Tell me what you read (or watch) and I will tell you what you research: The two-way street between science and literature

Literature and in particular science fiction is often seen as being prefigurative to the development of science and technology. Whilst this can on occasion be the case, drawing on a study of AI researchers and their reading and viewing material, **Sarah Dillon** *discusses how literature and other media can have structuring effects on the formation, research and communication practices of scientific communities.*

'What you reading?' That's how the character Daniel always greets his young friend Elisabeth in Ali Smith's novel *Autumn*, even if he only saw her yesterday. Perhaps it's how we should always greet people. You can find out so much from the answer. It turns out scientists read too (and not just scientific papers). They read for pleasure, like many of us do, but their reading also influences their scientific thought and practice.

When people talk about the influence of literature on science and innovation, they usually point to a few high-profile examples of direct influence, examples of an idea conjured in a (usually science fictional) story that inspires its real-world development. A common example is Arthur C. Clarke's 'invention' of the global communications satellite. However, Clarke didn't come up with the idea in a fictional story, rather in a letter to *Wireless World* written in 1945 when he was a young officer in the Royal Air Force. A less successful attempt to realise an idea from one of his works of fiction – that of the space elevator – inspired Marvin Minsky to spend six unsuccessful months with scientists at the Lawrence Livermore National Laboratory trying to design a pulley to haul things into space. Claims of direct influence are actually very rare, and often in fact turn out to be apocryphal, or at least not quite as clear cut as they seem.

Beyond these charismatic examples, we wanted to find out more systematically how what scientists read and watch might influence their work. For our study, we focused on research in AI and computing, gathered together some of the more and less well-known existing evidence, and created new evidence by interviewing twenty practising AI researchers in the UK. We found six main areas in which literature plays a role in the field of AI: research focus, career choice, community formation, science communication, ethical thinking, and modelling of sociotechnical futures.

Literature can inform and develop research already underway, and open up new directions of exploration. One researcher, who works on network technology, noted that William Gibson's *Neuromancer* fed into his team's research when it was published. Whilst it didn't give them their research ideas, it made them think about a cooler interface. This sits alongside wider evidence for the role of cyberpunk in influencing the research focus of those working in virtual reality, in particular Verne Vinge's proto-cyberpunk novella *True Names*. In contrast, another researcher working on affective computing pointed to Agatha Christie's books as enhancing her understanding of human behaviour.

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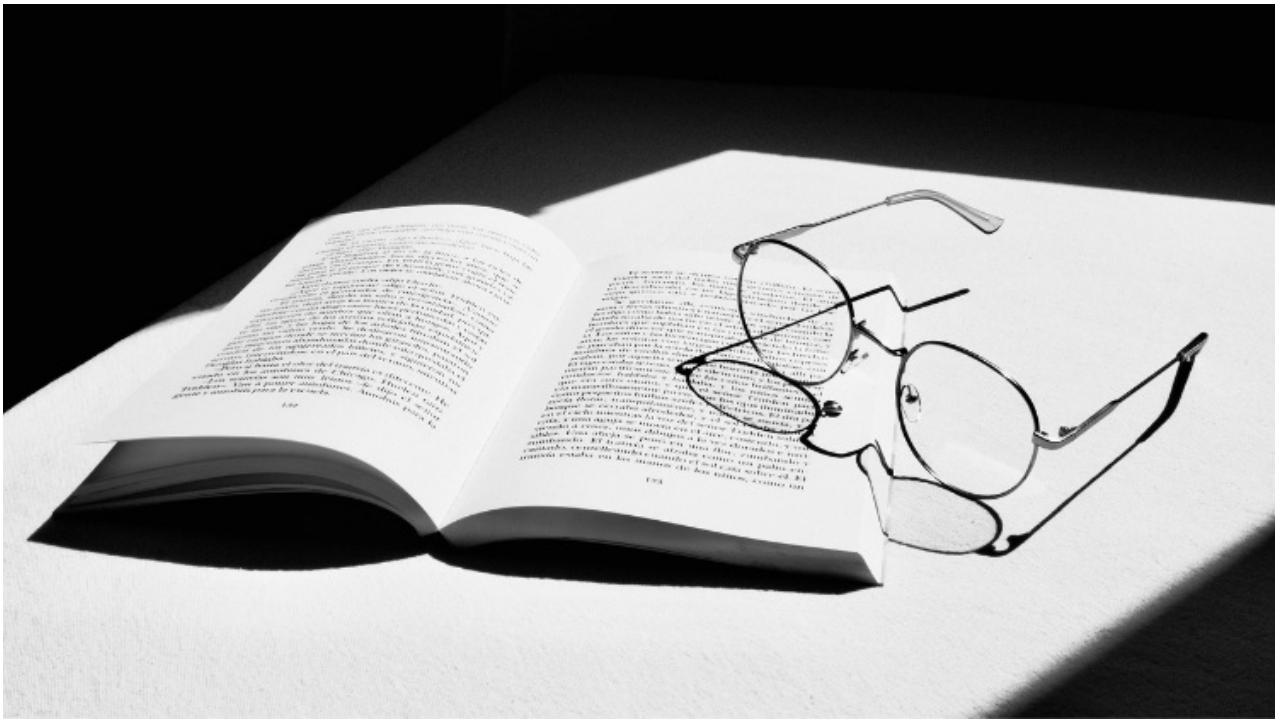

Literature plays a role in career choice, encouraging entry to the field for some. Scientists and technologists have talked about this in the TV documentary *How William Shatner Changed the World*. One researcher we interviewed pointed to Isaac Asimov's robot stories as a key influence on wanting to become an expert in cognitive robotics – the real Susan Calvin. Further research into the influence of (particularly early) reading on career choice could have an important impact on initiatives to encourage students into science and engineering careers.

Science fiction (SF) plays a role in the formation and cohesion of AI researcher communities, also helping communication of research ideas with fellow researchers and with students. Two communal areas at one of the major AI research centres in the UK are even named after SF writers – Isaac Asimov and Iain M. Banks – and one researcher noted that she took this as a signal that it was important to read their work. Whilst this shared SF literacy has distinct advantages in terms of community formation and cohesion, it also poses a risk of exclusion. Further investigation is needed into the way in which it might serve as a gateway to the field for some, but as a gatekeeper for others, in particular if (as the interviews suggest might be the case) the dominant operational stories are primarily works produced by white Anglo-American men (see Figure 1).

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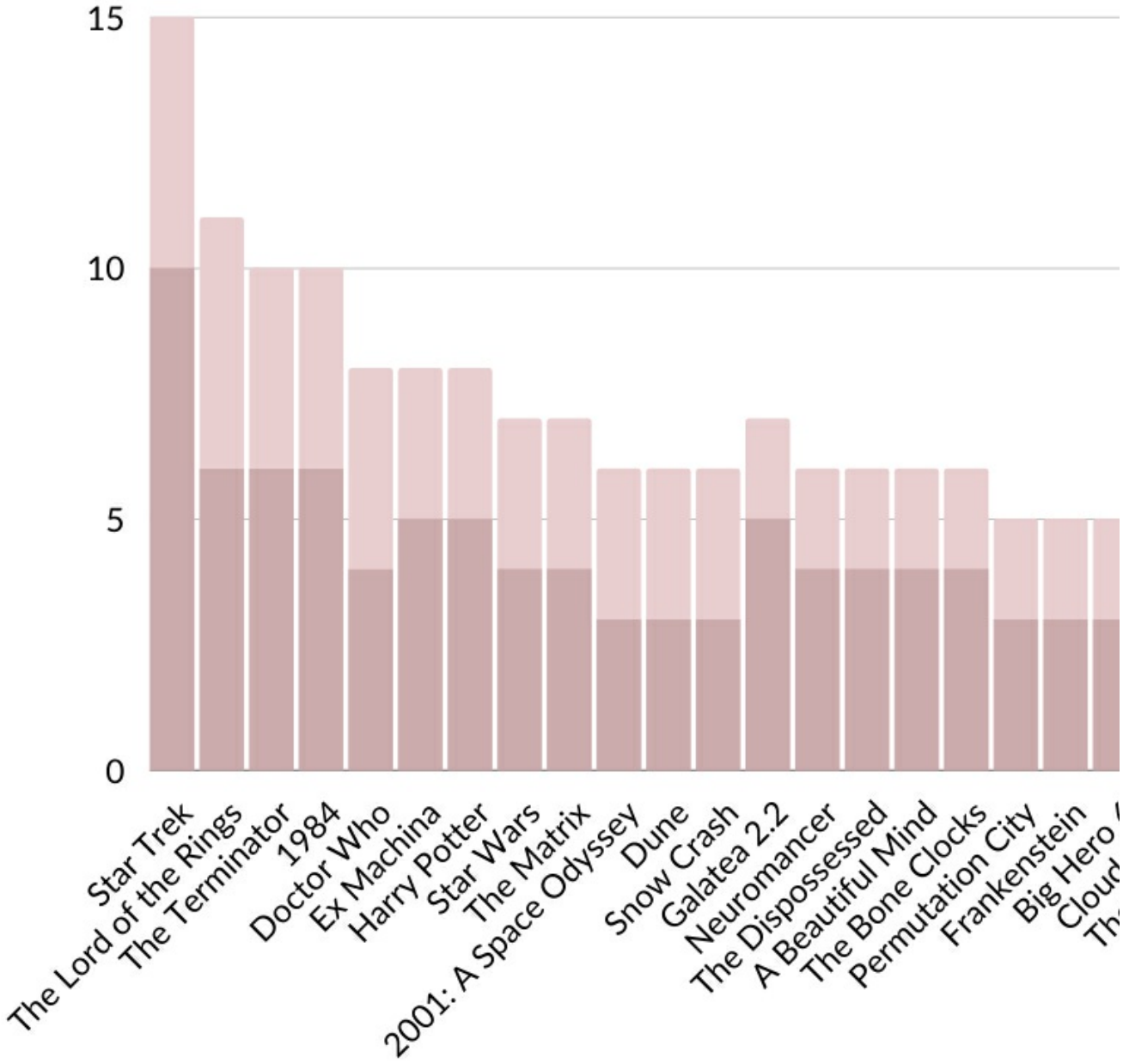

Figure 1. Total mentions of literary works (higher values) and number of interviewees who mentioned each work (lower value).

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Stories about, or relevant to, AI (both fictional and nonfictional) constitute a body of enduring narratives – often problematic ones – that affect both AI researchers and the public, and have a significant influence on the development, communication and reception of the scientific research. Many interviewees talked about the way in which literature, and stories in other media such as film and television, explore and transmits these narratives – from Mary Shelley's *Frankenstein* to *The Terminator*, from *Star Wars* to *Robot and Frank* – by which they themselves are sometimes influenced, but also with which they must contend or become familiar in order to communicate their research to the public – whether that is to use them as an example, or as a starting point to explain why and how they are in no way representative of the science.

SF, and other forms of fiction (from high canonical literature to popular cinema), serve as productive sites for thinking through the ethical questions raised by AI research. Such narratives encourage and aid ethical reflection on the research being undertaken, decisions that need to be made about research direction, and the potential wider consequences of that research. One researcher pointed to the work of filmmaker Andrei Tarkovsky as providing a site for thinking through the question of minds, over and above its treatment in philosophical literature; another pointed to Gustav Flaubert's *Madam Bovary* as contributing to cultivating an ethical self-consciousness. Literature and literary studies can be used in teaching to give science students a wider perspective and prepare them to consider ethical issues relating to their research, and can inform the multidisciplinary field now broadly labelled AI Ethics.

SF dominated researchers' discussion of the importance of literature for modelling the potential social futures to which their research could lead, from Kim Stanley Robinson's Mars trilogy and Iain M. Banks' Culture novels, to the Bloomsbury group's life and literature as a model for a post-work future. Literature offers anticipatory narrative models of possible futures, providing virtual worlds in which the nature of a potential reality can be explored in detail.

This taxonomy of the ways in which literature can influence AI researchers needs to be tested by further qualitative and quantitative research, including further investigation of the influence of stories in different media, on different demographics, and into the different types of stories influencing different scientific fields. But it is a start: a start in thinking more closely and more carefully about the bidirectional influences and interactions between literature and science, whilst recognising and valuing their differences. Investigating this direction of influence is an important part of understanding the cognitive, not just affective, value of literature, and the role literary scholarship can play in drawing attention to it. It is important for expanding the ways of knowing the world and the beings that inhabit it that are considered legitimate in our contemporary moment, and which, when taken seriously, can expand our means of addressing its most pressing issues.

This post draws on the author's paper, What AI Researchers Read: The Role of Literature in Artificial Intelligence Research, co-authored with Jennifer Schaffer-Goddard and published in Interdisciplinary Science Reviews.

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