

SOUTHAMPTON: POWERING THE DEVELOPMENT OF WEB SCIENCE

The World Wide Web is the most complex piece of technology ever created. In thirty years, it has transformed the world, affecting every aspect of our lives by reshaping the way we do business, our social interactions, and our cultural expression.



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Professor Leslie Carr

The University of Southampton has been a driving force behind the development of Web Science, the interdisciplinary academic discipline which focuses on the study of the Web, its impact on society, and the underlying technological and social phenomena that shape its development and use.

“In 2004 we were talking to Tim Berners-Lee (inventor of the Web) about how we could see the Web starting to impinge on people’s daily lives,” explained Professor Leslie Carr, Web Science professor and Deputy Director of the Web Science Institute (WSI).

“At the time, most universities considered the Web as just a kind of computing over the internet, and saw no need for a separate academic discipline, but we felt that it was going to have a much greater impact.”

In 2007, the University set up the Web Science Research Initiative with MIT. This led to EPSRC funding to establish the world’s first Centre for Doctoral Training in Web Science, in 2009. Further EPSRC funding enabled a second Centre for Doctoral Training in Web Science Innovation, and the creation of the Web Science Institute in 2014.

As the WSI’s tenth anniversary approaches, Leslie reflected on the “wild ride” keeping pace with the breakneck speed of development of the online world.

“In the early days of the Web, the debate was around intellectual property and copyright violation” he explained, “but the race to develop networks and personal devices, and ever-more sophisticated apps, drove individuals to make more and more data available to tech giants like Google, Facebook, and Twitter.

“The desire to mine these huge data sets for valuable information has fuelled the development of machine learning and AI. Now, computing is more about understanding the patterns, structure and information hidden in this data.”

As Web platforms have expanded their scope and influence, the discussion has, says Leslie, shifted to concerns about these corporations appropriating and controlling our data. A highly agile discipline, Web Science has expanded to include the role of data in society and the development of human-centred AIs.

Contemplating why the University of Southampton has remained at its epicentre, Leslie said:

“Southampton had two important things in its favour.

“The first is a pioneering record in the field of computing. In 1947, German refugee Professor Eric Zepler founded the Department of Electronics, Telecommunications and Radio Engineering, making Southampton one of the first universities in the world to recognise the importance of electronics.

“Forty years later, we were one of the first British universities to begin teaching Computer Science as a degree.”

“The second factor,” said Leslie, “is that Southampton has the pre-conditions for successful inter-disciplinary work in spades.

“Academic curiosity, combined with a high level of collegial participation, means that interdisciplinary interactions thrive here.”

WEB SCIENCE INSTITUTE

The University’s Web Science Institute (WSI) combines expertise in Web Science, Data Science and Artificial Intelligence (AI) to explore the challenges and opportunities the web brings to society, from issues around privacy, intellectual property and data rights, to trust in AI.

Led by Professor Dame Wendy Hall and Deputy Directors Professor Leslie Carr and Professor Pauline Leonard, the WSI draws together 168 academics from across social, computational, and natural sciences, humanities, medicine, health, business, and law, for inter-disciplinary research into the online environment.

The WSI coordinates the University’s membership of the Alan Turing Institute and is a founding member of the global Web Science Trust network of 22 web science labs.

Key areas of research include web science, digital futures, open data, open science, social machines, data trusts, digital governance, online health, and human-centred AI.

The WSI’s world-leading expertise influences public policy around the role of the Web, Data and AI in society. Dame Wendy Hall’s 2017 report, ‘Growing the artificial intelligence industry in the UK’, resulted in Government backing and funding to develop the UK’s AI industry.

Collaborations with industry partners have included Google, IBM, Elsevier, Digital Catapult, and the Cabinet Office. The WSI pioneered an undergraduate degree in Web Science, alongside its masters and doctoral programmes, as well as offering MOOCs, and aims to be amongst the first to offer online degrees.

Each year the WSI runs several stimulus funding calls, to accelerate research and knowledge exchange and enterprise (KEE).



Find out more

www.southampton.ac.uk/research/institutes-centres/web-science-institute



Hannah Williams, Photo © Oliver Gestin

WSI STIMULUS FUND PROJECT

LOVE LETTERS (WITH AI)

Composer Dr Benjamin Oliver from Music is leading an interdisciplinary team exploring creative applications of AI to generate song texts.

“I approached soul singer Hannah Williams to collaborate on a song cycle, then ChatGPT landed. After experimenting a little, I found the generic quality of the content generated by ChatGPT frustrating,” said Benjamin.

With WSI funding, he formed a new research team including Professor Will May (English) and Dr Shoaib Jameel (ECS). They developed LovelaceGPT, a new AI text generation model which creates first-person love texts.

“I’ve been setting these texts to music for Hannah to perform, accompanied by Riot Ensemble. It has been exciting to find unconventional musical materials that bring them to life in my new work, ‘Love Letters’”.

Love Letters (with AI) premieres in Southampton and London in July.



Find out more

www.benolivermusic.com/2023/01/love-letters-with-ai

WSI PILOT RESEARCH PROJECT

COUNTER-TERRORISM AND ‘DIGITAL HUMAN TRAFFICKING’

Dr Gina Vale and Dr Avi Boukli from Criminology are working with Professor Leslie Carr to investigate human trafficking victimhood and its role in terrorism offending.

In a recent landmark case of a 14-year-old British girl, terrorism charges were dropped after she was found to be a victim of human trafficking. Despite no physical movement, her international online communications on forums and with individuals linked to terrorism were considered to be human trafficking under the Modern Slavery Act 2015.

The case prompted questions about the defence of human trafficking for other individuals (particularly minors) facing terrorism charges. The project is highlighting a crucial research and policy gap between counterterrorism and ‘digital human trafficking’.



Find out more

www.southampton.ac.uk/research/projects/counter-terrorism-digital-human-trafficking

WSI STIMULUS FUND PROJECT

EXAMINING CHATGPT: THE ACADEMIC TURING TEST

Professor Leslie Carr is working with Professor Christian Bokhove (Education) and Dr David Baxter (Business), to assess the performance of ChatGPT under real University assessment conditions.

“We are doing a comparison of students’ answers to exam questions and ChatGPT’s answers,” explained Leslie. “Assessors are marking them, without knowing there are any Chat GPT answers, and we will see how well it scores.

“We are looking forward to being able to report confidently on the results.”



AI IN HIGHER EDUCATION: GETTING THE BALANCE RIGHT

As well as his roles at the University, Professor Leslie Carr also performs stand-up comedy about the Web and AI, and hosts 'AI DIY', a light-hearted podcast. Here he considers the implications of AI for higher education.

“In the podcast, 'AI DIY', we ask our guests – researchers and comedians – “What sort of AI would you like to see?” Most of them come up with a vision of an AI that's 'got your back', something that will be your 'wingman' – technology that genuinely supports the user, rather than competing with them.

In developing a Digital Strategy, the University is asking, 'What does an AI-supported university look like?'

The vision that is emerging is one where all the data that the institution holds about a student, on their academic performance, their attendance, their timetable and so on, is married up with the potential that AI offers to engage with, understand and support individuals.

My vision for a future University app might be like a virtual mentor: prompting a student to hand in coursework or attend a lecture, linking them to information resources or professional support, suggesting a call with their tutor, but also helping them to balance their study and their personal life. It could be equally useful for early career researchers or professors – helping them keep up with the latest research, stay on top of communications from UKRI, and making sure that they take time out. I see an AI that provides emotional and practical support, that helps develop better learning and lifestyle habits.

On the question of how developments like ChatGPT might impact education, the University needs to develop a nuanced approach. A simple ban on students using AI in their University work is, unfortunately, already unworkable because AI is embedded into Google and many tools that students already use.

Generative AIs, or large language models (LLMs), such as ChatGPT or Google's Bard, are predictive text generators. Their capabilities are astonishing – they can summarise the latest ideas in a particular area and produce a report for you – but to characterise them as the same as the independent

thinking, creative, problem-solvers that we want our students to be, is mistaken.

Now that students have access to these tools, as an institution we must think carefully about what we give credit for. For too long we have conflated someone producing a well-crafted essay with someone with a high level of intellectual capability. Now, we must consider giving more credit for skills like knowledge-gathering, evaluation, argumentation and synthesis.

We need to be considered and deliberative in our response to this issue, and we need to respond quickly, but I am confident that we can.

We came to terms with calculators, with spelling checkers and grammar checkers. We responded to the pandemic by prioritising the university experience and making sure that we were not disadvantaging students. We need to monitor the situation and think about holding on to the important parts of the learning experience.”

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