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‘We’re physicists’: Gender, genre and the image of scientists in *The Big Bang Theory*

ABSTRACT

As a comedy, the popular CBS television show The Big Bang Theory (2007–) has made an international commercial success of its portrayal of scientists, complete with equation-laden white boards and an affectionate depiction of nerd culture. Working both with and against the gendered stereotypes of the nerd and the mad scientist – and drawing upon many of the core characteristics of situation comedy as a genre – The Big Bang Theory offers a sympathetic and nuanced depiction of scientists, including a more diverse group of scientists by gender, ethnicity, and scientific subfields than usually seen in either television or movies.

KEYWORDS

scientists
situation comedy
nerd/geek stereotype
history of science
genre
gender

Contemplating a heavy, oversized box that needed to be moved up several flights of stairs, the lead characters in the popular CBS television show *The Big Bang Theory* (2007–) established in its second episode how deeply their identity as scientists imbued everything they did. Eager to impress the pretty girl across the hall by fetching the box for her, Leonard Hofstadter (portrayed by Johnny Galecki) appealed to his apartment-mate, Sheldon Cooper (Jim Parsons), by calling on their shared vocation. ‘We’re physicists. We are the intellectual

descendants of Archimedes. Give me a fulcrum and a lever, and I can move the Earth', Leonard declared, just before he was almost crushed by the box, which was far too heavy for him to lift ('The Big Bran Hypothesis'). As a comedy, *The Big Bang Theory* has achieved worldwide commercial and critical success, being broadcast (according to numbers provided by Warner Bros Television Group) in more than 25 major international television viewership-tracking territories (Rowe 2014). The heart of its appeal rests in its affectionate portrayal of scientists, complete with equation-laden white boards, and its kind-hearted depiction of nerd culture, asserted without explanation as somehow inextricably linked to scientific pursuits. As Leiva (2009) opined in the *LA Times*, '*The Big Bang Theory* is the finest and best fictional portrayal of scientists in any current media – and a series that is carving out a place for itself in the annals of television comedy'.

Despite the long-standing figure of the 'mad scientist' in literature, film and television, the existing history of science scholarship on the images of scientists in popular culture asserts that realistic scientists most often appear as stereotyped characters in dramas (and more often in films than on television). And yet, the most successful comedy on television today features a group of scientists as its central characters. How, then, should those characters be understood? The answer can be found, dually, in the recent cultural shift towards sympathetic depictions of nerds in popular culture and in the analyses of comedy as genre done in television studies. As a situation comedy, *The Big Bang Theory's* affectionate depictions of scientists has tapped into the contemporary popularity of nerd culture and built on that with comedy grounded in authentic scientific content. Both depicted subcultures remain male-dominated. And yet, *The Big Bang Theory* portrays a group of scientists who are more diverse – in gender, ethnicity and especially specialty – than often seen on television. Analysing *The Big Bang Theory* highlights how its characters and its comedy build upon and play against long-standing, gendered stereotypes.

SEVEN SEASONS – AND COUNTING

The CBS comedy created by Chuck Lorre and Bill Prady, creators of *Two and a Half Men* (2003–2015), features as its main characters two genius physicists who work at Cal Tech and share an apartment. The programme broke out after its second season in summer 2009 when CBS began airing it in reruns following *Two and a Half Men* – and *The Big Bang Theory* episodes started getting higher ratings than it had in first run. By 2012, the programme had such a widespread fan base that Warner Brothers Consumer Products signed deals with 70 different licensing partners to produce branded merchandise, an unusual circumstance for a sitcom (Graser 2012). Its popularity grew in later seasons. In 2013/2014 primetime on CBS, according to Warner Brothers, *The Big Bang Theory* averaged 'over 23 Million viewers per original telecast, making it the #1 sitcom and the #2 programme in all of Prime' (Rowe 2014). Likewise, in syndication, it ranked as the number one programme in 2013/2014. Internationally, the viewership counts also remained impressive: for 2013/2014, *The Big Bang Theory* garnered, per telecast, 1.9 million viewers in Germany (PRO7), 1.5 million viewers in Canada (CTV), 875,000 in Australia (NINE), 800,000 in Italy (ITALIA1) and 590,000 in the United Kingdom (E4/CHN4) (Rowe 2014).

Its viewership is likely even larger than that. The fullest extent of the show's worldwide popularity remains difficult to enumerate precisely in an

era when television viewing occurs via multiple delivery systems, including broadcast, subscription on-demand streaming services – and even Internet piracy. According to research by CEG Tek, International, '*The Big Bang Theory* was the single most illicitly shared CBS programme and the second most shared overall', behind only HBO's *Game of Thrones* (2014). In China, the programme distinguished itself as both popular and censored. Episodes of *The Big Bang Theory* had been legally streamed 1.4 billion times via China's Soho.com Internet portal before seven complete seasons of it (and three other American television programmes) were abruptly removed, in their entirety, without explanation in April 2014 (Makinen and Flint 2014).

CBS's announcement in early 2014 that the programme would be renewed for a multi-year contract to run through 2017 (Steinberg 2014) affirmed the network's faith in the show's character-driven comedic formula. The show's central cast comprises a locational 'family' of young people, a group of single professionals (and an aspiring actor) living in seemingly close proximity, and gathering in the main characters' apartment or at their workplaces. As such, it echoes the settings of earlier television programmes that expanded the traditional domestic family-based situation comedy to include work-families or 'families' of room-mates, such as *The Mary Tyler Moore Show* (1970–1977), *Three's Company* (1977–1984), *Friends* (1994–2004) (Taylor 1991), or, more recently, *How I Met Your Mother* (2005–2014). In *The Big Bang Theory*, the main set reinforces the impression of a found family gathered in a domestic setting, in this case a somewhat nerdy living room shared by two bachelor room-mates.

The show's premise centred on three main characters: Dr Sheldon Cooper, a neurotic and rigid theoretical physicist; Dr Leonard Hofstadter, his long-suffering experimental physicist flatmate; and Penny (played by Kaley Cuoco), the attractive girl across the hall and Leonard's sometime girlfriend. The core triad was initially rounded out by two additional characters: Kunal Nayyar as Dr Rajesh Koothrappali, an astrophysicist who could not talk to women unless he was drunk or medicated; and Simon Helberg as Howard Wolowitz, an engineer who has driven a Mars rover, designed a space toilet, and even, in Season 6, flown to the International Space Station (ISS) as an astronaut. Later seasons added several new regular cast members, including two additional scientists: Howard's girlfriend-then-wife microbiologist Dr Bernadette Rostenkowski (Melissa Rauch), a neuroscientist who dates Sheldon named Dr Amy Farrah Fowler (Mayim Bialik), and comic book store owner Stuart Bloom (Kevin Sussman). Plot lines integrate some elements of the characters' occupations and hobbies throughout.

Fans, non-fans and critics have disagreed about whether the fictionalized portrayals of scientists (and 'nerds') in *The Big Bang Theory* offer an overall negative or positive depiction of those historically bullied groups. Some have argued in particular that a comedy featuring scientist characters amounts to a kind of scientist blackface in which the stars of the show must be the butt of the jokes, laughed at by the audience. The attention paid by the show's producers, writers, and set dressers to scientific and nerd-culture accuracy, however, favours an assessment that the scientists are to be seen as sympathetic: quirky but lovable despite being isolated by their inside jokes and scientific knowledge. Such sympathetic portrayals stand in contrast to the long-standing 'mad scientist' archetype – or what scholars working in the field of the history of science have often found when they analysed real and fictionalized depictions of scientists in popular culture.

'A RARE AND SPECIALIZED CHARACTER'

Popular culture depictions of scientists have long operated against the persistent trope of the 'mad scientist'. Rooted in a long-standing classical association of genius with madness, which found new life and new adherents in the mid-nineteenth century (Stiles 2009), the figure of the mad scientist appeared frequently in European literature (Haynes 1994; Back 1995) and even in Japanese 'mad scientist murder' detective fiction (Kawana 2005). Mad scientists have been associated with nuclear power (Wear 1988) and featured as stock characters in science fiction and horror films (Tudor 1989; Brosnan 1991; Skal 1998; Frayling 2005). Films celebrating genius mathematicians such as *A Beautiful Mind* (Howard, 2001) or *Proof* (Madden, 2005) have also illustrated the purported relationship between mental illness and startling insight. The mad scientist stereotype historically irritates real practitioners. For instance, when a scientific products company staged photos of mad scientist characters for its catalogue cover image, the letters page in *Science* recorded disappointment and anger (Byrne 1989). For scholars interested in images of real science and scientists, the mad scientist trope complicates their ability to assess public perceptions.

The appearances of scientists in mass media have largely been studied as a part of the broader scholarship on popular understanding of science. For instance, researchers have looked at how actual scientists communicate via mass media, how accurately news coverage depicts science and scientists, or how fictionalized visions of scientists affect perceptions of science (Bauer et al. 2007; Dudo et al. 2011). But the first real investigations into the perceptions of realistic scientists in popular culture emerged in the early 1960s.

Faced with national Cold War concerns about producing enough scientists and engineers for the space age, a survey of high school students reported by the Associated Press (and analysed by academics) found that many young people dismissed students of science as 'squares in sweatshirts' (Hagerty 1964). The results were not much better when a group of social scientists (Gerbner et al. 1981) did the first systematic survey of the fictionalized depictions of scientists on television. Basing their analysis on message systems analyses of television programmes sampled from 1969–1979, Gerbner's group concluded that: 'although science is a frequent theme of television drama, the scientist is a relatively rare and specialized character'.

Interestingly, Gerbner et al. (1981) also found that, although male scientists were largely *under*-represented on television in comparison to their representation in the contemporary labour force, women scientists were *over*-represented when compared to labour force statistics in the same way. Gerbner and his group noted this disparity but offered little explanation. The increased visibility of female scientists as dramatic characters may have been related to another over-representation that they did record: of doctors and health professionals on television versus other kinds of scientists. Or the proportions may simply have been skewed by what the scholars themselves acknowledged was the 'tiny actual percentage in the country' of women scientists.

By the time a group of Bruce Lewenstein's graduate students at Cornell University collaborated to carry out a broader analysis of the image of science in popular media (Nisbet et al. 2002), that group found that 'the scientist' had become a series of identifiable stereotypes, with many common links between the types. In dramatic television or movies, scientists often appeared as the absent-minded professor, a socially isolated man (almost always a man) who

was completely absorbed in his work. A variation on the theme was the old trope of the Mad Scientist (think Dr Frankenstein), as a researcher whose obsessive experimental plans were at best misguided, or at worst actually evil. Many disaster or monster stories in film or television featured the scientist as the Voice in the Wilderness (a Cassandra of sorts), the researcher who had studied some obscure phenomenon that allows him to comprehend whatever disaster is unfolding, but who fails to communicate the danger effectively (often because he is so socially removed that people will no longer listen to him). The scientist as Passive Pawn stereotype depicts an obsessive but compliant researcher who is controlled or co-opted by the military or big business. All of these categorizations share a basic impotence that reflects the stereotype that scientists, because of their devotion to their work, fail to exercise their masculinity appropriately.

In contrast, the Hyper-Rational Observer (think Sherlock Holmes, Mr Spock from *Star Trek* [1966–1969], or Temperance Brennan from *Bones* [2005–]), is a less obviously gendered stereotype: a scientist who is aloof, socially awkward, or removed but exhibits superior analytical skills. Such a character is sometimes posed as one half of a dramatic exploration of science versus religion, e.g., Jodie Foster as radio astronomer Ellie Arroway in *Contact* (Zemeckis, 1997) opposite Matthew McConaughey's Reverend Palmer Joss. Finally, recent films have featured the Unlikely Hero, the scientist who comes through with the solution or moral lesson in the end. After depicting a classic mad scientist in *The Fly* (Cronenberg, 1986), Jeff Goldblum has played the Unlikely Hero twice, in *Jurassic Park* (Spielberg, 1993) and a techy version of that character in *Independence Day* (Emmerich, 1996). Likewise, in *Pacific Rim* (del Toro, 2013), the Unlikely Hero appears as a pair when the key to saving humanity from gigantic inter-dimensional monsters comes from the unexpected collaboration of two previously squabbling researchers. Although there have been dramatic depictions of women as scientists, often as doctors or medical examiners, most of the portrayals of research scientists in popular culture reinforce the basic stereotype of the scientist as white and male.

Moreover, such depictions of scientists appear more often in film than on television, and more often in drama than comedy. A recent multi-authored study analysing the relationship between televised depictions of scientists and public attitudes about science (Dudo et al. 2011) found that scientists were depicted 'infrequently' in primetime dramatic programming. Notably, in the history of science, both of the recent scholarly monographs on the portrayal of science in film focus almost exclusively on dramatic movies (Perkowitz 2007 and Kirby 2011). Because historians of science tend to be concerned, first and foremost, with the entertainment media's effectiveness in communicating real science to the public, less attention has been paid to comedy.

Light-hearted depictions of scientists are not necessarily any less stereotypical. In some cases, comedic depictions of scientists in films or television simply played the previously described stereotypes for laughs. One example (made twice) would be the absent-minded professor/scientist/inventor in *The Absent-Minded Professor* (Stevenson, 1961) or the remake of that movie, *Flubber* (Mayfield, 1997). On television, the handsome and affable character known as 'The Professor' spent three seasons marooned on *Gilligan's Island* (1964–1967), without expanding the stereotype of the romantically oblivious, inventor/scientist very much.

The depiction of scientists in *The Big Bang Theory* builds on another stereotype that shares many core characteristics: the geek or nerd. The terms are

rooted etymologically in the first use of 'nerd' in a Dr Seuss book in 1950 and in the circus term, 'geek', for the sideshow performer who bites the heads off chickens or one who, according to the Oxford English Dictionary, was 'foolish, offensive, or worthless' (Bueno 2013). The identity has roots in the amateur radio communities in the 1920s (Eglash 2002). The cultural stereotype depicts an awkward, outcast individual who paired intense intellectual interests with general social discomfort. Although nerd and geek have been carefully parsed in numerous blog entries, online graphics, and social media lists as not being synonymous with each other, there does not seem to be a firm consensus on exactly where and how that line is drawn and they are used here interchangeably. Bueno (2013) summarizes the key characteristics as 'obsession, intelligence, and social ineptitude', noting that the Japanese term 'otaku' for one with obsessive interests or hobbies has been compared to geek or nerd.

The widespread adoption and proliferation of computers in the 1960s and 1970s created a new kind of nerd – the computer geek – sometimes portrayed unsympathetically (Kendall 1999) and sometimes celebrated from within that community for their shared lexicon and culture (Raymond 1991; Sifton 2000). *The Big Bang Theory* creator Bill Prady knows that culture, of course, having worked briefly as a computer programmer. Most often stereotypical nerds were depicted in popular culture as white, heterosexual, and male, although not always (Kendall 1999; Eglash 2002; Pateman 2007). Much like the stereotype of scientists who fail to perform their masculinity properly, Quail argues that the nerd's 'shortcomings are often ridiculed as a sign of sexual weakness and homosexuality' (2009).

Since the 1980s and 1990s, however, the geek or nerd stereotype changed as the business of networked computers made millionaires and billionaires of its pioneers. After the late 1990s dot-com boom, geek became chic. Indeed, Eglash (2002) has argued that the ability to assert and participate in nerd identity has become a 'critical gateway to [...] technocultural access' in a lucrative field. The exploits of nerds-turned-tycoons have been valorized in major motion pictures such as *The Social Network* (Fincher, 2010) or the Steve Jobs biopic, *Jobs* (Stern, 2013). Television programmes such as HBO's *Silicon Valley* (2014) have jumped on the bandwagon. For *The Big Bang Theory*, nerds form both its subject and its audience.

'WENDY TO THE LOST BOYS'

As a character-driven situation comedy drawn out over the course of multiple seasons, *The Big Bang Theory* has both played with and broken down the expected stereotypes of nerds and scientists. In doing so, it tapped into the interests of the programme's scientifically literate, fanboy-friendly audience. *The Big Bang Theory* has offered a sympathetic portrayal of its core group of male scientists by making the characters underdogs: human, approachable and vulnerable. But it was almost not that way.

The first pilot that Chuck Lorre and Bill Prady wrote for *The Big Bang Theory* defined the gender dynamic between the main characters differently – and did not work. The female lead, initially named Katie (played by actress Amanda Walsh) was to have been a hardened, intimidating woman whose softer side would be revealed over time by her interactions with the two male leads (already cast as Galecki and Parsons as Leonard and Sheldon, respectively). Juxtaposed with the isolated, reclusive scientists, however, the Katie character seemed harsh, even mean. As Bill Prady reported to *Variety* after the

end of the first season, reflecting on the initial pilot, 'What we didn't anticipate ... is how protective the audience would feel about our guys' (2009). In the end, CBS did not pick up the pilot.

Even in the first draft of the revised pilot, however, the re-envisioned Penny character was still written as hard-drinking party girl who moved into the apartment across the hall from two nerds. In that version, dated 2 October, when Sheldon and Leonard first noticed Penny through her open apartment door, she is burning a photograph of an ex-boyfriend. When asked what the gesture represents, she offers the jarring answer, 'My desire to set him on fire'. The rest of the photos in the flaming trash can, the viewer later learns, contain images of Penny and her (ex-)boyfriend having sex. When invited into Sheldon and Leonard's shared apartment for lunch, Penny describes herself as, 'And I'm a José Cuervo shot girl but I'm also writing a screenplay about a girl who comes to L.A. to be an actress and failed and wound up as a José Cuervo shot girl'.

The final reimagining of the script created the central dynamic that became so popular. Most significantly, Lorre and Prady recast the Penny character as an earnest, practical, Midwestern girl who becomes one of the guys. The contrast can be heard in the revision of the line given above. In the pilot that aired on 24 September 2007, Cuoco as Penny explains to the two scientists that, although she is a waitress at the Cheesecake Factory, 'I'm also writing a screenplay. It's about this sensitive girl who comes to L.A. from Lincoln, Nebraska to be an actress, and winds up a waitress at the Cheesecake Factory'. The punchline is that the screenplay is not about her; she's from Omaha.

The potential for more nuanced, likable characters grew from the reliance of the situation comedy genre on audience comfort. Indeed, the scholarly literature on sitcoms supports the idea that the central characters tend to be depicted sympathetically, allowing the audience to laugh along with them easily (Mills 2009). As Marc (1989) asserted, 'situation comedy tends to establish a range of comfortable and familiar logics in whatever subject matter it addresses' in order to allow audiences to identify with the core characters. Recognition is one key, therefore, to successful comedy.

Despite the success of the show over several seasons, Cuoco's character, written as just 'Penny', never gained a surname. Usually such an omission is a sure sign of an underdeveloped role. In this case, the quirk has become something that the programme's writers have held onto deliberately. In online videos about the programme released to promote *The Big Bang Theory's* sixth season, cast members explained that Penny's lack of a last name has become 'a thing' that the writers are superstitious about and do not want to change.

Recasting Penny as sweet and Midwestern also allowed Lorre and Prady to reimagine the scientists, depicting them as vulnerable without having them seem threatened. Actor Kaley Cuoco, who plays Penny, has described her character using the analogy of the famous characters from J. M. Barrie's *Peter Pan* as being 'Wendy to the Lost Boys'. Moreover, the Penny character serves as a foil for the genius scientists, a reassuring outsider who can give viewers who do not identify with the scientists an entry point into scenes that are heavy with technical jargon. She also offers a way for the show to explain the intricacies of the complex social lives that Prady and Lorre gave the scientists in their rewrite of the show's premise.

Rather than having the male leads be socially isolated and awkward, the revised version of the situation comedy adapted the show's premise so that the scientists were awkward but socially active, albeit still geeky. Prady

and Lorre also added two additional male leads: the characters of Howard Wolowitz and Rajesh Koothrappali. In the early episodes in the first season, the show established the context in which all of the comedy would happen. As a foursome, Sheldon, Leonard, Raj and Howard adhere to a busy (and, thanks to Sheldon, rather rigid) weekly schedule of game playing, comic book collecting, science fiction television watching, and movie viewing, all fuelled by a steady diet of takeout and restaurant meals.

The character of Sheldon owes much to the ever-present cultural archetype of the 'mad scientist'. Depicted as either having Asperger's or just an otherwise rigid personality, the Sheldon character is a new take on the stereotype of the narrowly focused, socially inept and physically awkward scientist. Sheldon lives a regimented life, attempting to impose rationality on the inherent unpredictability of ordinary social situations by requiring formal written agreements to govern relationships, whether with room-mates or his girlfriend. Sheldon does not grasp sarcasm. And yet, the character rejects any assessment of his behaviour as madness, stating more than once, 'I'm not crazy; my mother had me tested!' He does have friends. And as much as Sheldon's many rules drive them crazy, the group tolerates his preferences in their collective pursuit of nerdy fun.

The Big Bang Theory conflates science knowledge with passionate fandom, combining two different aspects of the American conception of the nerd or geek without questioning their relationship. The depictions of the main characters' fandom reinforced the choice to have the core group of characters be all male, playing on the stereotype that such interests are mostly held by men who are uncomfortable or inexperienced in relationships with women. And yet, allowing the characters to be immersed in a culture of fandom also gave them a social context full of pastimes that had become increasingly mainstream in recent years. In a character-driven show, the expression of the main characters' friendship through the exercise of those hobbies was not only humorous but often provided opportunities for the characters to express resilience, persistence and likability.

The nerdiness illustrated by *The Big Bang Theory* characters, therefore, is depicted far more sympathetically than another famously nerdy TV character: the Winslow's neighbour, Steve Urkel, in *Family Matters* (1989–1998). In that case, despite becoming the recognized star of the show, the Steve Urkel character (portrayed by Jaleel White) was uncool, annoying, and alternately relentlessly optimistic or oblivious enough to withstand being dismissed, ridiculed, or slighted by many of the other principal main characters. As a nerd, Urkel's failed inventions and physical clumsiness provided the comedic turns for the show's plots. Although the character gained audience sympathy and affection, the show's plots never assumed that viewers would identify with Urkel's interests or hobbies.

In contrast, in *The Big Bang Theory*, the show's producers and writers supported the authenticity of the main characters' geek street cred by layering into the script and the set dressing details from the characters' active fandom in ways intended to be recognizable for a significant segment of the audience. Models, action figures and posters decorate the apartments depicted throughout the show. More so, the characters themselves have conversations, arguments, and debates rooted in science fiction, table-top gaming, online or console games, cosplay and comic books. Getting the details right becomes an inside joke for fans who enjoyed seeing their hobbies portrayed accurately on-screen. That authenticity has been reinforced with cameos from the stars of

that world. A particularly popular episode in Season 4 featured actors George Takei from the original *Star Trek* (1966–1969) television programme and Katee Sackhoff from the re-envisioned *Battlestar Galactica* (2004–2009) both appearing in one of Howard Wolowitz's sexual fantasies ('The Hot Troll Deviation').

The Big Bang Theory can be enjoyed by viewers who do not understand the scientific principles being referenced or the geek culture being depicted. But fans who can do more than just chuckle along, who fully get the jokes and understand the references, gain an extra thrill from recognizing their subculture depicted on-screen, whether by identifying particular equations or appreciating the specific comic book references. Show creator Lorre denies ever having used a laugh track for *The Big Bang Theory*, relying instead on a long-standing practice for radio and television comedies: a studio audience. Playing off an audience allows the actors to gauge their comedic performances but, as Marc (1989) points out, television comedies have also long relied upon modern technologies to ensure that the studio audience's guffaws are carefully fine-tuned. Industry practice for many American television comedies includes having a sound engineer adjust the recordings of studio audiences to clean up the sound, better punctuating the show's action (Adalian 2011). The laughs in *The Big Bang Theory*, whether real or enhanced, arise from a situation comedy based on scientists – and getting the science right has been one key to its success.

DEPICTING DIVERSE SCIENCE

From its very first episode, *The Big Bang Theory* has used real science to reinforce the authenticity of the main characters' occupations as the basis for the situation comedy. The writers themselves contribute some of the science content, but the scripts also go for review and suggestions to Dr David Saltzberg, a UCLA astrophysicist who serves as the technical advisor for the show. In that capacity, he reviews scripts, refines language, suggests props, and fills the white boards that decorate the main set, Sheldon and Leonard's apartment. He also suggests many of the experiments that the characters undertake in the course of the show, or the laboratory experiments and research topics that the scientists are depicted as pursuing professionally. In this way, if a viewer looks up an experiment or a principle that is mentioned in the show, he or she will find that it is real. The details add complexity to the set, plots and characters.

The Big Bang Theory's comedy relies on audience recognition and empathy. For that matter, both comedy and science rely on understanding a specific subculture based on an insider–outsider dynamic. As Mills (2009) suggests, 'comedy has traditionally been a form which relies on a communal, social aspect in order to be effective'. And, in practice, laughing along with 'insider' jokes reinforces the audience's sense of belonging. Such content only works if its entertainment value enhances the performances – and such authenticity only works if it seems believable.

In order to allow the actors in *The Big Bang Theory* to perform the scientific conversations convincingly, the scripts contain a pronunciation guide at the beginning. According to an interview given by lead actor Johnny Galecki in promotion of the sixth season, as the show has turned more to exploring the relationships between the well-established characters, there have been fewer technical terms to memorize, but in the early seasons of the programme, the pronunciation guide could be a full page long, or longer. In the structure of

an episode, the scientific jargon can function as 'technobabble' if a viewer does not understand it. But fans who do recognize the equations on the white boards, which often relate to the content of the episode's plot, may find the programme even more enjoyable for understanding that connection. For instance, during an episode from Season 1, in which the four main male characters purchased a full-sized prop of the time machine depicted in *The Time Machine* (Pal, 1960), the white boards scattered around the apartment showed time travel equations ('The Nerdvana Annihilation').

The authentic details sprinkled into the scripts and set dressing by *The Big Bang Theory's* science advisors are not intended to teach real science. Indeed, the potential of television situation comedies for real contributions in the public understanding of science are, in some ways, inherently limited. By definition, the genre uses settings to shape comedy, not to educate the public. Nor should the programme be expected to increase the basic science literacy of its viewers. But that is equally true for any situation comedy, even those that employed content experts to advise the programmes. In comparison, despite using a real New York City police lieutenant as a technical advisor, *Barney Miller* (1975–1982) was not expected to offer a tutorial on police procedure any more so than the hospital-based comedy *Scrubs* (2001–2010) used the medical professionals who advised its scripts to educate fans about surgery.

Using those details, however, *The Big Bang Theory* has offered a popular depiction of real science with some useful specificity. Rather than treating science as a monolithic subject, the programme depicts specific scientific subfields as well as the biases that some scientists have about other fields and subfields. Sheldon, a theoretical physicist who works with equations and theories but not with any physical apparatus, sees a fundamental difference between his work and the experimental research that Leonard conducts. Conversely, Leonard teases Sheldon about some of the conclusions that theoretical physicists have reached. In the pilot episode, for instance, Leonard criticizes the multiple extra dimensions postulated by string theorists: 'at least I didn't have to invent 26 dimensions just to make the math come out'. When Sheldon retorts, 'I didn't have to invent them. They're there', Leonard asks incredulously, 'In what universe?' Sheldon's reply, 'In all of them. That's the point', serves both as the punch line of the exchange and an insider's reference to another aspect of string theory.

Furthermore, when the characters of Dr Bernadette Wolowitz and Dr Amy Farrah Fowler are introduced, Sheldon regularly dismisses microbiology and neuroscience, their respective fields, as less significant (less intense, less difficult, less demanding and less profound) than physics. Sheldon's opinions are meant to be extreme and impolitic, a reflection of his characteristic attitude and lack of social grace. The character's dismissal of the women's work also suggests a devaluing of their gender, in addition to their professional subfields. At the same time, the plot device of placing Sheldon into an unfamiliar laboratory permits the comic opportunities of the character being a fish out of water, as well as for different kinds of science and research plans to be shown. Most popular culture depictions of science and scientists do not feature such a range of specialties, experiments, or settings.

The biases that exist between scientists with engineers are also well developed by *The Big Bang Theory*. The programme contains a running joke that references the historic rift between scientists and technologists. In the first season, Sheldon expresses the sentiment with characteristic comic bluntness

as he enters Wolowitz's lab: 'Engineering, where the noble, semiskilled labourers execute the vision of those who think and dream', he says as he surveys the room: 'Hello, Oompa Loompas of science!' ('The Jerusalem Duality'). The hierarchical distinctions between different kinds of scholarly labour are reinforced throughout all of the seasons by the scientist characters who repeatedly address Howard, with emphasis, as 'Mister' Wolowitz. Even though Howard eventually flies to the ISS, he is constantly reminded throughout the series that, his Master's degree from M.I.T. notwithstanding, he ultimately lacks a Ph.D.

The characters of Howard and Raj also contribute to the limited portrayal of ethnic and racial diversity among scientists. Over the course of the programme's seasons, these characters' personal identities (Jewish and Indian) factor into the comedy more in terms of how they have affected their personal family and dating lives than how they shaped their professional opportunities. The racial diversity depicted does not reflect the presence of African American or Hispanic researchers in scientific fields. But the presentation of a non-homogenous social group of scientists linked through their common workplace, the labs at Cal Tech, reflects the reality for most people working in academic science. The consistent pairing of these two characters has also developed into a running joke in later seasons, relying on double entendre to make otherwise innocuous comments suggest a homosexual relationship between the two. The actual romantic relationships depicted in the programme have all been heterosexual, however. From the show's inception, the female characters have been caught between their function as supporting characters for the male leads, and the potential to depict women as working scientists.

'COME FOR THE BREASTS, STAY FOR THE BRAINS'

From the beginning, *The Big Bang Theory* included women scientists. In the very first season, actress Sara Gilbert appeared as the recurring character, Dr Leslie Winkle, a fellow experimental physicist working in the same laboratory as Leonard. In response to Penny's surprised exclamation at meeting her – 'Wow, a girl scientist!' – Winkle sardonically replied, 'Come for the breasts, stay for the brains' ('The Fuzzy Boots Corollary'). The character served as an antagonist to Sheldon and an on-again, off-again lover to Leonard, with whom she ultimately breaks up in Season 2 because he supports Sheldon, not her, in a scientific argument ('The Codpiece Topology'). As a woman who managed her own sexual needs and remained independent, not wanting an emotional relationship with Leonard, the Leslie Winkle character both breaks out of the usual stereotypes of women even as she conforms to some of the established stereotypes of scientists, being aloof and unpolished.

In her critique of women scientists in *The Big Bang Theory*, communications scholar Laura Willis cites Rosabeth Moss Kanter's typology of female stereotypes: the Temptress, the Mother, the Pet, and the Iron Maiden (or Ice Queen) as the basis for her analysis (2012). In *The Big Bang Theory* there have certainly been depictions of women scientists that fit that typology. In the third season, for instance, the one-time appearance of Dr Elizabeth Plimpton, a famous quantum cosmology expert who unexpectedly turns out to be a sexually aggressive houseguest (bedding Leonard quickly and making advances to Raj and Howard together), certainly reflected the stereotypical depiction of woman as temptress ('The Plimpton Stimulation').

After two more female actors portraying scientists were added to the regular cast in Season 3, the potential for depicting women scientists as more

than one-note stereotypes expanded. The two additions were Mayim Bialik as neuroscientist Dr Amy Farrah Fowler and Melissa Rausch as the microbiologist Bernadette Rostenkowski. Because Bialik actually holds a Ph.D. in neuroscience from UCLA in real life, the actor also took on the additional behind-the-scenes role of working with David Saltzberg to review the biological science on the show (Landau 2011; Bialik 2013).

Although their presence on the show supports the depiction of scientists as both male and female, the women scientists in *The Big Bang Theory* consistently fall victim to what historian of science Margaret Rossiter has called 'the Matilda effect', the tendency to have their work devalued or co-opted by male colleagues (1993). Sheldon's general disparagement of their research interests has already been discussed. But that attitude can be seen throughout the programme. Written as supporting characters, the female scientists serve primarily to support the character development experienced by the core male actors over six seasons.

In fact, the writers directly suggest in several plot developments that a women's success could be justifiably threatening to the men with whom they are in romantic relationships. In the Season 4 finale ('The Roommate Transmogrification'), when Bernadette receives her Ph.D. and lands a good job, she celebrates by buying Howard a pricey Rolex watch. The combination of the disparity between their respective statuses and the expensive gift throws their relationship sufficiently off balance that the episode, and the season, ends with their status still unclear. The resolution (or lack thereof) of that plotline is portrayed as a reflection of Howard's insecurity (an aspect of the nerd stereotype) but his discomfort with Bernadette's accomplishments is also depicted as a reaction that the viewer should see as understandable given contemporary gender norms. The depiction of women as scientists does not outweigh the programme's overall reliance on the stereotypes of male-female romantic relationships to drive much of its comedy.

By Season 6, however, the writers seemed to have realized some of the comedic juxtapositions permitted by having female leads portraying scientists. After Sheldon, Leonard, Howard and Raj fail dismally at encouraging a classroom of young women to consider the joys of pursuing careers in science, they appeal to the women in their lives ('The Contractual Obligation Implementation'). The characters of Amy and Bernadette had spent the day with Penny at Disneyland getting makeovers. Nonetheless, when called by their male counterparts, they save the day by speaking to the assembled schoolgirls via speakerphone about the importance of women pursuing science, even as they were (unbeknownst to their young audience) dressed head-to-toe as Disney princesses.

ACADEMIC CULTURE AND SCIENTIST STARS

It is worth noting that, for all of its attention to scientific details and scholarly hierarchies, *The Big Bang Theory* producers misrepresent the working structure of academic science. To be fair, the focus of the programme is literally the main characters' living room, not their work places. However, given the attention paid to portraying the subcultures of science and fandom accurately, it seems an odd and perhaps deliberate blind spot to represent the practices of academic culture so poorly. At a time when commentators have called on academic scientists in the United States and the United Kingdom to reconnect their scholarly pursuits to real-world problems (Maxwell 2014; Kristof 2014),

the choice by the producers of *The Big Bang Theory* not to pay as much attention to the academic setting of their story as they have to the scientific background of their characters seems to reflect a larger sense that academic settings lack relevance.

A few examples make the point about the lack of authenticity around academic culture. In the first season alone, Sheldon gets fired from the university for insulting the department chairman but then receives his job back after he reluctantly apologizes (‘The Luminous Fish Effect’). Academics might believe that Sheldon could be fired quickly, but will wonder that any university could refill a vacated research line that easily – and with the previously fired person no less. Five episodes later, the plot revolves around Leonard’s presentation at an academic conference of some joint work done with Sheldon, who dismisses speaking at a conference as popularizing (‘The Cooper-Hofstadter Polarization’). In reality, presentations at well-respected conferences count towards professional advancement because they allow scientists to stake claims to new discoveries and conclusions. Most working scientists understand that conference presentations are an inextricable part of their professional work lives.

Nor does the accurate portrayal of academic work structures improve in later seasons. In Season 6 (‘The Tenure Turbulence’), the three male physicists, Sheldon, Leonard and Raj, compete for a tenured professorship vacated when an old professor dies. They each attempt (awkwardly) to woo tenure committee members, even at the funeral. Although vacated office space might be awarded by fiat by a department chairman based on a popularity contest, tenure is not. Fundamentally, *The Big Bang Theory* fails to grasp the structure of academic life at a university. At best, the show repeatedly ignores such details in favour of funny plot devices.

Because *The Big Bang Theory* takes the science seriously, however, the show has become a desirable destination for guest appearances by real scientists as well as some key instances of science and technology ‘product placement’. The list of the real-life scientists and science writers who have made guest appearances on the show includes world-famous astrophysicist Stephen Hawking, astrophysicist and director of New York City’s Hayden Planetarium Neil deGrasse Tyson, string theorist and science author Brian Greene, Nobel-Prize-winning astrophysicist George Smoot, NASA Space Shuttle astronaut Mike Massimino and Apollo 11 astronaut Buzz Aldrin. Other cameo appearances featured science educator Bill Nye (the Science Guy) and National Public Radio science reporter Ira Flatow (although, fittingly for a radio star, only by voice). The attention paid to getting the scientific details right allows real-life scientists to appear on the programme without worrying that the association jeopardizes their reputations.

And the fandom has become reciprocal. The story arc in Season 6 about Howard Wolowitz going to the ISS was directly supported by the National Aeronautics and Space Administration (NASA). After NASA astronaut Mike Massimino and his colleagues provided real spaceflight details to enhance the final episode of Season 5, in which Wolowitz launched into space aboard a Russian *Soyuz* spacecraft, Wolowitz’s stay aboard the ISS became a major story arc in the next season, not just a plot point that was supposedly resolved during the interseason break, as had originally been planned.

Because of the show’s reputation for paying attention to the details of its portrayal of science, NASA officials saw supporting the programme, by lending Massimino as an actor and suggesting authentic details, as a creative way

to foster public interest in the real ongoing ISS mission (Pearlman 2012). In turn, show creator Chuck Lorre attended the Mars Science Laboratory (MSL) *Curiosity* landing at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California as a guest of NASA. Moreover, after the successful landing on Mars, the Entry, Descent, and Landing group of MSL team visited the set of *The Big Bang Theory* and took a picture sitting on the famous couch in Sheldon and Leonard's living room. In a moment of true public relations blindness, however, although the MSL team included both men and women, the group brought to the set by JPL included only men.

CONCLUSION, OR REVENGE OF THE NERDS

The Big Bang Theory became a hit on television at a time when, in broad terms, nerd-dom found new popularity. When the MSL *Curiosity* touched down on the Martian planet's surface, it was carried live on the big screens in New York City's Time Square at 1: 31 a.m. EDT on 6 August 2012. Amazingly, the crowd broke out in chants of 'Science! Science!' as they watched. Whether those cheers were self-consciously ironic or not, members of that crowd recognized that they were standing out in the street in the middle of the night watching planetary science happen in real time. In 2014, Neil deGrasse Tyson hosted *Cosmos: A Spacetime Odyssey* on 21st Century Fox in the United States and via the National Geographic Channel and associated channels in both the United States and Canada. The re-envisioned and updated version of Carl Sagan's path-breaking science documentary, *Cosmos: A Personal Voyage*, broadcast on the Public Broadcasting System in 1980, earned critical acclaim, four Emmy awards and approximately 8.5 million viewers.

Public awareness of science and technology has also changed radically in the last ten years. The concerted effort to promote Science, Technology, Engineering and Mathematics (STEM) in all levels of education has actually resulted in dramatic drops in humanities study at colleges and universities, in favour of STEM areas of study. And the success of technology entrepreneurs that made Steve Jobs, Bill Gates, Tim Berners-Lee, Elon Musk, and Mark Zuckerberg rich also made them famous. In that cultural moment, *The Big Bang Theory* capitalized on the new enthusiasm for science and technology, offering an entertaining, funny, and award-winning situation comedy featuring a diverse group of working scientists as its main characters.

To appreciate its humour, viewers have to understand the 'complex social conventions and generic rules' (Mills 2009) that underlie the genre of television comedy. As a programme that treats science and fandom with respect – and successfully entertains – *The Big Bang Theory* has become a destination for real scientists and engineers. In many ways, the key to the show's popularity has been its detail-driven authenticity, used to demonstrate understanding of the (linked) subcultures of science and fandom. The resulting depiction of male and female scientists builds on a long history of geeks, nerds and mad scientists.

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REFERENCES

- Adalian, J. (2011), 'Please chuckle here: The return of the sitcom laugh track', *New York magazine*, 27 November, <http://nymag.com/arts/tv/features/laughtracks-2011-12/>. Accessed 20 October 2014.
- Allen, R. C. and Hill, A. (eds) (2004), *The Television Studies Reader*, London: Routledge.
- Back, K. W. (1995), 'Frankenstein and Brave New World: Two cautionary myths on the boundaries of space', *The History of European Ideas*, 20: 1–3, pp. 327–32.
- Bauer, M. W., Allum, N. and Miller, S. (2007), 'What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda', *Public Understanding of Science*, 16: 1, pp. 79–95.
- Bialik, M. (2013), 'A blossoming career field', *STEM Education*, an independent supplement from MediaPlanet to *The Washington Post*, 8 May, p. 4.
- Brosnan, J. (1991), *The Primal Screen: A History of Science Fiction Film*, London: Orbit Books.
- Bueno, B. (2013), 'Legendary Days – a novel, and the aspects of geek culture in fiction', Ph.D. dissertation (creative and critical writing), Norwich: University of East Anglia.
- Byrne, G. (1989), 'Banishing the "mad scientist"', *Science*, 243: 4893, p. 896.
- Cronenberg, David (1986), *The Fly*, Culver City: Brookfilms Limited.
- del Toro, Guillermo (2013), *Pacific Rim*, Burbank: Legendary Pictures.
- Dudo, A., Brossard, D., Shanahan, J., Scheufele, D. A., Morgan, M. and Signorielli, N. (2011), 'Science on television in the 21st century: Recent trends in portrayals and their contributions to public attitudes toward science', *Communication Research*, 38: 6, pp. 754–77.
- Eglash, R. (2002), 'Race, sex and nerds: From black geeks to asian-american hipsters', *Social Text*, 20: 2, pp. 49–64.
- El Nasser, H. (2012), 'Geek chic?: "Brogrammer?" Now that's hot', *USAToday*, 12 April, <http://usatoday30.usatoday.com/tech/news/story/2012-04-10/techie-geeks-cool/54160750/1>. Accessed 30 July 2014.
- Emmerich, Roland (1996), *Independence Day*, Los Angeles: Centropolis Entertainment.
- Fincher, David (2010), *The Social Network*, Beverly Hills: Relativity Media.
- Frayling, C. (2005), *Mad, Bad, or Dangerous?: The Scientist and the Cinema*, London: Reaktion Books.
- Gerbner, G., Gross, L., Morgan, M. and Signorielli, N. (1981), 'Scientists on the TV screen', *Society*, 18: 4, pp. 41–44.
- Graser, M. (2012), '"Big Bang" booming as licensing property', *Variety*, 9 November, <http://variety.com/2012/tv/news/big-bang-booming-as-licensing-property-1118061937/>. Accessed 20 October 2014.
- Hagerty, W. W. (1964), 'Students' images of scientists and engineers', *Bioscience*, 14: 3, pp. 20–23.
- Haynes, R. (1994), *From Faust to Strangelove: Representations of the Scientist in Western Literature*, Baltimore: Johns Hopkins University Press.
- Howard, Ron (2001), *A Beautiful Mind*, Universal City: Imagine Entertainment.
- Hurtado, C. (2008), 'Return of the (televised) nerds', *Popular Science*, 4 December, <http://www.popsci.com/node/29881>. Accessed 20 October 2014.
- Kawana, S. (2005), 'Mad scientists and their prey: Bioethics, murder, and fiction in interwar Japan', *Journal of Japanese Studies*, 31: 1, pp. 89–120.

- Kendall, L. (1999), 'Nerd nation: Images of nerds in US popular culture', *International Journal of Cultural Studies*, 2: 2, pp. 260–83.
- Kirby, D. A. (2011), *Lab Coats in Hollywood: Science, Scientists, and Cinema*, Cambridge: The MIT Press.
- Kristof, N. (2014), 'Professors, we need you!', *New York Times*, 15 February, http://www.nytimes.com/2014/02/16/opinion/sunday/kristof-professors-we-need-you.html?_r=0. Accessed 20 October 2014.
- Landau, E. (2011), "'Big Bang Theory" actress Mayim Bialik a real-life scientist', CNN, 15 July, <http://www.cnn.com/2011/HEALTH/07/15/mayim.bialik.big.bang.theory/index.html>. Accessed 20 October 2014.
- Leiva, S. P. (2009), "'Big Bang Theory" is an evolved portrayal of scientists (and fanboy funny!)', *Los Angeles Times*, 14 December, <http://herocomplex.latimes.com/uncategorized/big-bang-theory-2/>. Accessed 20 October 2014.
- Madden, John (2005), *Proof*, Santa Monica: Miramax.
- Makinen, J. and Flint, J. (2014), "'Big Bang Theory", other U.S. shows vanish from Chinese Internet', *Los Angeles Times*, 28 April, <http://www.latimes.com/entertainment/envelope/cotown/la-et-ct-china-blackout-20140429-story.html>. Accessed 20 October 2014.
- Marc, D. (1989), *Comic Visions: Television Culture and American Culture*, Boston: Unwin Hyman.
- Maxwell, N. (2014), 'A revolutionary mission statement: Improve the world', *Times Higher Education*, 23 January, <http://www.timeshighereducation.co.uk/comment/opinion/a-revolutionary-mission-statement-improve-the-world/2010674.article>. Accessed 20 October 2014.
- Mayfield, Les (1997), *Flubber*, Burbank: Walt Disney Pictures.
- Mills, B. (2009), *The Sitcom*, Edinburgh: Edinburgh University Press.
- Nisbet, M. C., Scheufele, D. A., Shanahan, J., Moy, P., Brossard, D. and Lewenstein, B. V. (2002), 'Knowledge, reservations, or promise?: A media effects model for public perceptions of science and technology', *Communication Research*, 29: 5, pp. 584–608.
- Pal, George (1960), *The Time Machine*, Beverly Hills: Metro-Goldwyn-Mayer.
- Pateman, M. (2007), "'That was nifty": Willow Rosenberg saves the world in *Buffy the Vampire Slayer*', *Shofar: An Interdisciplinary Journal of Jewish Studies*, 25: 4, pp. 64–77.
- Pearlman, R. (2012), 'Behind the scenes with Big Bang Theory's real-life astronaut actor', *collectSPACE*, 10 May, <http://www.collectspace.com/news/news-051012a.html>. Accessed 20 October 2014.
- (2012), 'Space for rent: How "The Big Bang Theory" sent Howard Wolowitz to space', *collectSPACE*, 4 October, <http://www.collectspace.com/news/news-100412a.html>. Accessed 20 October 2014.
- Perkowitz, S. (2007), *Hollywood Science: Movies, Science, & the End of the World*, New York: Columbia University Press.
- Prady, B. (2009), "'Big Bang Theory": "We didn't anticipate how protective the audience would feel about our guys"', *Variety*, 5 May, http://weblogs.variety.com/season_pass/2009/05/big-bang-theory-we-didnt-anticipate-how-protective-the-audience-would-feel-toward-our-guys.html. Accessed 20 October 2014.
- Quail, C. (2009), 'Hip to be square: Nerds in media culture', *FLOW*, 9: 6, 7 February, http://flowtv.org/2009/02/hip-to-be-square-nerds-in-media-culture-christine-quail-mcmaster-university/#identifier_0_2383. Accessed 20 October 2014.

- Raymond, E. (ed.) (1991), *The New Hacker's Dictionary*, Cambridge, MA: The MIT Press.
- Rowe, S. (2014), e-mail to author from Senior Vice President, Worldwide Television Communications, Warner Bros Television Group, 18 July.
- Skal, D. (1998), *Screams of Reason: Mad Science and Modern Culture*, New York: W. W. Norton & Company.
- Sifton, S. (2000), *A Field Guide to the Yettie: America's Young Entrepreneurial Technocrats*, New York: Talk Miramax/Hyperion Books.
- Spielberg, Steven (1993), *Jurassic Park*, Universal City: Amblin Entertainment.
- Steinberg, B. (2014), ‘CBS sets mega 3-season renewal for “The Big Bang Theory”’, *Variety*, 12 March, <http://variety.com/2014/tv/news/cbs-sets-mega-3-season-renewal-for-the-big-bang-theory-1201129964/>. Accessed 20 October 2014.
- Stern, Joshua Michael (2013), *Jobs*, Beverly Hills: Endgame Entertainment.
- Stevenson, Robert (1961), *The Absent-Minded Professor*, Burbank: Walt Disney Productions.
- Stiles, A. (2009), ‘Literature in “Mind”: H. G. Wells and the evolution of the mad scientist’, *Journal of the History of Ideas*, 70: 2, pp. 317–39.
- Taylor, E. (1991), *Prime-Time Families: Television Culture in Post-War America*, Berkeley: University of California Press.
- TBI reporter (2014), ‘Shooting down the pirates’, *Television Business International (TBI) Vision*, 3 June, <http://tbivision.com/features/2014/06/shooting-down-the-pirates/284392/>. Accessed 20 October 2014.
- The Big Bang Theory fansite (2013), ‘David Saltzberg Interview’, <http://the-big-bang-theory.com/saltzberg.interview/>. Accessed 20 October 2014.
- Tudor, A. (1989), *Monsters and Mad Scientists: A Cultural History of the Horror Movie*, Oxford: Basil Blackwell.
- Weart, S. R. (1988), *Nuclear Fear: A History of Images*, Cambridge, MA: Harvard University Press.
- Willis, L. E. (2012), ‘Women of science: Gendered representations of scientific research in *The Big Bang Theory*’, Conference paper, *Annual Meeting of the Midwest Popular Cultural Association*, Columbus, Ohio, 12 October.
- Zemeckis, Robert (1997), *Contact*, Burbank: Warner Bros. Entertainment Inc.

TELEVISION PROGRAMMES

- Barney Miller* (1975–1982, United States: ABC).
- Battlestar Galactica* (2004–2009, United States: Sci-Fi).
- The Big Bang Theory* (2007–, United States: CBS).
- ‘Pilot’ (Season 1, Episode 1, 24 September 2007).
- ‘The Big Bran Hypothesis’ (Season 1, Episode 1, 1 October 2007).
- ‘The Fuzzy Boots Corollary’ (Season 1, Episode 3, 8 October 2007).
- ‘The Luminous Fish Effect’ (Season 1, Episode 4, 15 October 2007).
- ‘The Cooper-Hofstadter Polarization’ (Season 1, Episode 9, 17 March 2008).
- ‘The Jerusalem Duality’ (Season 1, Episode 12, 14 April 2008).
- ‘The Nerdvana Annihilation’ (Season 1, Episode 14, 28 April 2008).
- ‘The Codpiece Topology’ (Season 2, Episode 2, 29 September 2008).
- ‘The Plimpton Stimulation’ (Season 3, Episode 21, 10 May 2010).
- ‘The Hot Troll Deviation’ (Season 4, Episode 4, 14 October 2010).
- ‘The Roommate Transmogrification’ (Season 4, Episode 24, 19 May 2011).
- ‘The Contractual Obligation Implementation’ (Season 6, Episode 18, 7 March 2013).

'The Tenure Turbulence' (Season 6, Episode 20, 4 April 2013).
Bones (2005–, United States: Fox).
Cosmos: A Personal Voyage (1980, United States: Public Broadcasting Service).
Cosmos: A Spacetime Odyssey (2014, United States: Fox and National Geographic Channel).
Family Matters (1989–1997, United States: ABC; 1997–1998, United States: CBS).
Friends (1994–2004, United States: NBC).
Game of Thrones (2011–, United States: HBO).
Gilligan's Island (1964–1967, United States: CBS).
How I Met Your Mother (2005–2014, United States: CBS).
The Mary Tyler Moore Show (1970–1977, United States: CBS).
Scrubs (2001–2008, United States: NBC; 2009–2010, United States: ABC).
Silicon Valley (2014–, United States: HBO).
Star Trek (1966–1969, United States: NBC).
Three's Company (1977–1984, United States: ABC).
Two and a Half Men (2003–2015, United States: CBS).

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