UNIVERSITY of BRADFORD

Faculty of Engineering & Informatics

Faculty of Engineering and Informatics Newsletter

February 2021

Welcome from the Dean

The Prime Minister has this week made a statement to Parliament on the roadmap for easing lockdown restrictions in England. Students on practical Higher Education courses at English universities, who would be unable to complete their courses if they did not return to take part in practical teaching, access specialist facilities, or complete assessments, may also return from 8th March. The University will be reviewing the detail of the roadmap and will be providing further guidance to students and staff at the earliest opportunity. Further detail on the announcement can be found at the University website here>>

Staff and research students must still continue to register their requests to attend campus via our established Faculty procedure.
The easing of lockdown restrictions should be treated with cautious optimism. As such, staff and students attending campus are strongly encouraged to obtain an LFD COVID test twice a week, at the University testing centre. The University continues to work with Bradford Council to monitor virus transmission across the district.
In the meantime, stay safe and keep in touch.

Newsletter summary:

Dr Brown coordinates University contribution in celebration of the UN International Day of Women and Girls in Science

11 February was the United Nations International Day of Women and Girls in Science. This day was planned to recognize the contributions made by women and girls to advancing understanding in science and technology, with a particular theme for 2021 of Women Scientists at the forefront of the fight against COVID-19.
A UNESCO Zoom Webinar showcased some of the work led by women in the fight against COVID-19, and highlighted the often negative impact of COVID-19 on woman scientists and the related contribution to the widening of the gender gap in science.
Staff and students from our Faculty shared their thoughts and visions via social media and a University news story. More here: https://www.bradford.ac.uk/ei/women-in-engineering/

Academic in profile:

Prof Crina Oltean-Dumbrava

Crina has over 44 years' professional experience of which 40 years have been in academia, with teaching and research experience in the UK, France, Germany, Italy, Greece and Romania. She has a MSc qualification in civil and building engineering and a MA in economics, and she is a Fellow of the Institution of Civil Engineers (ICE), a Member of the Royal Institution of Chartered Surveyors (RICS), and a Member of the Chartered Institute of Building (CIOB).

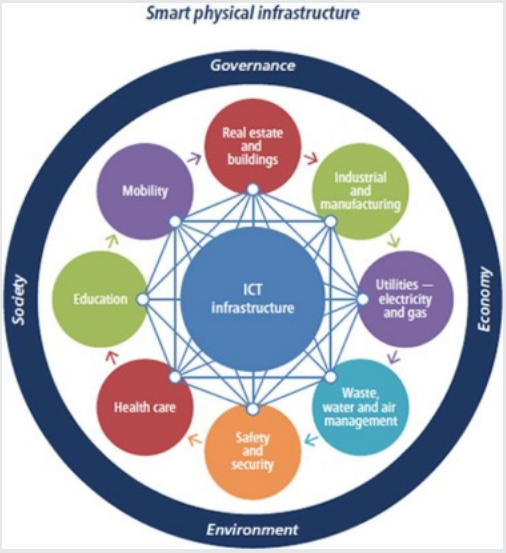
Crina is also a Board Member of the Joint Board of Moderators (JBM) Visiting Accreditation Panel and Past Chair of the UK's Association of Civil Engineering Departments. She is also an international expert on the evidence-based sustainability assessment framework on multi-criteria analysis and she was selected by European Commission's Environment Directorate-General independent scientific advisors to assist the development of effective, evidence-based policies.

In the last 40 years, she has been a Principal Investigator (18 grants), a Co-Investigator (18 grants), and a Collaborator (2 grants) of 42 research and teaching grants, including four personal grants. Her research activity has generated in the UK a total of £7,499,160 equivalent.

As an academic she has authored or contributed to 17 books, and published over 120 journal and conference papers. In addition, Crina has made 25 keynote presentations.

Crina has been appointed as a member of the REF 2021 Main Panel B, Sub-panel 12: Engineering, as an Output Assessor.

She is a UN Partner and Expert in Sustainable Buildings and Construction, more here>>



Current research interests:

- Sustainability assessment of the built environment (buildings, water and waste water infrastructure, transport infrastructure and noise reducing devices);
- decision support systems based on multi-criteria analysis;
- construction economics with special expertise in cost modelling, cost benefit analysis and whole life cycle costing

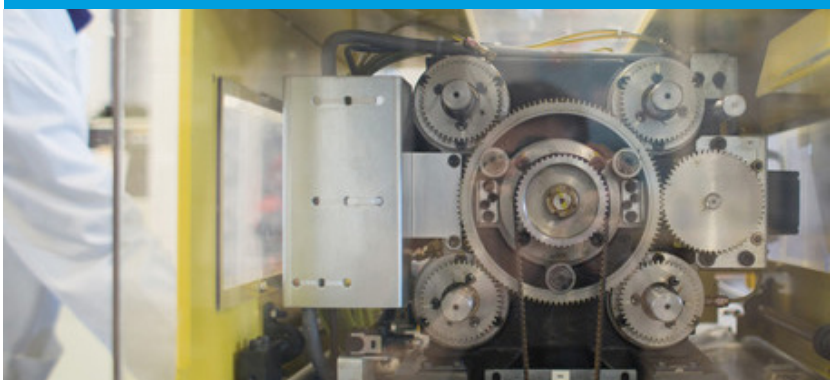
Research projects:

- Cost Action TU 1406 Quality specifications for road bridges, standardisation at a European level (BridgeSpec)
- QUIetening the Environment for a Sustainable Surface Transport (QUIESST), FP7 EU Grant
- EPSRC/WITE Grant, A Multi-Criteria Analysis/Risk Management Tool to Assess the Relative Sustainability of Water Applications

Research and Knowledge Transfer

Submitted Projects:

- Immersive Hospitals: Ecologies for the Democratization of Visual Analytics in Healthcare, Mai Elshehaly
- Digitally controlled biomimetic system, John Sweeney
- Engineered TEtrahedRal Plastic ReInforcement in Structural concretE (ENTERPRISE), John Sweeney
- PLA/PBAT processing, Floreon, Adrian Kelly
- University of Leeds - Textile Technology, Adrian Kelly
- Distrupol Testing 1, Ben Whiteside
- Non-invasive Face and Gesture based Predictive Analytics, Hassan Ugail



Artificial intelligence solar flare detector used by NASA, developed in Bradford

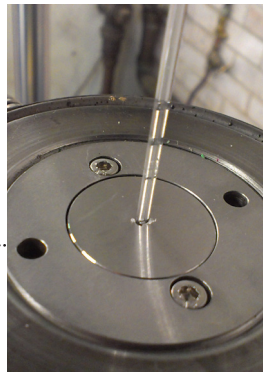
Solar flares could be on the increase over the next few years as the sun moves towards the most active part of its 11-year cycle, according to the Space Weather Research team, led, at the University of Bradford, by Professor Rami Qahwaji.

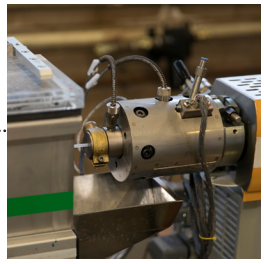
Moreover, our increasing reliance on technology means we're more vulnerable than ever to solar flares, which can cause massive power blackouts.

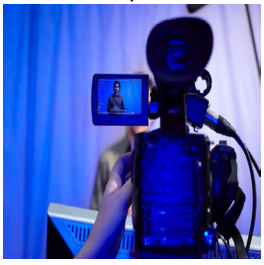
However, a system used by NASA to monitor sunspots and predict solar flares - which was developed at the University of Bradford (UK) - could give us more warning.

Open calls for funding:

- Expression of interest: ISCF smart sustainable plastic packaging demonstrators, closing date: 24 March 2021 11:00 UK time
- Innovate UK Smart Grants, closing date: 26 May 2021 11:00 UK time
- Pre-announcement: NERC scientific support and facilities, closing date: 22 June 2021 16:00 UK time
- UKRI Trustworthy Autonomous Systems programme: responsibility, closing date: 13 May 2021 16:00 UK time







Staff and Students' news

New Interdisciplinary Research Projects

Two new projects in the Automotive Research Centre / Advanced Automotive Analytics Institute demonstrate the strong and growing collaboration between the engineering and computer science disciplines in the Faculty of Engineering and Informatics. The new academic staff that joined us as result of the Bradford Excellence Programme are so important to this exciting research on future transport solutions.

aiR-Force – Artifical Intelligence (AI) for Reliability-based Feature Optimisation with Driver Contextual Intelligence, in collaboration with Jaguar Land Rover (JLR) and funded by the Institute of Digital Engineering as a 'Proof of Concept'. The aim of the work is to validate on an industry virtual test rig platform the reliability-inspired strategy for control optimisation of vehicle propulsion system developed by Aleks Doikin, a PhD student working on the major inPowerCare project previously funded by JLR. The team will have access to large volumes of real-world vehicle data to develop advanced driving behaviour models, which can be implemented in real time controllers to optimise performance with contextual intelligence predictive analytics. The interdisciplinary research team includes Felician Campean (Mechanical and Energy Systems Engineering Department (MESE)), Cuong Dao (MESE), Amr Abdul-Latif (Computer Science Department (CS)) and Kit Zhang (CS).

NextGenDrive – £6M Advanced Propulsion Centre UK project led by electric vehicle innovator Arrival, with partners Romax / Hexagon, and VersusTek, to develop and demonstrate a radically new manufacturing model, using autonomous robotic manufacturing to deliver high quality / low unit costs for small to medium volumes of electric drive units for the Arrival vans and buses. The Bradford team (Felician Campean (MESE), Sohag Kabir (CS), Kit Zhang (CS), and Eduardo Munive-Hernandez (MESE)) will be leading two work packages focussed on a model-based systems engineering approach to the assurance of robust and resilient design and operation of the drive unit robotic microfactory.

UK-China on-line research workshop January 2021

After 11 physical research workshops in the UK and China, the Polymer IRC hosted the first online UK-China Advanced Materials Research Institute Research Workshop on Wednesday 27 January 2021.
The workshop attracted 130 academics and researchers from the UK and China, consisted of technical talks and open discussion. The main representatives were the core 5 leading Chinese polymer research groups, which include our 3 joint research laboratories. It showcased recent research, particularly emphasising two collaborative projects, with keynotes by Prof Canhui Lu for the EPRSC Low Carbon project with Sichuan University on recycling of polymers (with comments from PI Prof Adrian Kelly) and Prof Yongfeng Men for the Royal Society Newton Advanced Fellow project with Changchun CIACAS on in-situ structural measurements during orientation of polymers (PI Prof Phil Coates). Prof Ben Whiteside, Prof Steve Rimmer, and Dr Brian Thomson presented research in precision moulding, novel functionalised biodegradable PUs and shape memory tissue-bone fixations respectively. Professor Phil Coates, UK Director of the UK-China AMRI, chaired and Dr Fin Caton-Rose and Ms Xiaolei Wang co-hosted the workshop. Phil comments: "This was a really encouraging meeting! We aim to host these online research workshops throughout the year, to encourage existing and develop new collaborations."

Staff and Students' news

Bradford academics make their mark on global citations rankings

Faculty's academics have ranked highly in the global database of the World's Top 2% Scientists by Stanford University and hosted by Mendeley.
The database contains over 150,000 leading scientists and it was created to provide updated analyses and a publicly available database of top scientists.

Prof Ashour, Prof Lam, Prof Mujtaba, Prof Vourdas, Prof Watts, Prof Abd-Alhameed, Dr Parchin are few of the Bradford academics listed for their contribution to science.

More here>>

Prof Sweeney is the Special Issue Editor for Polymers

The topic of this Special Issue is 'Shape Memory Polymers: Applications and Associated Manufacturing Techniques'. Shape memory polymers (SMPs) have been developed over the last few decades and have begun to find practical applications. While many of the applications are in the biomedical area, there are also examples in 'heavier' engineering, such as aerospace and civil engineering structures. The subject of this Special Issue is applications of SMPs that have been practically realised. The manufacture of the SMP devices concerned is considered to be an intrinsic part of the application process and is within the scope of the Special Issue. Shape memory polymer composite devices are also included in the scope of the issue. There is no restriction on the application areas.

More here>>

Dr Farshid Sefat is appointed as a guest editor for the Special Issue of Bioengineering Journal

This special issue is focused on the 'Design and Fabrication of Artificial Stem Cell Niches' and it aims to capture innovative approaches to designing functional synthetic niche environments in a form of original research papers as well as comprehensive reviews.
More here >>

Staff and Students' news

Polymer IRC academics' work on microneedle manufacturing is published

Prof Ben Whiteside, Dr Mert Gülçür, Prof Tim Gough and Dr Elaine Brown published their findings on high-throughput manufacturing of transdermal microneedle arrays. This poses a significant challenge due to the high precision and number of features that need to be produced, and the requirement of multi-step processing methods for achieving challenging micro-features. The work presents the capability of laser machining as a cost-effective method for making microneedle moulds and micro-injection moulding of thermoplastic microneedle arrays as a highly-suitable manufacturing technique for large-scale production with low marginal cost. This cost-effective process chain for thermoplastic microneedle manufacture combines laser micro-machining and micro-injection moulding was published in the CIRP Journal of Manufacturing Science and Technology.

This research work was undertaken in the context of MICRO-MAN project (Process Fingerprint for Zero-defect Net-shape MICROMANufacturing), a European Training Network supported by Horizon 2020.

More here>>

Dr Kabir joins the editorial board of Applied Sciences

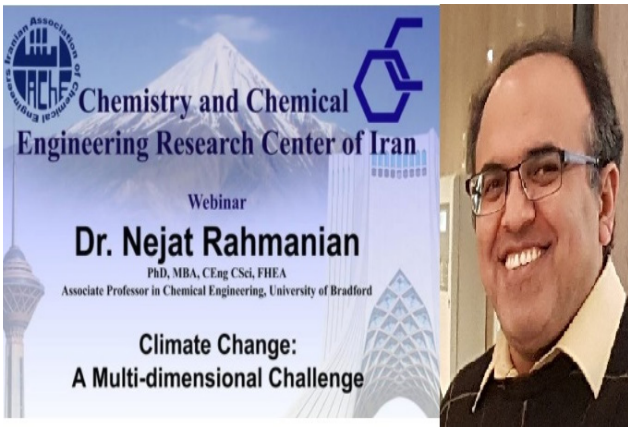
Sohag is a Topic Editor for Applied Sciences, an international, peer-reviewed, open access journal on all aspects of applied natural sciences published fortnightly online by MDPI.

Find out more here>>

Staff and Students' news

Dr John Buckley and Prof Brendan Barrett (Optometry) secure WCL funding for mobile eye-tracking device

The team was awarded £21k of WCL funding to purchase a mobile eye-tracking device for use in our Gait Lab. The proposed equipment will allow us to monitor eye movements/gaze direction during locomotion and, by linking the equipment to our motion-capture system, we will know precisely which areas of the scene are being viewed during each phase of locomotion, and for how long. This will allow us to link data relating to adaptive gait with precise spatio-temporal information about gaze position/direction.



Dr Nejat Rahmanian delivers climate change lecture

Nejat was invited by the Chemistry and Chemical Eng. Research Centre of Iran, part of the Ministry of Higher Education of Iran, and the Institute of Chemical Engineers to deliver a lecture on Climate Change on Sunday, 7 February 2021.

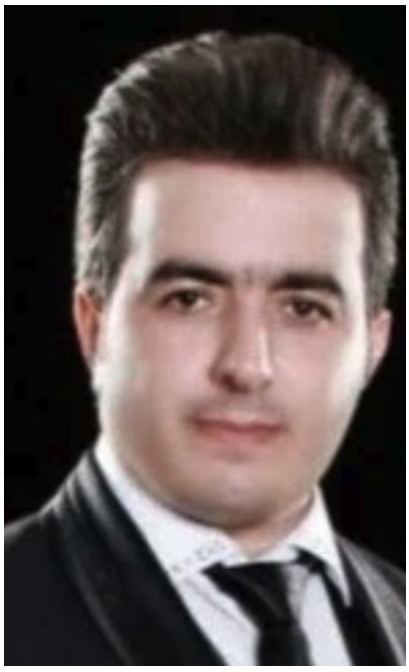
The lecture highlighted the technical, economical, social and cultural issues of climate change in the so-called developed and developing countries. He also talked about the research on carbon capture and transportation at Bradford.

Prod Abd-Alhameed and Dr Parchin are the guest editors of Electronics

The special issue entitled 'Metamaterials and Metasurfaces' in Electronics Journal, an open access journal of MDPI covers all aspects of metamaterials and metasurfaces. It also aims to highlight the exciting developments, ongoing trends, and latest achievements in their design and construction.

Deadline for manuscript submissions: 31 December 2021.

More here>>



Staff and Students' news

Dr Pu is the Topic Editor and Special Issue Editor for MDPI Fluids

This Special Issue is dedicated to gathering recent developments in research and technology, and aims to form a useful collection for environmental sediment transport studies.
This Special Issue's scope includes, but is not limited to, the impact of sediment transport to urban watercourses; evolution of morphological and scouring properties within coastal or river systems; contaminant and pollutant transports; and sedimentation and erosion induced by extreme natural flow events, such as in flooded or turbulence conditions.

More here>>

Dr Buckley New Publications

John's work on 'Faster visual reaction times in elite athletes are not linked to better gaze stability' was published in Scientific Reports. The paper can be found here>>

Furthermore, his work on 'Stair gait in older adults worsens with smaller step treads and when transitioning between level and stair walking' was published in Frontiers in Sports and Active Living here>>

Early Career Research Seminar (ECRF) and Shut-up and write session

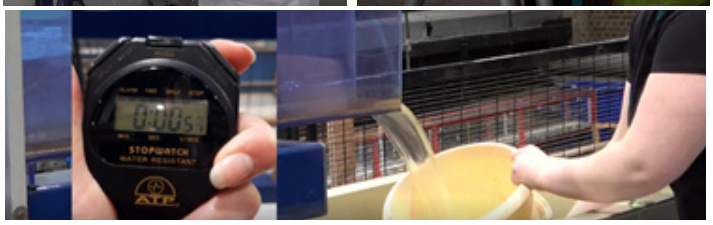
Dr Irfan Mehmood presentation on 'Recourse Conscious Frameworks for Videos Summarization and Prioritization' was well received by the forum.

Dr Cristina Tuinea-Bobe talked about the EPSRC Fellowships types and methods of appying.

The forum joined after the standard ECRF meeting a 'Shut-up and write' session where they concentrated on the developmet of presentation, research bids, reports and papers. The sessions will take place weekly on alternate Wednesdays and Fridays.

Our next meeting is on 17 March 2021, 12 noon, followed by a 'Shut-up and write' session.

Staff and Students' news



Dr Panesar, Dr Mehmood and Prof Ugail host the Research Seminar Series

The 8th seminar from the Centre for Visual Computing (CVC) Research Seminar Series (RSS) – took place on Thursday 18th February 2021 at 12pm.

Dr David Zendle, a Lecturer in Computer Science at the University of York, and a Video Games Effect Expert, talked about 'loot boxes and the convergence of gaming and gambling'. Loot boxes are items in video games that may be bought with real money and contain randomised contents whose value is uncertain at the point of purchase. Similarities between loot boxes and gambling have caused concern regarding their social effects and proper regulation. Dr Zendle outlined the effects, prevalence, and profitability of loot boxes, before moving on to discuss a variety of other ways that video games and gambling are colliding. A recording of this seminar is available.

The Virtual Lab

Last March when we went into lockdown, it did not take long to realise that students would not be able to attend lab classes on campus and this might be a long-term issue. Therefore, questions arose about how practicals should proceed. Could it be that all learning including labs would have to be online?

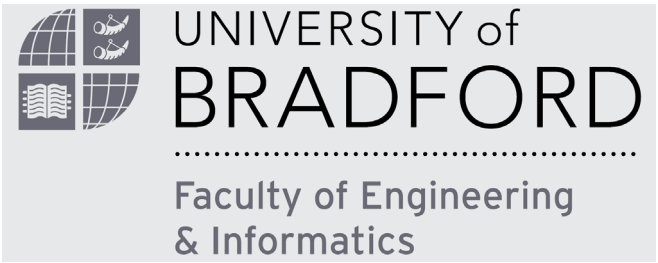
Joanna Wood is a Lead Engineering Technician and mainly works in the labs in Chesham building. With anticipation of having to put videos online, and already with a background in graphics and media, she took on the challenge of learning how to edit video while in lockdown. The National Science and Media Museum rearranged the Bradford Science Festival to an online event in 2020, so this was an opportunity for Joanna to dive in and put her new video editing skills to the test by producing videos for the public to see, showing what we do in the labs.

"It was an opportunity to not only learn new skills, but also to provide help in difficult circumstances. We all need to work together to provide students with the best support we can. There are times that I've also filmed myself doing labs, it's not quite the same but you get used to being in front of the camera and it's great when you can edit the video yourself afterwards."

When a couple of people on campus knew about this, word went around the Faculty quickly. While a few Academics were able to video and edit their own classes, or do live labs, there were many who required assistance. With the use of MDT's camera equipment, and planning with Academics about what was needed, labs started to be filmed and edited so that they could be uploaded alongside teaching material for our students on Canvas.

"Blended learning and social distancing posed significant challenges when it came to delivering lab sessions for our students. The skills learned from small group, hands-on lab classes are important, so we had to ensure students were provided with high quality experiences to compensate for the situation this year. Videos containing both a clear explanation from staff and close-up, high quality shots of equipment are helpful for learning. High definition filming enabled the details to be communicated and made accessible to students in a way that was relevant to their experience. Joanna's ability to suggest best angles, film, edit and add in detail where necessary was invaluable. She was happy to spend time planning and working with tutors to produce films in a very short timescale."

Dr Elaine Brown – Reader in Mechanical & Process Engineering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