



University College Dublin  
School of Computer Science

MAY 2024

# CS NEWS

GENERATIVE AI  
IN COMPUTING  
EDUCATION:  
WRECKING BALL  
OR HOLY GRAIL?





# WELCOME

## A MESSAGE FROM THE HEAD OF SCHOOL



Welcome to our magazine bringing the latest news from around the School to our students, alumni, collaborators, staff, friends and the worldwide computer science community.

We highlight research in AI, Machine Learning and Data Analytics, throwing a spotlight on the SFI-funded Insight Centre for Data Analytics, in which researchers from the School of CS have played a big role since its establishment. It is timely to look back at the impact of the centre over the last 10 years.

Generative AI broke into the public consciousness in late 2022 with the release of ChatGPT, which brought the power of AI to the attention of wider society. Asst. Prof. Brett Becker and Assoc. Prof. Brian Mac Namee address the impact of GenAI on CS education. GenAI brings many risks and opportunities; it has led the School to reconsider some of its assessment strategies, but we have also embraced the power of AI and are teaching students how to program with AI support.

The technology that underlies ChatGPT is known as a Large Language Model (LLM). LLMs can interact with humans, holding conversations that suggest uncanny intelligence. But can they exhibit human attributes, such as a sense of humour? Explore this question with Assoc. Prof. Tony Veale.

The UrbanArk project is addressing the climate emergency and in particular coastal flooding. Prof. Michela Bertolotto and Assoc. Prof. Nhien-An Le Khac lead this project which is funded jointly by the Northern Ireland Department for the Economy, the US National Science Foundation and Science Foundation Ireland.

Our researcher spotlight is on Assoc. Prof. Liana Pasquale, who describes her research and teaching vision and her contributions to secure software engineering and cybersecurity.

Close relations with industry are a key strength of our programmes. Graduates of the MSc in Advanced Software Engineering, a niche programme offered to professional software engineers, talk about their studies. Stage 4 student, Turlough Kelly tells us about his internship programme. Finally, PhD graduate, Dr Fergal Reid, VP of AI at Intercom, gives his views on the future of AI.

Many thanks to the editorial team of Rupert Bowen and Colm Ryan. Enjoy!

*Neil Hurley, Head of School*

# RESEARCH CENTRES



## Science Foundation Ireland Research Centres

UCD CS researchers are active in several SFI Research Centres, which link scientists and engineers in partnerships across academia and industry to address crucial research questions.

See: [www.sfi.ie/sfi-research-centres/](http://www.sfi.ie/sfi-research-centres/)



## Insight – data analytics

High-impact research in data analytics, with significant benefits for the individual, industry and society. See: [www.insight-centre.org/](http://www.insight-centre.org/)



## LERO – software

Bringing together expert software teams from universities and institutes of technology in a centre of research excellence with strong industry focus. See: [www.lero.ie/](http://www.lero.ie/)



## ADAPT – AI-driven digital content technology

Pioneering new human-centric AI techniques and technologies including personalisation, natural language processing, data analytics, intelligent machine translation, and human-computer interaction. Setting standards for data governance, privacy, and ethics for digital content. See: [www.adaptcentre.ie/](http://www.adaptcentre.ie/)



## CONNECT – future networks and communications

World-class expertise from ten Irish academic institutes creating a one-stop-shop for telecommunications research, development and innovation. See: [www.connectcentre.ie/](http://www.connectcentre.ie/)



## VistaMilk

Innovative precision pasture-based dairying for the environment, animal well-being and the health of consumers. See: [www.vistamilk.ie](http://www.vistamilk.ie)



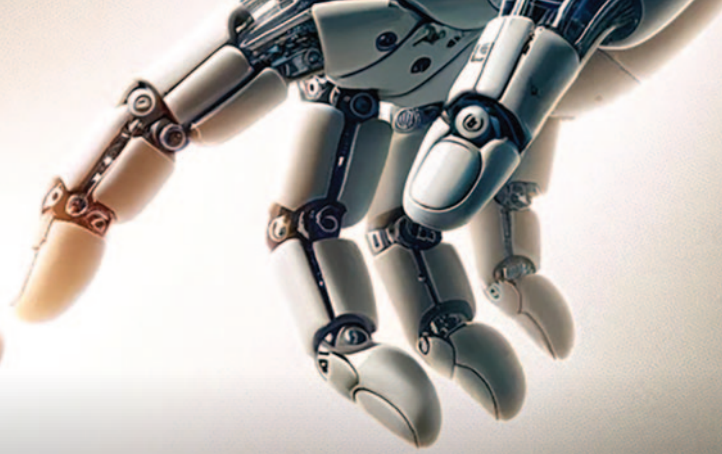
## FutureNeuro – chronic and rare neurological diseases

Improving the health and healthcare of people with neurological disease through diagnostics, therapeutics and eHealth research. See: [www.futureneurocentre.ie/](http://www.futureneurocentre.ie/)



## I-Form – advanced manufacturing research centre

Shaping the future of manufacturing through high-impact research into the application of digital technologies to materials processing. See: [www.i-form.ie/](http://www.i-form.ie/)



# GENERATIVE AI IN COMPUTING EDUCATION: WRECKING BALL OR HOLY GRAIL?

Generative AI (GenAI) dominated just about every education discussion in 2023. Is GenAI the beginning of a new era in teaching and learning, or is it just hype? PCs, followed by the internet, took years to decades to revolutionise our lives, and both of these developments largely support us in doing the same things we've always done – communicating, moving money around, getting work done, and providing entertainment. In much less time, GenAI has eaten the internet for breakfast and accomplished something that the PC and internet could not do – generate stuff.

## What has AI done so far?

Before we ask how GenAI might affect CS education, let's look at some analysis UCD researchers have done on its capabilities to date. In 2023 we, together with our PhD student Joyce Mahon, demonstrated that GPT-4 could ace the Leaving Certificate and UK A-Level CS papers.

This wasn't that surprising, as over two years ago Codex (the successor to GPT-3) was shown to rank in the top 25% of university introductory programming (CS1) students, with subsequent work showing the same for data structures exams. More recently UCD CS researchers have been building tools to help students use GenAI more effectively for learning.

At UC San Diego last semester, Leo Porter taught his CS1 course using his new book *Learn AI-Assisted Python Programming With GitHub Copilot*

and *ChatGPT*, co-authored by Dan Zingaro (University of Toronto). Their AI-first approach showed promise in overcoming some long-standing programming education barriers including beginners' struggles with syntax errors, which UCD CS researchers have shown are largely rendered moot by GenAI.

## So, where is this going?

The "assessment apocalypse" (which led many educators to feel that GenAI should be banned) has simmered down. After all, cheating is not a new phenomenon and GenAI was just another means. Emerging are opportunities where GenAI might seriously impact teaching and learning in novel ways. However, we need to understand more about how students interact with GenAI and provide tooling and strategies to effectively achieve useful interaction. It is also very likely that in a few short years GenAI will be powering virtual teaching assistants that are always available, always approachable, and never get tired of hearing the same questions over and over. Several trials are already underway.

## What about the concerns?

A very incomplete list includes bias, ethical, and equity issues, along with the potential of GenAI exposing educational structures that are no longer fit for purpose. It is possible that GenAI will change who studies what (including CS) and could both

narrow existing gaps and disparities, while creating new ones such as an "AI-divide". We are only now in a period where the dust has settled to the point where such issues can be investigated with some clarity. What do we do if GenAI-assisted students start to ace all of their material? Grade harder? Cover more content more quickly? These questions bring profound professional, economic, societal, ethical, and other issues to the table.

So - hero or a villain? Perhaps a bit of both. After all, the computers and the internet aren't all good - humans can do ill with almost anything. However, society has decided that these innovations were worth it.



**Brett Becker** is Assistant Professor in the UCD School of Computer Science, and co-author of the textbook *Computer Science for Leaving Certificate*.



**Assoc. Prof. Brian Mac Namee** is Co-director of the Insight SFI Research Centre for Data Analytics (discussed on page 6 of this issue) and the SFI Centre for Research Training in Machine Learning.

This is an extract from a longer article which you can find on the UCD CS website

[www.ucd.ie/cs/blog](http://www.ucd.ie/cs/blog) complete with references.



# CLOWN COMPUTING 101

## Why So Serious?

The computational study of humour might seem a fertile field for the pursuit of ignoble prizes, but the study of jokes is, well, no joke. Our sense of humour is a measure of how well we can react to the unexpected, and so it suffuses almost everything we do. For machines to engage with us on a human level, they must first reflect this basic reality. My own interest in computational humour – the algorithmic and data-scientific understanding of the human sense of humour – stems from a long-standing interest in adjacent creative phenomena such as metaphor, simile, analogy, irony, sarcasm, and conceptual blending. What makes humour special from a computational perspective is that all of the qualities that shape these other phenomena must come together so precisely to elicit a laugh. Jokes surprise us by reminding us of what we already know, but this extensive knowledge – of words and the world – has long proven a major bottleneck to computational modeling. Nonetheless, we can expect LLMs to revolutionise the study of computational humour no less dramatically than they have other areas of AI because these models are trained on vast quantities of content from all corners of the web. If you have played with ChatGPT and its ilk, you'll know how much fun these LLM-based chatbots can be, precisely because they weave their responses from so many diverse strands. However, a recent analysis of ChatGPT argues that the bot is fun but not funny, in part because its LLM (GPT3.5T) has been over-exposed to a small set of 25 jokes.

There are three broad approaches to reliably eliciting humour from an LLM:



1. Prompt engineering: the user fosters a playful context for the LLM with a series of prompts and examples. This chain of prompts may walk the LLM through a step-by-step algorithm for producing a polished comic output.
2. Fine-tuning: the LLM's capacity for humour is strengthened by providing it with additional training data (e.g., thousands of setup: punchline pairs), to remedy the LLM's original over-exposure to the same small set of jokes.
3. Reinforcement learning with human feedback (RLHF): ChatGPT has been "aligned" with human values through a process of reinforcement learning (RL) that rewards helpful, unbiased, and non-toxic responses. A sense of humour is just another value that we can reinforce in our LLM's outputs.

Contrary to Elon Musk's claims about Grok, his sarcastic LLM, computational humour means

more than giving LLMs an "attitude." The goal is not to transform our computers from sullen sphinxes into sarcastic teens, but to make them more aware of, and responsive to, our attitudes and our humors. We need them to understand the ambivalence that moves us to sarcasm and irony, to appreciate when we are playful and unserious, or to recognise when an email or a text message is intemperate, or likely to be received as such. We want them to use humour to offer new perspectives on familiar experiences, whether we are writing for ourselves or for others. We don't need them to replace us, just to understand us, and to lighten our load when they can with levity and insight.

A computational sense of humour, and the idea that an AI might possess one, is having a moment right now. Recent journalism on the subject, from *The New York Times* to the *Financial Times*, offers reasons to be optimistic and patient. To serve us better, our machines will become more like us, making the trend all but irreversible. To explore the topic further, from scholarly theory to AI practice, check out my recent book: *Your Wit Is My Command: Building AIs with a Sense of Humor* (MIT Press, 2021). For a deeper coverage of LLMs and their generative powers, check out my cartoon tutorials to how they work (still in beta) here: <http://robotcomix.com/LLMS/>

This is an extract from a longer article you can find on our website: [www.ucd.ie/cs](http://www.ucd.ie/cs)



Assoc. Prof. Tony Veale,  
UCD School of  
Computer Science



# IMPROVING RESILIENCE TO COASTAL FLOODING

UCD is a partner in the UrbanARK project which aims to improve the resilience and emergency preparedness of urban centres and their communities to coastal flooding. Flooding is a growing threat because of climate change.

## Underground spaces a priority flood risk

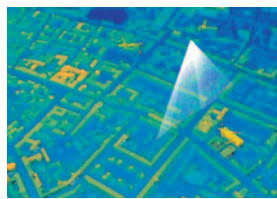
Within urban centres, underground spaces such as storage areas, transportation corridors, basement car parks, public facilities, retail & office and private spaces (such as residential basements) present a priority risk during flood events with respect to timely evacuation. However, often the location, geometry and volume of these underground spaces are not well known. Furthermore, these underground spaces are commonly not considered in urban flood prediction models.

## Communicating risk to the public

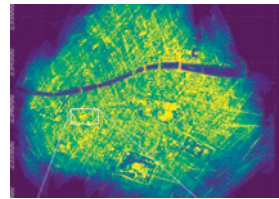
Communicating flood risks and enhancing emergency preparedness poses further challenges. The use of these urban underground spaces is highly varied and the perception of risk differs from one user community to the next. Emergency planners need engaging communication tools to increase community resilience and preparedness to flooding events. One big impact outcome is that the data collected is going to be made available to the public.

## New technologies and more accurate models

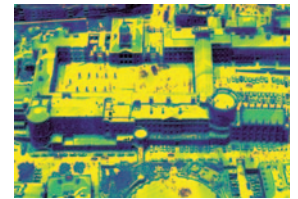
The project harnesses new technology in the area of remote sensing, high-resolution street view imagery, distributed computing and visualisation, including the presence of underground spaces which are currently not taken into account by predictive models. With more accurate models, emergency planners can help protect people and property. The models will provide refined information on flood levels and flooding rates into the underground spaces, which in turn will be used



Web application for three-dimensional LiDAR data visualisation



(a) Local point density index result

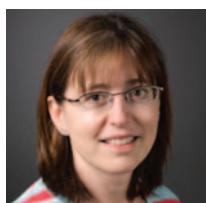


(b) Close-up view of Dublin Castle area

as part of a new risk communication tool comprising a virtual reality application. This tool will then communicate the local flood risks to urban communities directly, to better engage them in emergency preparedness, thus increasing community flood resilience.

## The benefits of international collaboration and shared expertise

UCD is collaborating with New York University and Queen's University Belfast. The project builds on the institutional strengths of each university, while fostering regular cross-fertilisation and synergistic team building. It interweaves the leading interdisciplinary research expertise of civil engineers, social scientists, geomaticians, and computer scientists. UCD contributed expertise in the area of spatial data management and looking at ways to help flood prediction and risk assessment for coastal urban communities. UCD's team is led by Professor Michela Bertolotto as UCD Principal Investigator with Assoc. Prof. Nhien-An Le-Khac as co-PI.



## Three cities

Dublin, Belfast and New York were case studies and the team was able to incorporate the expertise and stakeholders in emergency management and planning in each city to learn from each other. The interchange, interaction and co-learning was an exciting aspect of the project. Each city poses unique challenges and has its own distinctive character. In combining the three study areas, the investigations covered the range of different underground structures typically encountered in coastal urban centres and communities.



Intertrade Ireland selected UrbanARK to showcase the success of the SFI US-Ireland R&D programme which links researchers across Ireland, Northern Ireland and the USA.



The Project is jointly funded by the Northern Ireland Department for the Economy (USI 137), US National Science Foundation (NSF Award 1826134) and Science Foundation Ireland (SFI 17/US/3450).



# INSIGHT CENTRE FOR DATA ANALYTICS

The Insight SFI Research Centre for Data Analytics, co-led by UCD, DCU, UG and UCC, is one of the largest data analytics and artificial intelligence research centres in Europe. UCD's Insight members include researchers in eight schools including Mathematics and Statistics, Electrical and Electronic

Engineering, Public Health, Physiotherapy and Sports Science and English, Drama and Film.

Computer Science members include 28 PhD candidates, 8 Post-doctoral researchers, 5 Research Fellows, a Research Assistant, 7 Funded Investigators and 4 Principal

Investigators. Insight in UCD has a long record of collaborating with industry and researchers are currently working with Google, Xperi, Boston Scientific, Nestle and Contego Sports and many hospitals, government departments and other groups.



|   |   |
|---|---|
| <b>4</b><br>Co-Lead Universities<br>9 partner institutions  | Built on <b>22</b> years of research in Data Analytics and AI |
| <b>450+</b><br>Academics, Postdocs, PhDs, RAs               | <b>3400+</b><br>Scientific conference and journal papers      |
| <b>219+</b><br>Funded collaborations with industry partners | <b>350+</b><br>Research Awards                                |
| <b>14</b><br>Spin out companies<br>86 license agreements    | <b>122+</b><br>Horizon Europe initiatives, co-ordinated 30    |
| <b>1,137+</b> school visits, 28,000 students                | <b>1,087</b> Alumni   |



Insight's Director in UCD is Assoc. Prof. Brian Mac Namee in the School of Computer Science. His research focuses on machine learning methods - especially novel human-in-the-loop machine learning approaches that integrate algorithmic and human expertise and applications in health, agriculture, and industry.

Prior to UCD, Brian worked in industry as an R & D software engineer and as a lecturer at DIT School of Computing.

He is co-author of the textbook *Fundamentals of Machine Learning for Predictive Data Analytics* now in its 2nd edition with MIT Press and translated into 6 languages.

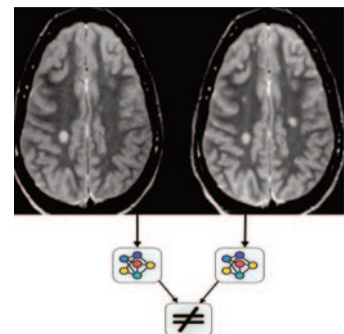


**Dr Aonghus Lawlor**  
- machine learning methods for applications in medical imaging

There are many interesting applications in this domain which involve novel machine learning and deep learning methods applied to complex imaging data such as X-ray, CT and MRI. We are trying to develop new models and methods to identify new biomarkers in images and provide better tools to clinicians to help them understand the relevant features in the medical images and make better clinical decisions for their patients. Among the topics we are investigating are few-shot

anomaly detection for identifying bad data in medical imaging datasets, active learning to help boost performance where labelled data is scarce, synthetic facial modelling to assist with post-op clinical assessments of cleft-palate, and diffusion modelling for cross-modal synthetic image generation. With the team in St Vincent's we have worked on better models for identifying brain lesions in MS patients. Patients are regularly scanned and monitored for progression and we have developed methods for change detection to help spot small growths which would otherwise be very difficult to catch. Dr Brendan Kelly recently completed his PhD on this topic and was awarded the Dean Medal of the MS Society for his work. Our active research topics include

development of datasets based on private and sensitive health data, new model development and interpretation or explanation of results to assist with decision making.



The left MRI shows a brain lesion, the right MRI shows the development a new lesion. We develop segmentation models and Siamese networks to detect the changes over time.



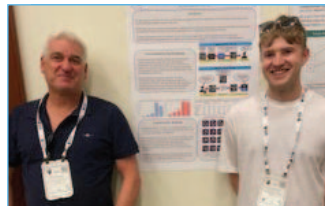
**Assoc. Prof. Georgiana Ifrim**  
- *human movement analysis*

I lead a research group which focuses on machine learning algorithms and methods, with a recent focus on time series classification and explanation. Our work is well embedded and known within the international machine learning and AI community, the top conference ECML in particular, where we presented 5 papers this year and where I regularly co-organise a workshop on time series analysis (AALTD). In terms of applications, we work on human movement analysis in collaboration with Professor Brian Caulfield in the School of Public Health, Physiotherapy and Sports Science, as well as OutputSports, a startup by Insight researchers Martin O'Reilly and Darragh Whelan. Brian and I co-supervised PhD student Ashish Singh who applied time series methods to exercise classification from video, and we both supervise Timi Aderinola, who is a Marie Curie fellow in CS, working on methods for analysis, forecasting and explanation to enable us to understand and prevent falls in high risk groups, such as Parkinson's.



**Assoc. Prof. Derek Greene**  
- *cultural analytics*

My work at Insight primarily revolves around developing novel algorithms in natural language processing and network analysis. As part of this, I have been particularly interested in looking at how these methods can unlock insights from large-scale cultural datasets, working closely with relevant experts from other disciplines. My projects have varied, including analysing character networks in Irish and British literature and examining discourse around public health and migration in 19th-century digital book collections. Other interdisciplinary studies have applied topic modelling techniques to study changes over time in the agenda of key EU institutions, such as the European Parliament and the European Central Bank. Building on this work, I am currently co-leading an initiative aimed at bringing together researchers from various fields and institutions, who are working in the general domain of Cultural Analytics.



**Professor Mark Keane**  
- *explaining AI to the masses*

Since 2018, I have been working on developing eXplainable AI (XAI) methods with the aim of making Deep Neural Networks more transparent and understandable. Our group has developed new algorithms for XAI and pioneered user testing of these techniques. Under GDPR and other legislation, automated decisions must be explained which has led to an explosion of research on XAI, opening up a wholly new area around cognitive aspects of explaining intelligent systems. We have won best paper awards and national AI awards for this work, with most of it being published in A\* conferences and leading workshops, with five of our papers having attracted >100 GoogleScholar citations. Several PhD students worked on this. Eoin Kenny (now at MIT) developed a suite of example-based explanation techniques for factual, counterfactual and semi-factual explanations. Eoin Delaney (now at Oxford University) developed the first counterfactual explanation method for time-series data and has shown how people's counterfactuals for images diverge from machine-generated ones. Greta Warren (just moving to University of Copenhagen) has explored how people differ in their understanding of the categorical and continuous features provided in explanations. Courtney Ford has examined how expertise affects people's understanding of explanations and Saugat Aryal is advancing new methods for semi-factual, "even... if" explanations. We have collaborated with Accenture AI Labs, Derek Greene (UCD CS) and Prof Ruth Byrne (Psychology, TCD) who is an international expert in counterfactual thinking.



**Professor Barry Smyth**  
- *helping marathon runners train using data*

My work in sports science was a happy accident. Some years ago, I started training for my first marathon. I was looking for a new project and I thought it would be interesting to explore how my machine learning and recommender systems background might be applied to the field of recreational running. I began collecting marathon race-time data which Padraig Cunningham and I used to provide runners with bespoke pacing plans to help them get the most from their races. Collaborating with Strava Inc., Aonghus Lawlor, Jakim Berndsen and I used Strava data to help marathoners run more effective races by providing pacing feedback. Working with fellow Insight investigators, Brian Caulfield, Cailbhe Doherty and Alison Keogh — from UCD's School of Public Health, Physiotherapy and Sports Science — I explored how runners train. Brian and I supervised Ciara Feely's PhD on predicting injuries and recommending training plans. Even our work with Samsung took on an exercise: we used reinforcement learning to recommend more appealing exercises to users. Yes, this "side project" has evolved a little. It has resulted in more than 30 peer-reviewed publications, several best paper awards, a few patent filings, and it has helped to create new application areas for machine learning and recommender systems.



# RESEARCHER SPOTLIGHT

Dr Liliana Pasquale is an Associate Professor at UCD School of Computer Science.

## Research vision

Given the pervasive presence of software and cyber-physical systems in our daily lives, we are entitled to expect that these systems are secure by design and can endure security throughout their usage and subsequent evolution. However, the complexity of cyber-physical systems exposes them to an extended attack surface where cybercriminals can exploit vulnerabilities in cyber and physical components and their users. Furthermore, the dynamic nature of cyber-physical systems requires them to evolve to maintain security despite the evolving threat landscape. My research aims to engineer sustainable secure cyber-physical systems that can endure the protection of their assets. One of the major projects I am leading is on "Engineering Sustainable Adaptive Security" sponsored by the SFI Research Centre for Software (Lero). The project envisions sustainable security as a collaborative effort between humans and the system. On the one hand, we are exploring how reasoning and learning techniques can enable us to discover previously unknown security threats and evolve security controls automatically. On the other hand, we are designing human-computer interactions that allow stakeholders (e.g., users and engineers) to help the system select security controls or even execute security controls when they cannot be performed automatically. As part of this



*Dr Liliana Pasquale  
Associate Professor at  
UCD School of  
Computer Science.*

project, I am leading a multi-disciplinary team that includes researchers in software and security engineering, HCI and psychology.

## Teaching vision

UCD is one of the most reputable universities in Ireland in the cybersecurity domain. I am the founder and director of the MSc in Cybersecurity offered by the School of Computer Science. The objective of the programme is to address the shortage of cybersecurity skills and prepare the cybersecurity workforce of the future. The MSc is taught by active cybersecurity researchers and the modules' content revolves around the most recent advances in cybersecurity research. The students are given

the option to do a project requiring them to address a relevant research or practical cybersecurity problem, which could be published in an academic journal.

In the academic year 2023/2024, the number of students enrolled in the MSc doubled compared to the previous year, and we hope to increase our presence in cybersecurity education in the country.

## About Myself

There are many things in life that I am passionate about, such as cooking, sports and travelling. I practise meditation and Brazilian Jiu-Jitsu. The beauty of this sport is the emphasis on adaptability and learning from mistakes, encouraging a growth mindset.





# MSC ADVANCED SOFTWARE ENGINEERING

The MSc Advanced Software Engineering (ASE) is designed to give experienced software engineers exposure to current technologies, methodologies, processes and theories as well as those under research that may become mainstream in the future. We spoke to some ASE graduates.

**Kris Foster**, Salesforce, Lead Software Engineer (ASE 2022) "The structure of the course fits well with a full-time job!"



**Q. What attracted you to go back to university to study for the MSc ASE?**

I worked in industry as a Software Engineer for a few years after graduating with an undergraduate degree in Computer Science. During these years, I discovered a renewed appreciation for some concepts that I did not value as much during my undergraduate degree. Another driving factor in enrolling in ASE was the opportunity to spend some structured learning time in areas outside my daily work.

**Q. It's a big commitment to take on a masters while working full-time. How did you manage the workload?**

I dedicated about one hour on Monday-Friday evenings on ASE coursework/lectures along with three hours on Saturday mornings to complete assignments. It added a nice variety to my day along with my full-time job.

**Yuxin Wang**, GoMappEd, CEO & Co-Founder (ASE 2007) "The always cutting-edge technologies and innovative projects bring students to the forefront of innovation."



**Q. It's a big commitment to take on a master's while working full-time. How did you manage the workload?**

The courses were so interesting that I was really motivated. I used all my holidays to join the master's programme. Luckily, my employer was very supportive and let me study at work when it wasn't too busy.

**Q. What have been the benefits to you?**

The projects and thesis were guided by amazing and open-minded lecturers and professors. They always encouraged us to push our limits and create things we thought were impossible. After finishing the master's programme, I successfully moved to the R&D team in my company and have been able to complete useful innovations with my colleagues.

**David Bowman**, XorCon technology consultants (ASE 2021) "The team of lecturers are clearly passionate about their subjects, which comes through in every lecture."



**Q. What attracted you to go back to university to study for the MSc ASE?**

I had started a master's 25 years ago, but ended up moving to London for a while and then, on returning, did a business degree rather than a CS master's. So for me it was largely unfinished business.

**Q. What have been the benefits to you?**

Some of the modules covered areas that I had no practical experience in, expanding my toolkit of solutions that could be applied to the challenges faced in my day to day work. There is huge benefit to progressing through a formal education process rather than a self directed exploration, as it serves to reinforce the theories underpinning the technologies which are easily ignored in the rush to get solutions out the door.

More information about the MSc ASE can be found on our website.



# MY INTERNSHIP IN DIGITAL STRATEGY AT LIMERICK CITY & COUNTY COUNCIL

Turlough Kelly, Stage 4 BSc Computer Science.

I started my internship in March 2023, in Limerick City & County Council (LCCC), assigned to the Digital Strategy Department. Despite the size of LCCC and the many departments, we were like a skeleton crew, with just over a dozen people across Digital Strategy! Every day was different, with something new to do or an opportunity to learn, through practical work or, in the quieter periods, through online learning to upskill on what I was working with.

My main focus was with data analysis and visualisation, utilising SQL and a programme called Tableau. I had done some work previously with SQL and data analysis, but this was still very new to me! Whenever we were gearing up for a new project, we would have a meeting with our small team to discuss what the aims and objectives were, and what sort of data we would need to compile. After, we would pull the necessary data from the servers, and gather them into a Tableau "workbook" for further manipulation. Depending on the project, we would sometimes get in contact with other departments, for further clarification on what data they needed. If they required any specific features with the workbook, such as the use of "calculated fields", this added a light programming element to Tableau, so then the software engineering work I did as part of my degree became a real asset to the team. It was really interesting to be exposed to many different departments and see the



inner workings of a local authority in more detail.

As a local authority, we used a CRM (Customer Relationship Management) system to keep track of customer details or persons. Part of our job was to debug and investigate any issues with the software, and take action to rectify the problems. We managed these requests through the "ServiceDesk", where I acted as a technician. In addition to issues with SugarCRM and Tableau, I would also manage any other computer-related issues alongside the ICT Department and troubleshoot alongside the rest of the team. This made me realise that the upkeep of software was just as, if not more, important than the creation of it, as well as the importance of accompanying documentation.

I was able to put my software engineering skills to use. My team had issues with storage on their remote servers, and had to constantly ask the ICT Department to grant them

additional space. I developed a script in Bash that, at the beginning of each month, would gather all the files in a certain location that were created in the previous month, and archive them in a compressed folder. This allowed them to maintain older files and make room for newer files. After much testing and a few days of coding, I was able to present this script to the rest of my department. Both my team and department were extremely surprised by this script, and how it was an effective solution to a big problem they had! My time in LCCC was extremely beneficial, considering how much I learned and my experience throughout. It gave me an opportunity to expand my skills in many different areas, and learn new skills, too. Working within such a small team and within the public sector gave me an extremely unique opportunity, and one that I can confidently say has greatly improved my confidence both personally and professionally.



# ALUMNUS IN CONVERSATION

Dr Fergal Reid, VP of AI at Intercom.

UCD graduate Fergal Reid (PhD 2013) came back to UCD to talk to current PhD candidate Rian Dolphin. In their wide ranging and fascinating conversation Fergal talked about some skills he has found useful from his PhD studies, how Intercom is using ChatGPT to do summarisations and how AI will change the workplace among other topics. You will find the the full video on our YouTube channel:

[www.youtube.com/@ucdcomputerscience](https://www.youtube.com/@ucdcomputerscience)

In the interview Fergal talks about how he first became interested in computer science and technology. After his degree he worked in software engineering before deciding to go back and do a PhD. He explains his thought process and whether he ever considered a career in academia.

"Potentially, I'd love to work in academia at some point in the future, but I found the niche in industry that I'm extremely happy with. There's also the issue these days of, if you want to do work on AI, you do need resources, you need computation budget, you need data. Some of that stuff is easier to come by in the industry at the moment. And I think that that's a challenge for AI. It's not an insurmountable challenge. I think there's cool academic work being done with not a huge amount of resources, but that has major impact."

He covers how he came to start a company with one of his fellow PhDs, the mistakes he made and what he learned from them.

"Retrospectively, when I look back at it, with more experience working in product and as a product manager, given how early we were, we actually did have a lot of traction, maybe we had a hundred users, not many, but now I look back, I'm like, wow, that's a lot of traction, a lot of startups don't get that much traction. And when a product is early in



its life cycle, even a small amount of traction can actually represent quite a lot."

He talks about ChatGPT and LLMs and their application in Intercom.

"If you're trying to deal with like messy human conversation, that's a lot harder than summarising a well structured document. Machine learning is a long way away from doing that. And then ChatGPT was able to do summarisations of these messy conversations almost out of the box. We were like, wow, that is amazing. People have been working on this problem for decades."

In a particularly insightful segment, Fergal talks about developing and using product skills and balancing time between being "in the weeds of the programming" and the activities that come with leadership and product as well as the

relationship between engineering skills and product management skills.

"A lot of the value I bring to Intercom is being able to understand, what's the product, what's the requirements, what's the strategy, and what's the technology, and where these things intersect. There's real skills in both and being able to mesh these things together can save you a bunch of time."

They finish by discussing the future with AI, LLMs and reasoning and how AI might disrupt business and work.

"I have an opinion which not everybody shares, but I think LLMs are doing something that can best be described as reasoning. And so I think that's amazing. And I think if you believe that, or if you think that's likely, then something absolutely wild has just happened in technology."



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