdsourced data from social media and specialised apps. The data accumulated in the MK Data Hub inform analytics at different levels of detail to support intelligent planning and usage of resources across city systems. To date, the MK Data Hub comprises over 3000 data sets that are accessible to developers wanting to build applications. In addition, it is being replicated in Manchester by BT, one of our partners in MK:Smart, in the context of the Innovative UK City Verve projects. While the project is formally completed, the MK Data Hub will remain operational for several years, enabling MK council services and data-intensive application
development, as well as providing a resource to support scientific research and business training.

MK:Smart also comprises ambitious education, business and community engagement activities and indeed one of the distinctive elements of the project is its active focus on involving citizens in the innovation process, not just through an outreach programme, but also by actively engaging the community in innovation-centric decision-making processes. This was achieved by allowing citizens to submit, via the OurMK website (https://ourmk.org/), their ideas for initiatives that, in their view, would create a real change within local communities, using Smart City concepts. As a result MK:Smart has supported and funded 13 such citizen projects. Among these, highlights include the Centre MK Beacon System for visually impaired citizens and the Breastfeeding Hub MK Mobile App, which allows the community to share information about breastfeeding-friendly places in MK.

Another crucial aspect of the MK:Smart project was development of a number of education programmes helping a wide range of audiences (from local schools to higher education students and businesses) to gain awareness and skills and competences needed to participate in the creation of a smart city. One of the key examples of this activity was the development of The Smart City MOOC (https://www.futurelearn.com/courses/smart-cities). This 6 week free online course helps students to navigate their own path through the complex landscape of Smart Cities. Over 30,000 students from over 100 countries have signed up to this...
MOOC so far.

MK:Smart also teamed up with several Milton Keynes schools to deliver the Urban Data School, an education programme designed to help primary and secondary school children to become urban data literate.

Finally, MK:Smart also developed a training programme (Urban Startup Lab) for local SMEs which explored the tools that urban startups need to prosper and succeed. This last activity was also a part of the MK:Smart integrated programme of business engagement, aimed at supporting businesses that wish to take advantage of the innovation capabilities developed in MK:Smart. During the course of the project we engaged with over 700 companies and a subset of these have worked intensively with the project team, acting as early users of the MK Data Hub and helping us to test the effectiveness of the infrastructure.

Although the project officially finished at the end of June 2017, a number of new exciting initiatives related to project’s main research areas (i.e. transport, energy, water as well as citizen and business engagement) are already in place, aimed at scaling up and consolidating the solutions pioneered by the MK:Smart project.
And in other news…

KMi’ers have become regular’s at ESWC!

Several members of KMi contributed to the 14th Extended Semantic Web Conference, which took place recently in Portorož, Slovenia.

In the research track, there were papers from Dr. Hassan Saif and Paul Warren, on "A Semantic Graph-based Approach for Radicalisation Detection on Social Media" and "Improving the Comprehensibility of Description Logics - Applying insights from theories of reasoning and language". Dr Saif’s paper focuses on the use of semantics together with machine learning approaches for detecting radicalised users on social media. Dr Saif also presented a paper entitled “On Semantics and Deep Learning for Event Detection in Crisis Situations" at the 2nd Semantic Deep Learning workshop (SemDeep), where he introduced a novel approach on enriching deep neural networking with word semantics for detecting crisis-related events on social media.

Prof. John Domingue took part in a panel entitled "The Future of Proceedings Publication: the Perspective of the Semantic Web Community" which stimulated a lot of active discussions about the community’s ability and desire to ‘eat its own dogfood’ and use Web-based and Web-focused tools and standards to promote publication in a linked semantic fashion, and how best to work with publishers to ensure this.

The programme also featured two workshops organised by KMiers (or former KMiers): the steering committee of the 1st International Workshop on Application of Semantic Web technologies in Robotics (AnSWeR) included Dr. Emanuele Bastianelli, Dr. Ilaria Tiddi and Dr. Mathieu d’Aquin, while the 2nd International Workshop on Linked Data and Distributed Ledgers (LD-DL) included Prof. John Domingue.

The AnSWeR workshop was the first attempt to bring together people from the Semantic Web and the Robotics area. A considerable amount of people attended the workshop, that featured lively interactions and discussions. Many of the points raised during the presentations and the final discussion have been put down in a shared document, which was editable by everyone in the audience, and will serve as starting point for the future editions of the AnSWeR workshop.

Dr. Allan Third presented a paper at LD-DL, "Towards the temporal streaming of graph data on distributed ledgers" featuring the...
work of the Blockchain group with the GreenData project and the data collection work organised in the KMi-featured MK2MG project (Milton Keynes goes to Mongolia). Two KMi’er in July are taking part on the Mongol Rally 2017 (see below story) where they will be covering over 10 000 miles and travelling through at least 15 countries, all the while feeding into this data collection. The paper describes the use of blockchains to provide a “certification” of streaming datasets which guarantees that they haven’t been corrupted or tampered with after initial storage, allowing trustworthy data querying in cases where there is a lack of trust due to, e.g., economic or political pressures.

OER17 - The Politics of Open

The Open Educational Resources conference (OER17) took place on April 5th and 6th in London. In two days fully packed with paper presentations and interactive sessions, OER17 presented an opportunity for open practitioners, activists, educators and policy makers to come together as a community to reflect on ‘The Politics of Open’ and discuss the following questions:

- What are our current key challenges and strengths – locally, nationally, and internationally?
- What are our priorities – in terms of political governance, organisational and personal politics?
- What are the changes that we want to effect together?

Alexander Mikroyannidis represented KMi and delivered a hands-on workshop together with Abi James (University of Southampton). The workshop was focused on the SlideWiki platform for collaborative authoring of open courseware. Similarly to the workshop delivered at the Open Education Global conference, this session offered the opportunity to participants to get acquainted with the redesigned SlideWiki platform and its functionalities for the collaborative authoring of open courseware, crowdsourced translation of educational content, as well as social networking. Valuable discussions were conducted with participants and feedback was collected regarding the redesigned content editing interface of the platform, its capabilities for reusing various sources of external media, as well as the import and export capabilities of educational content offered by the platform.
Learn About Fair 2017, but with a difference!

The Learn about Fair 2017 (LAF 2017) came back this year at the OU on 27 June bringing something new to the table focused around the theme of ‘Personalised Open Learning’. KMi participated as an exhibitor showing neat projects for future innovation in teaching and learning: Augmented Reality/Virtual Reality developments, Green Data & OU Analyse.

Paul Hogan, building on last year presentation of Augmented Reality (AR) applications, presented the Introduction to Sport and Fitness and Human Biology Apps developed in partnership with the Faculty of Wellbeing, Education and Language Studies (WELs) and STEM colleagues respectively.

The Apps provide a direct and dynamic way for OU students to learn how human digestion/ muscular systems (Level 1 E117 Sport & Fitness module) and our heart work (SK299 Human Biology module) bringing to life human body systems. AR allows digital and physical world to coexist in the same space. With the help of mobile devices, students are able to visualize digital objects placed in the physical space or human body, providing an extra layer of information, interaction and learning tool with the real world.

The students can access them not only via phone or tablet camera but also through PC based desktop version or non-AR mode on mobile devices as well.

Following the success of OU Go 3D campus Guide last year, in July we will be launching the OU Photobooth App, which will be available for students and general public respectively. The App has been developed in collaboration with Liz Ellis from Learning Teaching Innovation (LTI), project manager of OU PhotoBooth.

The app is being developed to allow students to edit their photos and text with OU styled emojis, 'OUmojis' and then share on various social media platforms as well as text and email. Look out for new OU photobooth snaps coming soon!

http://kmi.open.ac.uk/
Leaving the augmented reality and virtual world, Chris Valentine captured attention on the stand on how detect, store and share power generation and the use of data directly from solar PV, wind and solar/geo thermal installations.

The **GreenData** project collects data every 10 minutes using low-cost devices which are quick and easy to set up. The volume of data is expanding (currently 14 feeds from 12 contributors) all the time as the network of volunteers who have installed these devices in their homes increase, these are mostly in the UK, with two based in Greece and Austria.

The data captures instantaneously live information allowing students at any level of education to easily access and use in their learning in a different way as an incredible open source data.

Today the GreenData project is being used by a numbers of course tutors (associate lecturers) in their own teaching of the course. The next goal is to make the data extrapolation and interpretation as an official part of the OU course modules.

Students are constantly experiencing hard times during their studies especially in their first year. What can go wrong during my studies? Am I at the right speed? Did I choose the right course for my career or is the module too advanced?

**OU Analyse** is a project that is piloting machine-learning based methods for the early identification of students at risk of failing Open University modules. Thanks to a collection of Demographic and Virtual Learning Environment (VLE) data, OU Analyse creates predictive models in order to detect who is at risk. After detection, the system generates next a justification to show the reason why the model predicted the possible risk of failure. Supplied with this information, the student is supported by the tutors by intervention and advised on how to improve their performance in the course.

To support the tutor’s decision on how to help the students, Zdenek Zdrahal and Martin Hlosta presented the newly developed personalised study recommender at LAF 2017. Each week, the recommender combines the current importance of the specific course material with the effort each student has made so far. Based on this data, the model indicates which study materials which are most appropriate to use with respect to each assignment.

The recommender will be piloted in selected courses starting in the autumn semester.
Milton Keynes goes to Mongolia – they’re on their way!

KMi’ers Ilaria Tiddi and Emanuele (Manu) Bastianelli have embarked on a 4 month trip of a life time, currently taking part on the Mongol Rally 2017 as the MKpandas46 team. They are going to drive for charity their 15 year old Renault Clio, covering over 10,000 miles and at least 15 countries from Milton Keynes to Ulan-Ude in Russian, crossing Mongolia.

Ilaria and Manu are raising money for Mary’s Meals, a charity that fights hunger by providing daily meals in schools in food-vulnerable areas including Africa and South East Asia.

Of course, being KMi’ers they could not miss the opportunity to collect data on their locality, car telemetry and health analytics. Among other uses, the collected data will be used a part of the KMi Blockchain groups on-going experiments into the use of the Blockchains for certifying data integrity. Check out and monitor their progress [here](https://mk2mg.kmi.open.ac.uk/gengis-kan/#whatfor).

Follow their story, their adventure and of course their data analytics:

https://www.facebook.com/mk2mg

http://mk2mg.kmi.open.ac.uk/gengis-kan/#whatfor


https://twitter.com/mk2mg
KMi PhD Student success in winning HEIF funding

The Augmented Reality in Activism (ARIA) Project launched in June at KMi with the aim of improving inclusive participation in social protest and campaigning. ARIA will utilise Augmented Reality (AR) and Web technologies to enable people to remotely engage in social activism.

AR allows digital and physical world to coexist in the same space. With the help of mobile devices and head-mounted displays, any user is able to visualize digital objects placed in the physical space, providing an extra layer of information and interaction with the real world. In the ARIA project, AR enables those who support a given cause, but who are not able to visit a physical protest or event, to be “digitally” present and engage with the rest of the participants.

Through a web interface, activists will be able to place a digital avatar at the location of the event, along with a short statement expressing their views. Those who are physically present at the event will be able to download an AR application that will show them the people remotely supporting the cause: Looking through their smartphone or other device’s camera they will see in the space around them the avatars of the remote supporters.

PT Anywhere presented at the IEEE EDUCON 2017

The IEEE Global Engineering Education Conference (EDUCON) 2017 has been the eighth in a series of conferences that rotate among central locations in IEEE Region 8 (Europe, Middle East and North Africa). EDUCON is the flagship conference of the IEEE Education Society. This year’s EDUCON took place on April 25-28 in the city of Athens, Greece.

Alexander Mikroyannidis presented a paper on PT Anywhere. PT Anywhere offers a network simulation environment via a web interface that can be accessed from any web browser or as a widget inside an interactive eBook. PT Anywhere is based on the Packet Tracer network simulator for Windows and Linux developed by the Cisco Networking Academy. PT Anywhere has been jointly developed by the Open University and Cisco and has been funded by the FORGE project, as part of its initiative in driving and promoting the concept of experimentally driven research in education by using experiments as an interactive learning and training tool.

http://kmi.open.ac.uk/
channel for both students and professionals. Through Andrew Smith, a senior lecturer in a number in Cisco Networking modules, the tool has been piloted with the Cisco academy. KMi in a joint proposal in C&C (STEM) have been successful in a project which will further build on this work.

The FORGE project was completed in September 2016 and was rated "Excellent" by the European Commission. The Open University team continues to maintain PT Anywhere and is actively seeking new funding opportunities in order to further develop and improve PT Anywhere.

1st Workshop on Linked Data and Distributed Ledgers @ WWW

The first workshop on Linked Data and Distributed Ledgers which was recently held at the World Wide Web (WWW) conference in Perth, Australia attracted a lively audience who came to discuss the relationship between the two fields. Linked Data research has a long pedigree at WWW whereas Distributed Ledgers (which include blockchains the technological underpinning of crypto-currencies such as BitCoin) are very new.

The day was structured around two keynotes, three presentations based on refereed submissions and a Round Table discussion. After an opening from one of the workshop’s organisers, KMi’s Director John Domingue, Peter Evans-Greenwood first gave an overview of how Distributed Ledgers could initiate a golden era of community-driven collaboration over market driven enterprises.

The second Keynote came from Manu Sporny who outlined how Linked Data could contribute to Distributed Ledgers and vice versa. Two key messages emerged from his talk. Firstly, Distributed Ledgers can be used to digitally sign Linked Data graph fragments enabling authentication with respect to, for example, a Linked Data application or validation from an authority. Work needs to be carried out however, on how distributed identities, a core component of Distributed Ledgers, can be handled within the Linked Data technology stack.

In between the two keynotes a series of refereed presentations were given. Victoria Lemieux outlined how Distributed Ledgers could support Archival Bonds – the property linking an archival record to its surrounding context. For example, that a set of documents represent land ownership or birth records.

The presentation “Linked Data Indexing of Distributed Ledgers” outlined a joint paper from Allan Third and John Domingue of KMi on how meaningful and domain specific blockchain indexes
Best Paper at NLDB 2017

The paper, ‘Automatically Labelling Sentiment-Bearing Topics with Descriptive Sentence Labels’ coauthored by new KMi member, Advaith Siddharthan, ex-KMi member Chenghua Lin and their PhD student Mohamad Barawi was awarded the best paper award at the 22nd International Conference on Natural Language and Information Systems – NLDB 2017 (17% acceptance rate for full papers). The extended version of the paper below will be published in the Data & Knowledge Engineering Journal (Springer) later this year.

Advaith joined KMi in June from The University of Aberdeen. His research specialisation is in Computational Linguistics and Data Science, with a focus on communicating complex data and making information and data (particularly telemetric data) accessible through text analytics, summarisation, reformulation and natural language generation. Advaith has a particular interest in Citizen Science, and in particular, technologies that break down the divide between professional scientists and the lay public and facilitate the meaningful engagement of the public with science.

could be built. This work uses the BLONDiE blockchain ontology which emerged from a collaboration between KMi and the Fraunhofer Institute.

The round table discussions were lively and it was agreed that the work would continue within the existing W3C Blockchain Community Group. The newly formed W3C Working Group on Verifiable Claims will also provide a forum to expose the work. The overlap between Linked Data and Distributed Ledgers is a very exciting area with a lot of potential.
KMi wins prestigious SWSA Distinguished Dissertation Award for the 2nd year running

Dr Ilaria Tiddi has just won the 2017 SWSA Distinguished Dissertation Award for her Dissertation ‘Explaining the Data Patterns with Knowledge from the Web of Data’.

This is the second year in a row that a KMi PhD student has won this prestigious award with Dr Hassan Saif picking up the award last year.

Ilaria describes her work at the intersection of knowledge discovery and semantic web research, using the Web of Data to generate explanations for patterns found in data through data mining techniques. In her thesis Ilaria investigated the hypothesis that the interpretation of data behaving in a similarly way (“patterns”) could be facilitated and automatized using the Web of (Linked) Data thanks to the shared and cross-domain knowledge in it. To demonstrate this, Ilaria developed Dedalo, a framework that automatically provides explanations to patterns of data using the background knowledge extracted from the Web of Data. She studied the elements required for a piece of information to be considered an explanation, identified the best strategies to automatically find the right piece of information in the Web of Data, and designed a process exploiting Machine Learning techniques (such as Inductive Logic Programming, Neural networks and Genetic Programming) able to produce explanations to a given pattern using the background knowledge autonomously collected from the Web of Data. The final evaluation of Dedalo involved users within an empirical study based on a real-world scenario, the interpretation of trends of Google searches. She demonstrated that the explanation process is complex when one is not familiar with the domain of usage, but also that this can be considerably simplified when using the Web of Data as a source of background knowledge.

Congratulations Ilaria! KMi is very very proud of your achievement!
PhD Student Highlights

Our PhD students have been quite active in their respective studies. Many students took the opportunity to give a seminar in KMi’s Podium during the last few months, showing their research and their latest achievements both to the lab and to a wider audience through our live webcasts. Here is a summary of the excellent series we have enjoyed:

On 15th of May, Paul Warren, in his seminar “What have psychology and philosophy ever done for us?”, shows how Description Logic (DL) can be made easier, using insights from the theories of reasoning developed in cognitive psychology and from the philosophy of language.

On 25th of May, Taha Tobaili, in his seminar “Sentiment Analysis for Arabizi: A multilingual jargon in Social Media”, presented both his approach for detecting tweets written in Arabizi (Arabic with latin scripts) and his recent findings in performing sentiment analysis over tweets extracted in two countries, written in this language.

On 31st of May, Marilena Daquino, a visiting PhD student in KMi for 4 months from the University of Bologna, gave a seminar describing the work she had accomplished with the collaboration of other KMiers. In her seminar, entitled “Data provenance and trustworthiness assessment in photo archives”, Marilena firstly introduced her contribution to the development of ontologies that can represent domains like Photography and Arts, and then she introduced quantitative and qualitative approaches to evaluate the trustworthiness of data provided by archives.

On 26th of June, Renato Cortinovis, presented his research, aiming to contribute solutions to support educators in their exploratory search of Open Educational Resources (OERs). In his seminar, entitled “Supporting the discoverability of Open Educational Resources”, he showed the different prototypes he has developed throughout his studies and the results he obtained from his evaluations, interviewing 29 educators from different countries.

During July we also had the pleasure to listen to Gianluca Bardaro, a visiting PhD student from the Polytechnic University of Milan, he discussed: “Robot capabilities and models or: How I Learned to Stop Worrying and Love Robotics”.

All the seminars are available for replay at https://facebook.com/kmistadium.

Outside the lab, our students have also had chances to present their work to a wide community of scholars and have also left a footprint as contribution to science through peer-reviewed papers. In April, Tracie Farrell Frey presented her work on the affordances of learning analytics to the Future Learn Academic Network (FLAN). While in June, she had two papers accepted at the EC-TEL 17 conference in Tallinn, Estonia.
A further contribution came from Angelo Salatino, he had a journal paper accepted at PeerJ Computer Science entitled “How are topics born? Understanding the research dynamics preceding the emergence of new areas”, https://peerj.com/articles/cs-119/.

Furthermore, on 25th May, Anita Khadka presented her work to the London Hopper Colloquium 2017, http://academy.bcs.org/content/london-hopper-colloquium-2017, as her abstract was selected as a finalist of the competition. Anita also attended SWM2017 and BIR2017 which are workshops centred around her field of work. In addition, with the help of another student, David Pride, and their supervisor Petr Knoth, they organised the 6th International Workshop on Mining Scientific Publications (WOSP 2017). This was held in conjunction with JCDL 2017 Conference.

KMi is looking forward to what is coming next for our doctoral students!
KMi’s World Stage
and Closer to Home

John Domingue travelled to Reading to attend a Council of Professor and Heads of Computer Conference (24-25 April).

Shuangyan Liu headed to Athens, Greece to present a paper at EDUCON 2017 Conference (25-30 April).

Allan Third and Umar Mir attended a plenary meeting for Slidewiki in Madrid, Spain (25-28 April).

Allan Third travelled to Porto, Portugal to participate in the UP2U Technical Workshop (08-10 April).

Trevor Collins travelled to London to attend a HE networks meeting (24 May).

John Domingue, Aneta Tumilowicz, Jaisha Bruce, Alan Fletcher, Julian Gilbert, Robbie Bays, Paul Alexander, David Castledine, Emanuele Bastianelli, Ilaria Tiddi and Carlo Allocca travelled to London for the MK:Smart finale at the top of the BT Tower (16 June).


Pinelope Troullinou attended Cagliari, Italy for a summer school (23-29 July).

John Domingue, Ilaria Tiddi, Emanuele Bastianelli, Allan Third and Hassan Saif went to Portorož, Slovenia to attend the ESWC Conference and organise a workshop (28 May-01 June).

Alessandro Adamou went to Paris, France to attend a EU Project proposal meeting (30 May-1 June).

John Domingue, Ama Aba-sah, Aneta Tumilowicz and Alexander Mikroyannidis travelled to Paris, France to participate at the EDSA Plenary 2017 (07-10 June).

Shuangyan Liu headed to Shannon, Ireland to join the Language, Data and Knowledge (LDK) 2017 event (17-23 June).

Giuseppe Scavo headed to Amsterdam, Netherlands for a workshop at Unite Europe 2017 (27-29 June).

Allan Third, Umar Mir attended a Slidewiki Hackaton conference in Southapmpton (13-16 June).

John Domingue went to Newcastle to present KMi’s blockchain work at a procurement meeting for Open BlockChain support (14-15 June).

John Domingue travelled to Brussel, Belgium to participate in an invitation only high level US-EU workshop on the next generation internet (26-28 June).

Allan Third went to Troy, USA to attend a conference for Slidewiki (24 June-3 July).

Moizzah Asif travelled to Edinburgh to attend RECon Event (29-30 June).

Andrea Mannocci & Hassan Saif travelled to Bilbao to attend a summer school (16-22 July).
KMi Future

Events Coming Soon...

- Nancy Pontika will be traveling to Edinburgh for a CORE-Open Minted conference (3-4 August).

- John Domingue will be travelling to Barcelona to attend HUB4NGI forum on the next generation internet (12-14 September).

- John Domingue will be travelling Distributed Ledger Conference in London as an invited speaker (12 September) and also will be speaking at another Conference in London on 20 September, ‘Blockchain Live’.

- John Domingue will be chairing the STI International Summit in Crete on 4-5 September. This will be attended by senior researchers in the Semantic Web/Linked Data area.

- Alan Fletcher will be travelling to Yinchuan, China as an invited speaker at the TMforum smart city conference (18-24 September).

- Alessandro Adamou, Enrico Daga, Francesco Osbourne, Ilaria Tiddi and Hassan Saif will be travelling to Vienna to attend ISWC 2017 Conference (21-25 October).