

Cinema has helped 'entrench' gender inequality in AI, says study

February 13 2023



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Cinematic depictions of the scientists behind artificial intelligence over the last century are so heavily skewed toward men that a dangerous cultural stereotype has been established—one that may contribute to the shortage of women now working in AI development.

Researchers from the University of Cambridge argue that such cultural

tropes and a lack of female representation affects career aspirations and sector recruitment. Without enough women building AI there is a high risk of gender bias seeping into the algorithms set to define the future, they say.

The team from the university's Leverhulme Centre for the Future of Intelligence (LCFI) whittled down over 1,400 films to the 142 most influential cinematic works featuring artificial intelligence between 1920 and 2020, and identified 116 characters they classed as "AI professionals."

Of these, 92% of all AI scientists and engineers on screen were men, with representations of women consisting of a total of eight scientists and one CEO. This is higher than the percentage of men in the current AI workforce (78%).

Researchers argue that films such as "Iron Man" and "Ex Machina" promote cultural perceptions of AI as the product of lone male geniuses.

Of the meager eight female AI scientists to come out of 100 years of cinema, four were still depicted as inferior or subservient to men. The first major film to put a female AI creator on screen did not come until the 1997 comedy "Austin Powers: International Man of Mystery," with the over-the-top Frau Farbissina and her "Fembots."

This dearth of on-screen depictions may be linked to a lack of women behind the camera. Depending on how the directors' gender is counted, not a single influential film with an AI plotline was directed solely by a woman. The study is published in the journal *Public Understanding of Science*, with an accompanying report released on the LCFI website.

"Gender inequality in the AI industry is systemic and pervasive," said co-author Dr. Kanta Dihal from LCFI at Cambridge. "Mainstream films are

an enormously influential source and amplifier of the cultural stereotypes that help dictate who is suited to a career in AI."

"Our cinematic stock-take shows that women are grossly underrepresented as AI scientists on screen. We need to be careful that these cultural stereotypes do not become a self-fulfilling prophecy as we enter the age of artificial intelligence."

The researchers found that a third (37 individuals) of cinema's AI scientists are presented as "geniuses"—and of these, just one is a woman. In fact, 14% of all AI professionals on film are portrayed as former child prodigies of some kind.

The LCFI team point to previous research showing that people across age groups associate exceptional intellectual ability with men—the "brilliance bias"—and argue that the stereotype of AI scientists as genius visionaries "entrench" beliefs that women are not suited for AI-related careers.

"Genius is not a neutral concept," said co-author Dr. Stephen Cave, director of LCFI. "Genius is an idea based in gendered and racialized notions of intelligence, historically shaped by a white male elite. Some influential technologists, such as Elon Musk, have deliberately cultivated 'genius' personas that are explicitly based on cinematic characters such as Iron Man."

Dihal and Cave, along with their LCFI colleagues—and hosts of the [Good Robot podcast](#)—Dr. Eleanor Drage and Dr. Kerry McInerney, also catalog the way in which cinema's male scientists create human-like AI as a form of emotional compensation.

Some 22% of the male AI scientists or engineers throughout cinematic history create human-like AI to "fulfill their desires": replacing lost

loved ones, building ideal lovers, or creating AI copies of themselves.

"Cinema has long used narratives of [artificial intelligence](#) to perpetuate male fantasies, whether it's the womb envy of a lone genius creating in his own image, or the god complex of returning the dead to life or constructing obedient women," said LCFI co-author Dr. Kerry McInerney.

All this is further exacerbated by the overwhelmingly male milieu of many AI movies, argue researchers—with AI often shown as a product of male-dominated corporations or the military.

The LCFI team argue that the current state of female representation in the AI industry is grim. Globally, only 22% of AI professionals are women (compared to 39% across all STEM fields). More than 80% of all AI professors are men, with women comprising just 12% of authors at AI conferences.

"Women are often confined to lower-paid, lower-status roles such as software quality assurance, rather than prestigious sub-fields such as [machine learning](#)," said LCFI co-author Dr. Eleanor Drage.

"This is not just about inequality in one industry. The marginalization of women could contribute to AI products that actively discriminate against women—as we have seen with past technologies. Given that science fiction shapes reality, this imbalance has the potential to be dangerous as well as unfair."

While some may question whether on-screen representation truly influences the [real world](#), the LCFI team point to research showing that nearly two-thirds (63%) of women in STEM say that Dr. Dana Scully, the scientist protagonist on legendary TV show "The X Files," served as an early role model.

The eight female AI scientists and engineers (and one CEO) from a century of cinema:

- Quintessa, the female alien in "Transformers: the Last Knight" (2017)
- Shuri in "Avengers: Infinity War" (2018)
- Evelyn Caster in "Transcendence" (2014)
- Ava in "The Machine" (2013)
- Dr. Brenda Bradford in "Inspector Gadget" (1999)
- Dr. Susan Calvin in "I, Robot" (2004)
- Dr. Dahlin in "Ghost in the Shell" (2017)
- Frau Farbissina in "Austin Powers: International Man of Mystery" (1997)
- Smiler, a female emoji in "The Emoji Movie" (2017)

Of the 142 influential AI films in the corpus, one, "Captain Marvel," was co-directed by a man and a woman (Ryan Fleck and Anna Boden). Four were directed by the Wachowskis, who are transgender women.

However, when the first three films in the corpus were made (the Matrix films, 1999–2003), both Wachowski siblings presented as male, and when "Jupiter Ascending" was made (2015), Lilly presented as male while Lana presented as female.

More information: Stephen Cave et al, Who makes AI? Gender and portrayals of AI scientists in popular film, 1920–2020, *Public Understanding of Science* (2023). [DOI: 10.1177/09636625231153985](https://doi.org/10.1177/09636625231153985)

Provided by University of Cambridge

Citation: Cinema has helped 'entrench' gender inequality in AI, says study (2023, February 13)

retrieved 7 August 2024 from

<https://phys.org/news/2023-02-cinema-entrench-gender-inequality-ai.html>

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