

Matter of Opinion

Pop-culture references in peer-reviewed scientific articles

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With increasing multi-disciplinary collaborations and publications, there is a significant need to engage readers from different scientific fields. Pop-culture references in peer-reviewed articles can serve as an anchor upon which the audience can contextualize the work discussed in an article.

Communicating new research is as important as performing the research. In STEM fields, attracting a general audience to the topic of discussion requires an engaging format of writing and teaching. Many educators in chemistry (and science in general) have used popular culture (pop-culture) references to introduce their students to scientific concepts. This effort has also led to the creation of science talk sessions that are geared toward a lay audience (*Science on Tap*, for

example). Within the realm of scientific publishing, however, this trend is very minimal. As the number of interdisciplinary journals increase, the onus of enticing researchers outside our field of study becomes important. Contextualizing our research using pop-culture references can be a way to connect with the general audience as well as students.

Pop-culture plays a major role in influencing people's understanding of

science and scientists.¹ In addition, scientific concepts (such as new chemical elements) in books, TV shows, and movies also fascinate readers.² In STEM education, instructors have used memorable pop-culture references to teach chemistry effectively, including movies such as *October Sky* (propellant systems), *Apollo 13* (carbon dioxide filters), *Jurassic Park* (molecular biology and cloning), and *James Bond* (chemical compounds and their characteristics) and television medical dramas such as *ER* and *House* as case studies in biochemistry.^{3,4} In each of these examples, specific scientific concepts have been conveyed through a relevant pop-culture reference. Comics have also been used to teach safety in chemistry labs.⁵

Beyond classroom education, pop-culture references can be useful tools to share our research to fellow scientists, especially those outside our field of expertise (Figure 1). Science communicators and popular science magazines provide a simpler and spicier version of these stories to the general audience.⁶ Making a connection to the reader has significance not only in popular science articles but also in technical, peer-reviewed papers. One can use pop-culture to convey (in the introduction of a paper) what the research is about and why one should care; analogies of a superhero suit to biostability of drug carriers or an *X-files* reference on past science fiction being a present fact are some examples (Table 1). Scientists have already been using pop-culture characters for naming their technology (*Sherlock*,⁷ *R2D2*⁸) or a new genus (after *Lady Gaga*).⁹ Pop-culture references can animate a research topic in a way that grabs the readers'

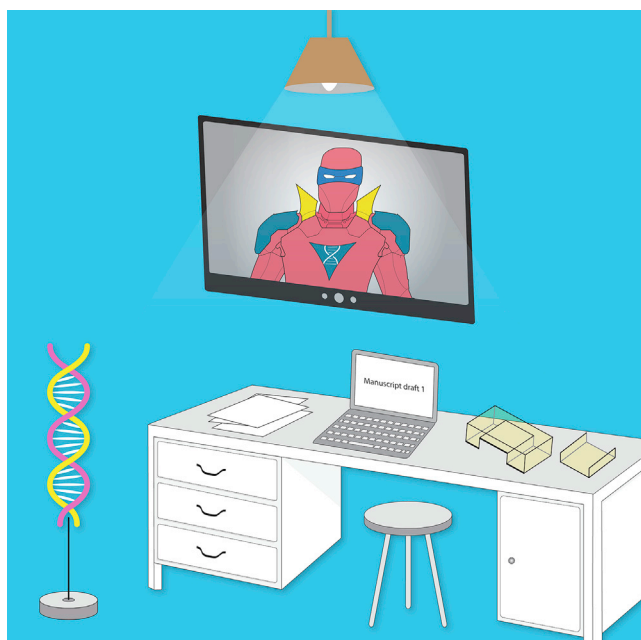


Figure 1. Pop-culture references such as comic book superheroes, movies, and literature can be used for communicating science in peer-reviewed articles

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Table 1. Examples of pop-culture references used in peer-reviewed articles

<i>Bahubali</i>	<i>Org. Lett.</i> 2019, 21, 9, 3098–3102
Comic book superheroes	<i>Chem. Commun.</i> 2019, 55, 6587–6590 <i>Nanoscale</i> 2020, 12, 21583–21590
<i>Fantastic Voyage</i>	<i>Trends Biochem. Sci.</i> 2018, 43, 12, 997–1013
<i>Harry Potter</i>	<i>Curr. Opin. Microbiol.</i> 2019, 52, 55–63
<i>Iron Man</i>	<i>Small</i> 2019, 15, 26, 1805386
<i>Lord of the Rings</i>	<i>Langmuir</i> 2019, 35, 14, 5050–5053
<i>The Dark Knight Rises</i>	<i>ACS Synth. Biol.</i> 2020, 9, 7, 1490–1498
<i>The Fifth Element</i>	<i>J. Am. Chem. Soc.</i> 2020, 142, 14, 6814–6821
<i>The X-Files</i>	<i>Nanoscale Adv.</i> 2019, 1, 969–972

attention. This gives readers a strong anchor upon which they can contextualize the rest of the paper. These concepts could hook the reader—the scientist next door who works in a different field or that non-scientist who is interested in reading science articles—to our new research. This would also engage students who are new to research and embarking on reading research papers. In short, using pop-culture references might help break the ice with our readers.

The academic community can test the waters to find out whether our fellow scientists like pop-culture references and whether the lay audience appreciate our research more through such connections. At the least, we can make science articles more fun to read. In chemistry teaching, the “Wow!” factor provides a set of criteria for choosing effective pop-culture references; movie clips that featured famous actors, amazing sets, and special effects were found to have higher pedagogical utility.¹⁰ Perhaps, a similar metric could be established to

estimate the effect of pop-culture references on the reach of scientific articles. Similar to chemistry teaching, pop-culture in scientific articles also need to be well-known references that resonate with a large population of the readers. A single reference may not connect with the entire audience—age, background, and interests vary—but pop-culture references can be the common ground to contextualize science, even if only a part of the audience relates to it.

There might be some concern about how journal editors or reviewers view pop-culture references in journal articles. My personal publishing experience has shown that some editors like such pop-culture references, especially in review articles that are meant to cover a broad audience. The occurrence of pop-culture references in peer-reviewed articles indicates that reviewers felt that the information, at worst, did not distract the reader and, at best, may have added some value (if only to entertain). There should also be a caution to not over-

simplify the scientific relevance or use inappropriate references, but only use pop-culture to provide a relevant context for our research. Science has featured in pop-culture so much, it’s now time to return the favor and use pop-culture in science.

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