



SCHOOL OF COMPUTER SCIENCE AND ELECTRONIC ENGINEERING

ALUMNI NEWSLETTER SPRING 2023



WELCOME

From Dr lestyn Pierce, Head of School of Computer Science and Electronic Engineering

Welcome to this second newsletter from the School of Computer Science and Electronic Engineering. This edition showcases the latest news, achievements and stories from both the school and our alumni. We share research highlights, including awards won at the 2022 Computer Graphics and Visual Computing Conference and a PhD student's prize-winning poster presentation at the Dimensional X-Ray Computed Tomography Conference. Last summer, we held our first in-person graduation ceremony since 2019, celebrating the achievements of our graduates from the past three years. It was a joy to welcome back students from three different cohorts to the university.

The school has actively resumed its in-person outreach program since the lifting of Covid restrictions. In November 2022, we hosted a Girls in STEM Day through EESW (Engineering Education Scheme Wales), where 90 female students from three local schools participated in engineering and computer science workshops facilitated by the school, Technocamps, and the Nuclear Futures Institute. Another Girls in STEM Day was held in January 2023, with 90 female students from three additional schools. Another event is scheduled for April 2023.

In November 2022, the school welcomed 60 pupils from three local schools to the Engineering Centre for North and Mid Wales Engineering Team Challenge, in partnership with Careers Wales and Magnox Ltd. In December we hosted the IET Faraday Challenge (whose theme partner is UKRI's Future Flight Challenge) where 6 teams of 6 (from year 8) from 5 local schools competed against each other for the glory of being crowned the Faraday Challenge Day Winners.

We are open to hearing from other partners about their experiences with organizing similar events and also welcome companies to join us in collaboration for the next year. If you are interested, please reach out to our School Liaison, Dr. Daniel Roberts at <u>d.r.g.roberts@bangor.ac.uk</u>.

Are you currently working in the fields of computing and engineering? We would be thrilled to hear about your experiences and explore potential collaborations. We offer numerous opportunities, including industrial presentations, guest speakers, and joint research initiatives. Additionally, we would be honoured to showcase your work in our next newsletter.

Best wishes,

Dr lestyn Pierce, Head of School



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PHD STUDENTS TRAVEL TO BOSTON TO DISCUSS AI (ARTIFICIAL INTELLIGENCE) RESEARCH

Two PhD Students from Bangor, supported by the Artificial Intelligence Machine Learning and Advanced Computing doctoral training centre, travelled to Boston to visit the Massachusetts Institute of Technology (MIT). AIMLAC is funded by UKRI (UK Research and Innovation).

The group of 12 PhD Students and two academics exchanged research ideas on how AI and machine learning, and education and training in data science. Two students from Bangor, six from Swansea and two each from Bristol and Cardiff universities presented their research in talks and had meetings to discuss the application of AI and Machine Learning (ML) in scientific research as well as on the education and training of the next generation of data science/ML leaders.

The delegate group, led by Professor Gert Aarts (from the University of Swansea, and lead of the joint AIMLAC project), also visited the NSF (National Science Foundation) AI Institute for Artificial Intelligence and Fundamental Interactions (IAIFI). The group was hosted by Professor Jesse Thaler and Dr Phiala Shanahan.

Iwan Mitchell (PhD student studying X-ray reconstruction and Optimisation) said: "The time at MIT is something I will not forget easily. The topics from both AIFAI and AIMLAC were intriguing and interesting, and I had an excellent time discussing AI research with the team at MIT. Boston was a beautiful place, and we even found time to visit the local aquarium! Overall, the presented research was inspiring, and has given me many ideas for my research."

Professor Jonathan Roberts (Bangor University lead in AIMLAC) said "This Boston trip was a fantastic opportunity for the students. The AIMLAC doctoral programme has provided opportunities far and beyond what is possible with a traditional PhD process. They have come back from this trip buzzing with excitement, and lots of new research ideas."



MEDRU AND THE DSP CENTRE PROVIDE XREALITY COURSE AT AIRBUS

Bangor University's Digital Signal Processing (DSP) Centre of Excellence team, within the University's School of Computer Sciences and Electronic Engineering, has delivered a new skills course to Airbus employees, as part of the University's new Medru Programme.

Medru <u>– the skills factory</u> is a partnership between Bangor University, Coleg Cambria and the Open University in Wales to provide skills development to local businesses in STEM disciplines and in the first phase, specifically around <u>Industry 4.0</u>.

<u>Dr Panagiotis Ritsos</u> and <u>Dr Peter Butcher</u> from the University's Immersive Environments Lab (IEL), delivered a course on **XReality** to the world-class development and production team at the largest aeronautics and space company in Europe, Airbus, based in Broughton, North Wales. This course is one of the activities of the DSP College, part of the Digital Signal Processing Centre of Excellence, which delivers training courses and vocational seminars, in addition to postgraduate taught, research, and undergraduate taught programmes.

The course, delivered over four two-hour sessions, provided an introduction to Virtual, Augmented and Mixed Reality (VR, AR, MR - collectively called XR), and discussed some of the challenges of these paradigms, along with use-case for the Aerospace sector and presented some of Bangor University's demos in <u>Immersive Analytics</u>. A similar course is offered to MSc level, through the <u>MSc in Advanced Computer Science</u>, where students can take up MSc dissertation work in XR with the School of Computer Science and Electronic Engineering academics.



Above: Example demo in Immersive Analytics: Image of the VRIA framework in MR, through the Microsoft HoloLens. *Credit: School of Computer Sciences and Electronic Engineering*

"It was a pleasure to deliver this course at Airbus, a company that has had strong interest in using XR technologies in various stages of their operational activities. Airbus has a long history of exploring the use of AR, in particular. With the current interest in concepts such as Digital Twins for training and simulation, we are confident that the course provided a strong foundation that underpins these applications. The participants were keen to ask very interesting questions, and we got the opportunity to explain how artificial intelligence (AI), future networks such as 5G, and recent advances in human-computer interaction (HCI) interfaces can facilitate further growth into the use of XR in aerospace. It was a pleasure to deliver this course, and we are already looking forward to the next time!"

Dr Panagiotis Ritsos, Bangor University Immersive Environments Lab (IEL)

"We got the chance to demonstrate some of our cutting-edge prototypes built using Web-based XR, through real-time demos with Microsoft's Mixed Reality HoloLens 2 and our Immersive Analytics framework, <u>VRIA</u>. In addition, participants got the chance to develop some basic prototypes, using an online sandbox and the <u>A-Frame</u> and <u>React-three-fiber</u> Web frameworks. It was exciting to see people pickup these activities and develop something in a single session, assisted by the immediacy of the Web."

Dr Peter Butcher, Bangor University Immersive Environments Lab (IEL)

Dr Daniel Roberts, Liaison Officer of the School of Computer Science and Electronic Engineering to Medru commented, "Medru offers a great opportunity to work with business to fill a skills gap in industry, at a range of different levels. Learners taking part in Medru courses are preparing for the future of Smart Factories, with XR being identified as an area of interest and development for Airbus. Through real-time demos, learners from Airbus got an opportunity to see how XR technologies, such as Microsoft's HoloLens 2, could enhance the working environment and how using such technologies could aid in manufacturing processes."

<u>Dr lestyn Pierce</u>, Head of School of Computer Science and Electronic Engineering added "It's great to see the benefits that staff from the school are delivering to industry through the DSP College and Medru."

<u>Prof Jianming Tang</u>, Director of the Digital Signal Processing Centre commented: "The course marks a fantastic start of the DSP Centre's training course series. By fully using the Centre's world-leading expertise in DSP, cutting-edge technical innovations and unique experimental facilities, the DSP Centre is working hard to provide more training courses in the near future to serve the community even better".

"The XR course was very insightful as an Airbus employee. The topics were covered in a way that was suitable for everyone, despite your background/previous knowledge of XR, with interactive elements as well."

Maya Paes, Digital Technology and Solutions Apprentice at Airbus



CELEBRATING THE SUCCESS OF OUR GRADUATES

On the 8th of July 2022, the School of Computer Science and Electronic Engineering hosted a graduation ceremony for students from three cohorts: 2020, '21 and '22. Students who graduated during the pandemic were invited back to the in-person graduation ceremony.

Dr lestyn Pierce (Head of School for Computer Science and Electronic Engineering) said "It was a pleasure to host our 2022 graduation ceremony. While every graduation celebration is special, this one was extra special, because we invited three years' worth of graduating students. Over the past few years, and during the covid pandemic, we held school graduation celebrations virtually. The University postponed the formal ceremonies to this year. It was a delight to see the students in-person, and celebrate with them, their parents, and friends. After the formal ceremony, we hosted a reception for over 400 people, where we handed out prizes. We congratulate all our students for their achievements and wish them well for the future. Indeed, it will be great to stay connected, and hear what they are doing, and how they are getting on with their careers."

The school awarded 21 student prizes, for the 2022 graduating students, along with formally acknowledging the prizes from the previous few years. Professor Jonathan Roberts, who chairs the awards and recognition committee, said "We are immensely proud of all our students. But some of our students have gone above and beyond. We acknowledge their success through the awarding of prizes. We gave each of the award winners a glass trophy paperweight celebrating their success. The school also honoured the memory of Joe Marshall, who was a Computer Science student from 2018 to 2020, by presenting the 'Kindness and Community' award in his honour. We congratulate the prize winners, as well as all our students for their achievements."

The prizes were handed to the following recipients:

• The J H Gee Prize, for outstanding performance in computing related maths was awarded to **Catty Langford**.

• The W. E. Williams prize, for the best second year student on a BSc or BEng course was awarded to **Jake Lowe**.

• The R H C Newton award, for the best second year student on maths for engineering, was awarded to **Sean Price**.

• The Paul Green Memorial award, for the most meritorious undergraduate on their final year project, was awarded to **Adam Brotzman**.

• The R A Jones Prize, for proficiency in Engineering-related Maths was awarded to Thomas Hughes.

• The Dr David Owen (physics) prize, for outstanding performance in physics in their engineering course was awarded to **Michael Giombetti**.

• The Ada Lovelace award, for the most meritorious female in engineering, was awarded to Zhijin Lyu.

• The Ada Lovelace award, for the most meritorious female in a Computing course, was awarded to **Stephanie Evans**.

• The Institute of Engineering and Technology (IET) prize for the best final year student on an IET-accredited course was won by **Sabrina Zulkifli**.

• **Charles Jones** was awarded the Jan Abas Computer Graphics Prize, by demonstrating the best use and understanding of computer graphics or related technologies in their final year of their course.

• The Dr Jane Rudall Award for Achievement and Progress is awarded every year to a student who has attained significant achievements, having pursued their studies with determination and effort. This year the Jane Rudall award was given jointly to **Kamila Klepalova** and **Ross Barnes**.

• The Professor David Last Memorial award, for the most improved student in the school, is awarded to **Annabelle Idu**.

- The prize for most meritorious student on a computing course, is awarded to Marius Evans.
- The most meritorious degree apprentice award is given to Spencer Kenny.

• The Kindness & Community Award was awarded to **Jasmine Parkes**. This award is to be presented to someone in the School of Computer Science and Electronic Engineering who has gone above and beyond to show kindness to others and to build community. The award is given in memory of Joe Marshall who was a Computer Science student from 2018 to 2020.

- The Degree Apprenticeship award was jointly awarded to Alexander Anglesea and Alex Jones.
- BSc Product Design Highest Academic mark was awarded to Andreas Koukouris
- The Lloyd Jones Award for Entrepreneurship (Welsh domiciled female) was presented to Elinor Jones.
- The Lloyd Jones Award for Entrepreneurship (Welsh domiciled male) was presented to Ben Lewis.

Two students also were recognised by the University for their outstanding achievements.

The Senate Prizes and Awards Committee of the University awarded the Dr John Robert Jones Award to **Marius Evans**, and to **Daniel Evans**. The awards are made by the University's Senate Prizes and Awards Committee and that the prize was instituted by means of bequest made to the University under the will of the late Dr John Robert Jones of Hong Kong and is awarded annually to a student or students whose academic performance is judged to have been the most meritorious in that year.

At the graduation ceremony the university also awarded a prestigious university teaching fellowship to Dr Daniel Roberts, lecturer in Electronic Engineering at the school, recognising his excellence in teaching, community outreach and student support.



Left: Celebrating with our graduated students, family, and friends

THREE PAPERS PRESENTED BY RESEARCHERS WIN AWARD AT 2022 COMPUTER GRAPHICS AND VISUAL COMPUTING CONFERENCE

Researchers from the School of Computer Science and Electronic Engineering presented their research on computer graphics, computer vision and interface design at the <u>2022 Computer Graphics and Visual</u> <u>Computing (CGVC)</u> Conference. The two-day conference took place online, on the 15th and 16th September 2022. One of the papers was awarded the "Best Short Paper" prize.

Professor Jonathan Roberts (Professor in Visualisation at the School) said "It was a delight to present our research at the conference. And a great honour to receive the best short paper prize. At the school, we have a long history of researching computer graphics, image processing, and human computer interaction and design. The conference series has run since 1981 and been supported by the <u>Eurographics</u> Association since 1983. In the past, we at Bangor have been involved in running several of these events. The school has hosted the event twice, recently in 2019, and before in 2007; and hosted the international 2011 Eurographics Association conference in 2011."

Dr Franck VIdal (Senior lecturer in computer science, at the school) said "Our paper presents work from a longestablished collaboration, on image analysis, machine learning and MRI imaging, with Basrh University, Iraq and INRAE, Saclay University, France. We are pleased to present our work at the 2022 CGVC conference. As a group of researchers from Bangor, we presented two full papers and one short paper." Two full papers were published:

"Personalised Authentic assessments with Synchronous Learning Activities: a Framework for Teaching Visualisation and Graphics." Jonathan C. Roberts [EG DL]

"Interactive Visualisation of the Food Content of a Human Stomach in MRI". Conor Spann, Shatha Al-Maliki, François Boué, Évelyne Lutton, and <u>Franck P.</u> <u>Vidal</u>, [<u>EG DL</u>]

And one short paper was published, which was awarded the "David Duce, Best Short Paper" prize, and was awarded by Professor David Duce: <u>"Towards Developing a Digital application for the Five Design-Sheets Methodology</u>". Aron E. Owen and Jonathan C. Roberts, [EG DL]

Aron Owen (a PhD student at the school) said "I was thrilled to receive this award. The work is a collaboration with my supervisor, Professor Roberts, and forms part of the outputs of the first year of my PhD. It is only in the initial stages of this research but helps to further and adapt the established Five Design-Sheet methodology. This was my second conference as a PhD student, and it was a delight to meet with fellow researchers and hear about their research and present alongside established researchers. It is a privilege to be researching in a dynamic and enthusiastic team."



Left: Announcement at the conference of the Best Short Paper award



AI (ARTIFICIAL INTELLIGENCE) PHD STUDENT WINS BEST POSTER PRESENTATION AT DIMENSIONAL X-RAY COMPUTED TOMOGRAPHY CONFERENCE

The annual Dimensional X-ray Computed

Tomography (dXCT) conference took place between 13-16 June 2022. Researchers from the School of Computer Science and Electronic Engineering presented their results and was awarded the prize for the "best poster" presentation.

The dXCT conference is coordinated by the UK's <u>National Physical Laboratory</u> (NPL) and brings together researchers to discuss the latest developments in X-ray computed tomography (XCT) dimensional measurement and its industrial applications.

Mr Iwan T. Mitchell (PhD student) and his supervisor, <u>Dr Franck P. Vidal</u> (Senior Lecturer in computer science) gave two presentations. First, an oral presentation on experimental microtomography (microCT) and high-fidelity simulations, titled "<u>Towards quantitative imaging in the case of strong</u> <u>artefacts</u>", which is a collaboration between Bangor University and INSA-Lyon (France). Second, they delivered a research paper titled "WebCT: Fully Featured Browser-Based Interactive X-Ray Simulations for Scan Planning and Training", which was given as a poster presentation, and was awarded the "Best Poster Presentation" Prize. The prize was sponsored by Waygate Technologies. This work is a collaboration between Bangor and Swansea Universities. The printed poster included a QR-code that enabled an Augmented Reality (AR) demonstration of his XCT simulation software.

Iwan (who is supported by the Artificial Intelligence, Machine Learning and Advanced Computing (<u>AIMLAC</u>) doctoral training centre) said, "It was exciting to be at the Dimensional XCT this year! Seeing how XCT can be applied in a metrology standpoint, and how every stage of the process can be calibrated for accurate results. Over the four days I have had inspiring discussions, alongside intriguing talks on how important quality XCT can be applied to many fields. I was a bit shocked at being nominated the best poster, because I had so much fun talking to like-minded people about my research!" <u>Dr Vidal</u> said "Missed the conference? You can scan the QR (Quick Response) code below at home with your Smartphone to experience the demo!"

He continued by adding "It is always a delight to attend Computed Tomography conferences and see how X-ray imaging is used in metrology (the science of measurements). The scientific talks were extremely interesting. I like seeing this increase in the use of computational simulations, something I am particularly interested in. What made the conference stand out is the relevance of the 2-day training, and the exhibition hall populated with all the major XCT manufacturers or distributors. No need to say I was an incredibly happy supervisor when Iwan was given an award for his research contribution. Well done, Iwan."



PostReality ID:





BEAUTIFUL VISUALISATION – INCLUSIVITY AND DIVERSITY AT THE HYBRID 2022 DATA VISUALISATION CONFERENCE

The IEEE (Institute of Electrical and Electronics Engineers) VIS 2022 conference brought together academics and researchers from around the world. With onsite participants in Oklahoma City, live participation online, and free places to encourage inclusivity and diversity.

IEEE VIS is an annual conference on data visualisation. It is a conference that is organised by volunteers representing the IEEE (Institute of Electronics and Electrical Engineers). This year, VIS (the Visualization and Visual Analytics Conference) ran from October 16 to 21st. This was the first time it was organised as a hybrid event, with both onsite and live-streamed remote participants. The on-site component took place at the Omni Oklahoma City Hotel in Oklahoma City, Oklahoma, USA. The virtual component of the conference provided access to the VIS community around the world.



Jonathan C. Roberts, Professor in Visualisation, said: "It was the best conference ever. I have been attending the annual visualisation conference for many years, but this year it was even better: with onsite participation along with live virtual participants. In addition, with the 'diversity and inclusivity' virtual ticket, many people from around the world could attend for free. This is brilliant. I understand about 200 people participated who would not have been able to do so. Over and above that, the organisers ran a programme for kids, which was called `<u>VISKids'</u>. This programme gave grants to help people attend with young kids, pay for child sitting, travel and so on, and additionally the group ran activities, discussion and play for both the kids and their parents. What a wonderful way to include more researchers, who have young kids."

While Jonathan Roberts was on-site in Oklahoma, other academics, and researchers, from the university, including <u>Dr</u> <u>Panagiotis (Panos) Ritsos</u> and <u>Dr Pete Butcher</u>, attended virtually.

<u>Dr Ritsos</u> (Lecturer in Visualisation) said "It was a wonderful experience. I enjoyed this year's conference. While it was a shame that I could not attend in person, it was great hearing all the presentations online." He went on to say, "We set up a big screen, and watched several presentations together as a team. I especially enjoyed the keynote. Dr Marti Hearst talked about visualisation, text and spoken words."



Above: IEEE VIS 2022 conference, people on the refreshment break

Left: Poster display at the IEEE VIS conference 2022

Credit: Photographs by Jonathan C. Roberts

Dr Pete Butcher (post-doctoral research in visualisation, at the Digital Signal Processing (DSP) Centre of Excellence) attended sessions on immersive visualization, visualization grammars, data dimensionality and visualization design.

Pete explained: "I really enjoyed the presentation of Andrew McNutt's paper entitled 'No Grammar to Rule Them All: A Survey of JSON-style DSLs for Visualization', which featured our tool: <u>VRIA</u>. VRIA is a Web-based framework for immersive visualization. The tool started as a contribution for my PhD, and we have continued to develop the framework here at Bangor. To see McNutt's survey, that included our tool and others, was great." Pete went on to say, "I always enjoy the IEEE VIS conference. There is a sense of community that is hard to get at different venues."



Above: Springer stand with Roberts' and Panos' Five Design-Sheets book. *Credit: Photograph by Jonathan C. Roberts*

The School of Computer Science and Electronic Engineering was involved in five different activities for the conference.

- Jonathan was joint chair of the Short Papers programme, which saw 32 papers published.
- Jonathan was chair of the Test of Time (ToT) board. This board recognises research publications from previous conferences which are still relevant and useful today. Papers from the 2012 IEEE, Visual Analytics Science and Technology conference, were considered. The 2022 ToT award was made to the paper "Enterprise Data Analysis and Visualization: An Interview Study" by Sean Kandel, Andreas Paepcke, Joseph M. Hellerstein, Jeffrey Heer.
- Jonathan sat on the committee to decide the best VIS Doctoral Dissertation Award 2022, as awarded by the <u>Visualization and Graphics Technical Community (VGTC) of the IEEE Computer Society</u>.
- Panos sat on the IEEE VIS programme committee, which reviewed the full papers.
- Jonathan presented a paper titled "<u>Reflections and Considerations on Running Creative Visualization Learning</u> <u>Activities</u>", which was published in the <u>VisGuides</u> workshop.

"Oklahoma City was beautiful, and so were the visualisations" said Professor Roberts."I walked through the poster room before the evening poster session. There were some amazing and beautiful data visualisations. Visualisations of jet streams, vortices, colourful tabular visualisations, to name a few. And it was great to see our book on display on the Springer stand. Outside, the weather was sunny and hot, with several large geometric Halloween displays, and a beautiful sunset to end the conference. Overall, I met many new researchers, started new collaborations, and had a very enjoyable time. Well done VIS 2022."



Above left: Professor Jonathan C. Roberts at the IEEE VIS 2022 conference Above right: The IEEE VIS 2022 conference was held at the Omni Oklahoma City Hotel, which is located across the street from the Bricktown District.

Credit: Photographs by Jonathan C. Roberts

STUDENT SUCCEEDS IN ELECTRONICS INTERNSHIP

Students at the School of <u>Computer Science and</u> <u>Electronic Engineering</u> are encouraged to take internships. Especially when related to the student's field of study, the internships help to develop student skills, support academic studies, and provide new opportunities for students.

Professor Jonathan C. Roberts (Director of Impact and Engagement for the school) talked with Adam Brotzman. Adam is a student on the <u>MEng</u> <u>Electronic Engineering</u> programme had completed a summer internship programme with an electronics design consultancy called Partner Electronics.

Adam Brotzman said, "Over the summer of 2022, I obtained a place on a 10-week internship with an electronics design consultancy called <u>Partner</u> <u>Electronics</u>. Whilst not part of the course - I am on (MEng Electronic Engineering) - this placement complemented my studies well, allowing me to apply my theoretical knowledge across a wide range of practical tasks, some of which were related to ongoing client work. The most beneficial part of an internship for me was getting an insight into the mindset of industry professionals: their approach to tackling real-world problems and finding solutions."

Jonathan Roberts asks, "I am always excited to hear about internships, and especially hear about the process of getting one, could you tell us some more about your experiences."

AB: "I chose this company, as it offered a lot of opportunities to partake in practical work – something which I find fun and gives me great satisfaction when a project gets completed." I found the company and placement on Gradcracker.com, and subsequently emailed them my CV, and a covering letter. A short while later, I was contacted by phone, where a more in-depth explanation of the placement was given, and some technical questions sent over – some short programming tasks, and some circuit design tasks. These were then discussed during the online interview, along with the typical generic interview questions."

JR: "It is great to hear that you had a practical experience. It is always great to have experiences that you can reflect on, at a later stage. What type of work did you do in the internship?"



Above: Adam Brotzman Photo credit: Jan Rydon – Office Manager at Partner Electronics

AB: "During the internship, I worked on several tasks, including fault finding and calibration of client equipment, circuit prototyping, embedded firmware design, even some GUI (Graphical User Interface) design in C#. In doing this, my skill set was significantly diversified; personally, I find it difficult to pick up new skills unless there is an external goal to achieve. As a result, a lot of the stuff I learnt was practical: usage of IDEs (Integrated Development Environments), and how to properly apply crimp terminals to wires stick out as two immediate, albeit quite different, examples. I also gained a good sense of the work environment there. I was quickly integrated into part of the team there. I was also asked to stay connected as they would "like to work with [me] again" - interpret this how you will."

JR: "That sounds brilliant. It is excellent to hear that you were accepted as part of their team. What are you doing now, and what are your next steps?"

AB: "I am back at university to complete my final year of studies. After the internship, I have a much better grasp on how to tackle tasks, particularly with regards to taking a step back and planning, rather than just diving straight in with no clear roadmap of what I am going to do.

I have also had, and accepted, offers from the university for another internship. This time with <u>Dr Cristiano Palego</u>, studying energy harvesting. I have also accepted a part-time research placement in conjunction with the laser department looking at laser treatment of diverse types of seeds – both of which are paid positions."





TRAINING RESEARCHERS TO CREATE VIRTUAL X-RAYS

Bangor researchers gave a tutorial on <u>gVirtualXray</u>, at the 2022 Image-Based Simulation for Industry (<u>IBSim-4i</u>) conference. The conference took place from the 17th to 20th October, at the Institute of Physics (IoP). It taught participants how to simulate X-ray images using the gVirtualXray library, and was led by Dr Franck Vidal.

The <u>Image-Based Simulation for Industry (IBSim-</u> <u>4i)</u> conference is an annual 5-day event. This year it was held at the <u>Institute of Physics (IoP)</u> from the 17th to 21st of October 2022.

Dr Franck Vidal (Senior Lecturer in Computer Science at the School of Computer Science and Electronic Engineering) led the tutorial, explained about the conference. "X-ray computed tomography (XCT) is a popular NDT (Non-Destructive Testing) technique for visualising the interior of solid objects. It is the same technique as CAT scanners in hospitals). While 3D imaging is increasingly used in the industrial sector for inspection, non-destructive testing / evaluation (NDT/NDE) and metrology, image-based simulation (in general) is still an underutilised. There are many opportunities for its use. Consequently, I led the development of the gVirtualXray library -- to give researchers the ability to create their own x-ray simulations."Franck went on to say: "Being Open-Source it is available for anyone to use. The gVirtualXray library has been used by researchers around the globe. By medical people, creating Virtual Reality systems for training, medical physicists have designed new diagnostic imaging techniques, people have used it to create Artificial Intelligence systems that detect the length of potato chips that are contained in bags, even to teach particle physics. To cite a few examples."

Different days of the IBSim-4i workshop

The first two days of IBSim-4i correspond to user training of the various techniques required for image-based simulation. Dr Vidal led a team of researchers from Bangor and Swansea Universities to teach a group of 25 international researchers how to simulate X-rays. Specifically, the training was to teach participants to create virtual X-ray computed tomography (XCT) experiments. The data generated consists of many Xray radiographs around the scanned object.

In addition, on the second day, a team from the <u>Science and</u> <u>Technology Facilities Council</u> (STFC, the United Kingdom government agency that carries out research in science and engineering) taught the participants how to reconstruct XCT volumes from the sets of radiographs with the <u>Core Imaging</u> Library (CIL).

Furthermore, Iwan Mitchell (a PhD student at Bangor University) presented the WebCT tool. WebCT is an application that uses the gVirtualXray framework and the Core Imaging Library (CIL). Iwan is funded by the Artificial Intelligence Machine Learning and Advanced Computing (AIMLAC) Doctoral programme. Iwan said "WebCT allows people to upload CAD models, set the experimental parameters of their virtual X-ray scanners, simulate the corresponding radiographs, and reconstruct the CT (Computed Tomography) volume. All without typing a single line of code! As co-chair of IBSim's Scientific Committee and coordinator of the user training, it was a delight to see that the training sessions were fully booked. As the developer of the aVirtualXrav library. I was honored to give the tutorial. It is extremely rewarding to see how people are planning to use it in their own research. I am excited to see how people use it in the future. Scanning a dense object can take several hours. Finding the right scanning parameters by trial and error is time consuming in this case. The combination of gVirtualXray and CIL makes it possible to estimate the most important scanning parameters ahead of time.

Above and Left: Attendees at the Image-Based Simulation for Industry (IBSim-4i) conference. Credit: Photographs by Dr Llion Evans

CAN WE REPAIR THE PLANET? – STUDENTS AND STAFF EXPLORE

In the Planet Repair school event, students and staff at the School of Computer Science and Electronic Engineering, explored potential solutions, unique designs, and created a short `idea pitch' video. The event took place on the 1st November 2022, and was held to celebrate 'National Engineering Day' 2022.

The Planet Repair workshop was held on the 1st November 2022. The day-long event was held to celebrate '<u>National</u> <u>Engineering Day</u>' 2022. The campaign, run by the <u>Royal Academy of Engineering</u>, with the school being a partner, helps to celebrate engineering, and challenge remaining misconceptions and outdated views of what engineering is.

Dr Daniel Roberts, Lecturer in Electronic Engineering, and Student Liaison lead, who helped organise the event said: "The Reading Week gives us, as a school, a chance to do different things and bring the multiple disciplines within the school together. This event challenged everyone to think about the climate, and what we can do to tackle climate change. It was a delight to arrange this event and it was even better to organise the event to celebrate people in engineering and to support the `This is Engineering' campaign, to challenge ourselves, and to think about climate change."



Above: Dr lestyn Pierce introducing the Planet Repair Workshop

The experiential 'Planet Repair Workshop' was designed and chaired by Chris Walker, a facilitator and lecturer who bridges business and academia. Chris Walker started by explaining that the innovation design-sprint challenge was motivated by how we can 'repair the planet'.

Dr lestyn Pierce, Head of School of Computer Science and Electronic Engineering, who welcomed everyone to the workshop said, "It was great to see how participants discussed different ideas and designed solutions that could help mitigate the effects of climate change. At the end of the day, people pitched their ideas in a short video and explained their concepts. Overcoming issues, climate change mitigation, and thinking about sustainability issues, represent huge challenges. Issues that hit at the very heart of the University's mission. It was brilliant seeing everyone getting stuck into the challenge; I'm looking forward to seeing where these ideas go!"

Pramod (Paul) Kusuma, a student studying for his MSc in Advanced Data Science, said "I had a fantastic learning experience yesterday at the planet repair workshop. I am glad I went. I learned about climate change, how productive teamwork can be, brainstorming of different ideas in a short amount of time. Particularly I learned from one our team members how algae and bacteria plays a vital role for the benefit of the climate. Information that I never knew before. I also learned about the importance of effective communication and visualisation to explain concepts to others."

Paul went on to say, "I also learned that playing a role in climate change does not have to be big. I do not need to leave it to the big companies' responsibility. Instead, it can start small, and start with me. Doing things differently, reduce the usage of plastic, reduce food wastage, encourage, educate others to do the same, and so on."



Rhodri WIlliams, a student studying for his BSc in Applied Cyber Security said: "I really enjoyed the day. It was wonderful to meet and network with like-minded people. As a degree apprentice student, I am working for M-SParc while studying for my degree. I can see huge opportunities to take these ideas further. Especially as the mission of M-SParc is to help people innovate and help to move towards a more sustainable Wales."

Left: Participants working on the Planet Repair challenge Credit: Photographs by Daniel Roberts



Many ideas were produced; and a brilliant day was had by all!

Three groups pitched their outcomes. Each group focused on a different challenge. The first group thought about the problem that methane brings to the environment. The second group focused on people's views. Thinking about how they could change behaviours. The third group focused on waste. Contemplating how they can improve how people recycle and throw away their rubbish, developing a smart rubbish bin.

Eva Voma, a degree apprentice student studying for her BEng in Applied Mechanical Engineering Systems, said "I was a member of the behavioural change group. On the one hand, it was difficult to think of different ideas and forge them into one, solid solution. On the other hand, it was wonderful to be with many intelligent people from different walks of life."

Luba Monksfield, who is studying for her BSc in Product Design, said "This was an awesome day. I worked in the group thinking about waste. I really enjoyed applying my design skills that I have been learning on the course. The group produced the idea of a smart bin. It was the day that the Bobby bin was born!"

The groups presented their work, along with a short video pitch. After discussion, the organisers decided that the best presentation should go to the group considering the methane challenge.

Thanks to the judges Jasmine Parkes (Studying for her Masters by Research, and a member of the team who won the prize in 2021), <u>Dr Daniel Robets</u> (Lecturer in Electronic Engineering, Staff/Student lead, and School's Director of Equality and Diversity) and <u>Dr Michael Ruston</u> (Senior Research Lecturer, who's research focuses on nuclear energy, sustainable systems, and decarbonisation).

Finally, a big thanks goes to Chris Walker for facilitating the event, and team facilitators from <u>Big Ideas Wales</u> and <u>Real</u> <u>ICE</u> who gave a presentation of some of their engineering challenges and solutions.



Above left: Participants presenting their solution Left: Judges making their decision

Credit: Photographs by Jonathan Roberts



TERRIFIC AND TREMENDOUS TREBUCHET SHENANIGANS



Reading week 2022 saw the Product Design students taking on a challenge of medieval proportions! Designing and building Trebuchets. The students had cardboard, duct tape and a broom handle to create their structure. All teams had a 5Kg weight at their disposal to generate power.

The weeklong activity is a non-assessed activity designed to encourage collaboration, problem solving and more importantly social interaction between all three years of our course as well as the master's students on the Applied Innovation Design course.

Peredur Williams (academic lead for Product Design) said "09:00 Monday (no lie-ins here!) saw the brief being shared. To design and build a structure capable of firing a juggling ball in three specific competitions. The first challenge was who could fire the juggling ball the furthest. The second was a speed challenge – how many juggling balls could be fired within a minute, and finally it was the precision challenge – could they hit a (very slow) moving target. The climax happened on Friday on the all-weather pitch at Ffriddoedd (thank you to Brailsford centre for its use) where the testing and firing of juggling balls happened." Peredur finished by saying "To be honest, I have no recollection who won which competition and who came out on top, but the winning was not the important element. We retired to Bar Uni to bring the Reading Week activity to a close."





REMEMBERING LLOYD JONES

Product Design received the sad news recently of the passing of Lloyd Jones P.E. on Monday 25th of April, 2022. Lloyd Jones was one of the longest supporters of Product design. Lloyd Jones was born in 1924 in Kingston, Pennsylvania to Welsh parents who emigrated from Wales.

A successful businessman, and an active member of his community, Lloyd Jones saw an opportunity to contribute to the development of others by establishing a charitable endowment in the National Welsh-American Foundation in 1986. The charitable endowment would provide an award grant to outstanding young entrepreneurs graduating from Bangor University. Since 2000, 37 students have received awards amounting to close to \$100,000 as the Endowment continues to grow based on Lloyd's continuing contributions and investments made over many years.

The department would like to extend their heartfelt condolences to the family and express gratitude to the support Lloyd Jones has provided over the years. A list of recipients since 2020 can be seen below.

Lloyd Jones Award Recipients

2022 Eleanor Jones & Ben Lewis 2021 Bridie Dimelow & Ciron Howell 2020 Elliot Goddard & Lois Griffiths 2019 Steffan Jones & Phoebe Sinnott 2018 Victoria Pulo & Hari Tidswell 2017 Danielle Louise Williams & Daniel Avis 2016 Rhianon Haf Quirk 2015 Ceri Mair Roberts & Ieuan Rees 2014 Jac Parry, Glynwen Davies & Bethan Roberts 2013 Catrin Lloyd Hicks & Daniel Sion Owen 2012 Zoe-Marie Hallsworth & Tom Purnell 2011 Sara Roberts & Shem ap Geraint 2010 Dyddgu Hywel & Sam Jones 2009 Sioned Williams & Wil Donaldson 2008 Elen Ritchie 2007 Sam Parry 2004 Celfyn Wynn Roberts 2003 Clair Roberts & Ross McEwing 2002 Bethan Britt Compton, Sarah M. Jones 2001 Mari Lois Williams 2000 Charlotte Mathews



Above: Lloyd Jones, 1924 - 2022

A full obituary can be found here: https://www.legacy.com/us/obituaries/mcall/name/lloyd-jones-obituary?id=34499321

ALUMNI PROFILES



CHRIS BALL

Electronic Engineering, 1969



"I made a good choice on that UCCA form so many years ago"

"I'm Chris Ball and run an IT support business in Surrey called Helpdesq. We started in 1985 as a bit of a hobby but when I was made redundant in 1998 it became a fulltime job and has grown into a business of 8 staff turning over almost £1 Million last year. Most IT companies were started by IT engineers and they focus on the technical side of things but our emphasis has always been on the PEOPLE who use computers rather than the computers themselves.

During the recent pandemic you would have thought that an IT company would be the first to cope with home-working and, indeed, the technology has been brilliant but our team have missed the extra communication that working in the same room as your colleagues brings. We already had Microsoft Teams and a myriad of other remote tools but it became invaluable when we started working from home. The last year has seen a big increase in computer-to-computer communication (APIs), monitoring and automation and it is always a challenge to keep up with all the new technology and software and choosing which is actually a benefit to the job. Yet the basic principles are still those I learned when at university. Our staff have adopted hybrid working and we all try and get into the office on a Wednesday and the outlook for 2023 looks rosy.

So what of the electronic engineering degree I received at Bangor? For certain the technical knowledge and the qualification has helped form my career but I am always amazed how engineering and physics principles can be applied to life in general. Open and closed loop systems, observation and test, isolating a variable, Boolean logic and of course the basic principles of electronics and programming that underpin every aspect of our modern technological way of life. It turned out to be a good choice I made on that UCCA form so many years ago."

ROGER FORSTER Electronic Engineering, 1974





"I graduated in 1974 and joined Marconi Space and Defence Systems (MSDS) in Portsmouth. My first proper job with them was the development of a Helium Speech Unscrambler and the design of associated communications consoles used by saturation divers in the North Sea. After 3 years doing that I moved to a different group within MSDS doing communication systems for the UK military. I became a chartered engineer in 1982, was promoted to Principal Engineer grade and became a project manager. I must be one of the few peoples who, tongue in cheek, can say thank you to Saddam Hussein. I was made redundant just as Iraq invaded Kuwait. The project for which I was project manager was needed in the Gulf before land fighting could start, so I ended up with 4 months extra working post the end of my 12 weeks' notice!

I got a job at what became Solent University as a Senior Lecturer and I taught various subjects for 23 years before retiring in 2014. Solent may not have been the most prestigious university but at least our BEng (Hons) Electronic Engineering was accredited by the IEE/IET. I studied part time with the Open University in the early 1990s and achieved an MSc in Computing for Commerce and Industry. I was an external examiner at Liverpool John Moores university and then at Swansea University.

Since retiring I have started to learn the art of bookbinding and have concentrated primarily on repairing books rather than making new ones. The photo of me here is with a photo album I made as a wedding present for a goddaughter using marbled papers that my wife had made. In 2022 I achieved my City & Guilds level 1 qualification with a Merit in case binding and a Distinction in making photo albums. I am now working towards level 2. My latest engineering challenge is trying to remember what I was taught about valves at Bangor as I have been asked to fault find a divers communication box made in the 1950s!

I learned to SCUBA dive at Bangor in 1970 and in 1982 I achieved the British Sub Aqua Club's highest diving qualification of First Class Diver. Since retirement I have been doing much more diving than I used to (until my wife's health and then COVID-19 got in the way). I am a volunteer guide at the Diving Museum here in Gosport, Portsmouth run by the Historical Diving Society. I take photographs above and below water and try and put the best ones on my Flickr site.

As my wife was deemed to be at risk we have been taking great care about going out. I am so grateful that we have lots of wildlife visiting our garden. I feel that we are so lucky to have all the facilities of the Internet at this time. Twenty or more years ago it would have been very different story. I celebrated by 70th birthday in October 2022 hiring an AirBnB to have all the family together. Of course all the best plans can have a hidden flaw and of course the army decided that our elder son was indispensable and had to be in Germany!"

NICHOLAS KIRK Electronic Engineering, 1967



"I first became interested in electronics with a Hornby Electric Train Set at about the age of ten or so. I was lucky enough to get a place at Bangor Electronics Dept at the age of eighteen and I obtained a lower second Honours degree in 1968. I then went to Southampton University and came out with a Postgraduate Diploma.

You might not think that these were very good qualifications but in actual fact they were good enough to get me into Seismic work in the Oil Industry where I travelled extensively in my twenties and designed some low frequency systems not least of which was a 'Down Hole Amplifier' which had to work in an oil well 20,000 feet down in the ground. It was used for at least twenty years. In my late twenties I left the Oil Industry to get more Communications Electronics experience and with others designed a low frequency modem (300 Bauds). After a couple of years I left and got a job as a Sales Engineer selling Multichannel Analysers and X Ray Dispersive Systems to universities and hospitals throughout the UK. During this time I patented a device for adding a memory to electronic organs which became known as a digital musical arranger or sequencer and I sold the rights to this instrument to Waddingtons House of Games as a children's toy known as Compute-a-Tune. I had thought of the idea when I was at Southampton University in 1969.

Around about the same time as this I wrote a letter to Electronics and Wireless World about photon collisions which I thought might be another explanation for the 'Red Shift' in the Cosmos. Later I worked on a coder for the Nato Facsimile Machine which was also an error corrector and this was an early device or even a world first. It amazed me when the system all worked. The interest which I had in music for the sequencer was because from the age of fifteen I had learned to play the plectrum banjo and I had played in many bands in Bangor and London. The Bangor band was Clive Evans' River City Stompers and we used to go down to Cardiff and play on the Welsh tv studios there. The knowledge of music which I needed for the musical arranger I obtained from playing the banjo. In 1993 I studied another MSc. course at Bradford University in Microwave Electronics and designed a frequency modulator in the GHz. region. I ended up with another postgraduate diploma.



For my efforts I have been included in the Routledge *Who's Who of Popular Music* and various books by the International Biographical Centre, Cambridge. I was even considered for the American qualification of 'Man of the Year'

The moral of the story is that you don't have to be brilliant at passing exams to think of original things. Also and more important in life is you get through the difficult times better with a belief in God."

DILL SANGHERA Electronic Engineering, 1967



"I was an undergraduate at Bangor reading BSc Hons in Electronics from 1964 to 1967. My favourite subject was Control Engineering taught by Prof. Paul. The study taught me research and analytical skills. The whole focus at the university was for the students to learn to think logically and undertake analysis. Armed with this type of thinking has been very beneficial to me professionally. The three years at Bangor were probably the most informative years of learning and confidence building for me that had a lasting impact on my outlook to life and business. Shortly thereafter, I completed my MSc in Business & Finance at Birmingham to expand on my management skills.

I was a resident at Neuadd Reichel for three years. On some occasions certain students were invited to the high table for dinner with the Lecturers and the Warden. We had to wear gowns for our meals and examinations. The students always addressed their Lecturers by their titles and surname, and never by their first name as a respect to the teachers. We wore our Bangor scarf with an enormous pride. These were some of the coolest moments for me, happening only once in a lifetime.

The School of Engineering located on Dean Street was one of the best places for Electronic Engineering education in the United Kingdom. The tube valves (switches) were being replaced by integrated circuits. I consider myself to be very fortunate to witness such a major technological transformation in development of small and largescale computers. Furthermore, Bangor being the oldest city in Wales is situated in one of the best locations in the United Kingdom providing access to the Menai Strait and the Snowdonia National Park.





My first significant employment was at AERE (Atomic Energy Research Establishment) Harwell, England, where I developed application software for the nuclear industry based on Digital and Honeywell computers. After this, I moved to the commercial sector, designing on-line systems for the Automotive and Food industries based on the IBM mainframes. In 1976, I joined Olivetti, an Italian multinational computer manufacturing company to implement banking systems in Ireland. This led me to senior Sales & Marketing positions progressing to Managing Director of Olivetti's International Clients Business Unit based in Milan, Italy. The global posting allowed me to travel all over the world and provided me with access to the Executive Boards of the Fortune Global 100 companies.

After having had C-level connections to the global multinationals, I set up my own technology company in the USA in 1994 to provide application management and hosting services based on the big Enterprise Resource Planning platforms at a global level. I am closely involved with the operations to this day and have no plans to retire yet.

I have been very active in mountaineering and have participated in climbing expeditions to Africa, Nepal, Peru and Argentina. I have been to the North Pole in an ice breaker and several times to Antarctica. My bucket list keeps on expanding."

ELLIOT COOKE MEng, 2018



"I am forever grateful for my time at Bangor University"

"After graduating from my MEng in Electronic Engineering at Bangor University, I began working for Continental Automotive as a Vehicle Electronics Project Engineer.

I was placed as a service contractor at Bentley Motors in the electrical engineering department. I was functional owner for a variety of chassis system ECUs. The job role revolved around project managing the successful integration and validation of electronic components within vehicle chassis systems. I worked closely with both suppliers and engineering counterparts from around the world. The job opened up so many fantastic opportunities including global travel and creative freedom. If you ever told me that one day I'd drive a Bentley to the Arctic Circle, I'd have called you crazy!

I've now moved on from Bentley and find myself placed as a Senior Engineer at BAE Systems, working on one of the most complex engineering challenges in the world, designing the Dreadnought-Class Nuclear Ballistic Submarine for the Royal Navy. Dreadnought is one of the largest, most complex vehicles on Earth and will be the first Royal Navy submarine to be built with inclusivity in mind, through dedicated female crew quarters, toilets and washing facilities.

I think its a great example of how much diversity a degree in Electronic Engineering can give you in your career. BAE are always looking for new engineers as we continue to expand over the next few years.

I am forever grateful for my time at Bangor University and to the lecturers who taught me the fundamentals of engineering that I find myself using on a daily basis."

GET IN TOUCH

If you'd like to share with your fellow alumni what you've been up to since graduation or your memories of your time in Bangor, please let us know and we will feature you in the next edition of the newsletter.

Send us your update along with a photo to: alumni@bangor.ac.uk

