	COM Science and South Park, Reddit and Facebook, Leonardo da Vinci and the Vitruvian Man, and modern fairy tales about emerging technologies: science communication and popular culture Hollywood heroes in high tech risk societies: modern fairy tales and emerging technologies
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Abstract	Science, research and emerging technologies often play a key role in many modern action movies. In this contribution we suggest to use genre analysis of folk narratives as an innovative and useful tool for understanding science and technology in action movies. In this contribution we outline our approach using illustrative examples and detail how understanding action movies as modern fairy tales can benefit the study of science, research and technology in popular culture.
Keywords	Popularization of science and technology; Risk communication; Visual communication
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In this text we propose that the genre analysis of folk narrative is a useful analytical tool for the interpretation and understanding of the role of science and research in present Hollywood action movies. In particular three films¹ are discussed; Mission Impossible II (MI II, 2000), Live free or die hard (the fourth Die Hard film, 2007), and Tomorrow never dies (the James Bond film of 1997). These films caught our attention because they deal with key challenges in present high tech high risk societies, often referred to by terms such as globalization, networked knowledge society etc. The MI II film from the year 2000 has the dual use of biotechnology as a key theme, roughly coinciding with academic discussions of the theme. The same can be said about the James Bond film's focus on media manipulation of political conflicts in networked society, and also the focus of the Die Hard film on how digitalized society becomes vulnerable for terrorist attacks. It is of special interest to us how these Hollywood productions elaborate key themes in present academic and political discussions on ethics and governance. This apparent consensus, or at

¹For plot summaries and further details see the three following URLs: http://www.imdb.com/title/tt0120755/?ref_=nm_flmg_act_21 http://www.imdb.com/title/tt0337978/?ref_=nv_sr_1 http://www.imdb.com/title/tt0120347/?ref_=nv_sr_1.

least strong overlaps, between academia's and Hollywood's understanding of the impact and risks of new technologies means that these action movies communicate and approach science and new technology in different ways than many Science Fiction and climate change doomsday movies.²

So what are these action movies all about, and what do they tell us about science communication today in popular culture? If they represent a consensus between popculture and academic discourses regarding present challenges generated from science, research and new technology, what do these films add to the present knowledge landscape of high tech risk societies and risk theories? The folk narrative genre of fairy tales will be the interpretative tool used in the present discussion to ponder on this question.

Genre analysis

Genre analysis implies a comparative and historic depth to the cultural analysis of narratives. In the case of Hollywood action movies, the narratives are popular visual stories originally made for and presented on 'the big screen', the movie theatre. We think that the understanding of folk narrative genres may enrich the reading of these modern popular narratives. In this text we will follow this path of analysis and use the movies mentioned above as illustrative examples. At the same time, genre analysis is a cultural practice among many, and further different readings of texts are possible and encouraged which will bring to light a greater variety of textual and cultural interpretations.³

The commercial films mentioned above are primarily made to entertain, and as such they have been most successful. These films do not represent particular sub-cultures but the well-established mainstream movie industry, and after their premiere in the movie theatres they are also repetitively broadcasted on TV and of course also found on the internet. Their protagonists, themes, story and film music are often cited and referred to in popular culture, for instance in advertisement.⁴ They are blockbuster movies with high production costs and they have major actors and actresses of the present day movie industry, and draw on high technical skills and vast economic resources. They are all part of a series, representing variants of a known hero placed in a familiar narrative structure where recognizable agents fulfill particular functions in a familiar order of narrative motives, which are generally astonishingly in line with the genre of fairy tales.

If one searches today for fairy tales in academic journals, the topic will most certainly be published in a journal elaborating children's literature. That is a far cry from where the study of fairy tales actually started. Europe was the crib of folk narrative studies, and the brothers Grimm's book Kinder- und Hausmärchen, Erster Theil [1812], is usually depicted as the starting point of the academic study of fairy tales. These tales, or narratives, were not primarily perceived as children's stories, but as key cultural stories in which cultural specifics of everyday life would

²In this context we refer explicitly to the presentations at the *#POPSCI2015 International Conference on Science, Research and Popular Culture,* held in Klagenfurt, Austria, 17–18 September 2015, for instance: Alexa Weik von Mossner: *The Good, the Bad, and the Terrifying: Depictions of Climate Science in Popular Film.* Further information: https://sciencetechnologysociety.wordpress.com/.

³For examples of different angles and interesting readings of the above mentioned Hollywood action movies, see for example Jones [2013] and Mulhall [2006].

⁴For instance: https://www.youtube.com/watch?v=aY9GBl7UmVs.

be highlighted through adventurous and extraordinary events.⁵ Fairy tales as a genre have some particular characteristics. In the following section we list some of these and explore them in regard to the aforementioned movies.

Action movies as fairy tales

- The fairy tale generally starts with 'once up on a time', though in a time
 where the agents of the story are of relevance to the audience. In the three
 movies mentioned above, high tech is a key characteristic of the society in
 which the story of the movie takes place. It is not necessary to have a date or
 a year to define the time period, the way society works indicates the era. This
 fact is further underlined by the way key agents in the movie do either
 produce, distribute, govern, or monitor high tech society.
 - 2. The hero of the fairy tale starts off in a rather ordinary or everyday situation. The hero is in a state of resting, not fully participating in the surrounding society. The hero might sometimes be questioned by the surrounding society for not fully participating, or for not contributing in a disciplined and expected way. So it is with the heroes of the movies we are investigating. James Bond is always a bit on the side generally sipping Martinis, when he is called into action. Ethan Hunt is deep into his private sphere, and so is John McClane, who early on in the film series was portrayed as a divorcee and often drunk social failure in the Die Hard movies.
 - 3. The fairy tales are put into motion by a powerful person, a king or queen, a troll or a witch, someone that is assumed to have the power and means to affect ordinary peoples' lives. The initiator is generally a powerful person or agent in the society the narrative is describing. In action movies stories are often set in motion by villains that can rely on extra-ordinary intelligence and means of science, research and technology, which then pose threats to society. Various agencies representing modern democratic society's governing bodies then have to react to the threats posed by high tech villains and need to recruit the movies' heroes to neutralize the threat. In James Bond movies it is the British intelligence services, the MI movies have the CIA as acting agency, and in Die Hard the police force. It is the agents governing western democratic societies that put the hero in motion, or sometimes, as in the Die Hard movies, John McClane stumbles into the action, by being at the wrong place at the right time.
 - 4. In fairy tales the names of the different agents of the story are important and most telling. In James Bond and Die Hard, James and John are names that can be said to represent the everyday Anglo-American or Anglo-British man. Ethan Hunt in the MI-movies is what the name depicts, a hunter, and in this context, the name is his quality.
 - 5. The fairy tale uses the law of two main characters; the good hero and the evil enemy. They represent two different states of the human heart; the hero owns

⁵The collection of folk narratives, ballades, fairy tales etc. was part of a cultural reorientation in Europe, where scholars taking part in the early creation of nation states actively turned their focus from the classical Greek and Roman cultures and towards local culture and the search for a golden past. The notion of 'folk' (a people) was developed, together with the synonymus term nation, both presupposing an essentialistic relation between languge, geography and society — one people, one languge, one country. An imagined stability and isolation that is also understood as a major source of legitimization of fascist thoughts in Europe that still represents a challenge in academic thinking today [See Svalastog, 2012; Svalastog, 2015].

a soft heart and cares for the weak and fragile, while the enemy has a heart of stone and cares for no one but him- or herself and nothing except wealth and power. In the movies we are looking at here, the focus on inner qualities are even accentuated when the hero and the enemy are shown to have a parallel or joint past, which maybe is most visible on the MI film. Somewhere along the line, and due to choices affected by bitterness, greed or lack of meaning, the bad guy became evil at some point in the past, despite often being super-intelligent or extremely capable in regard to science, research or technology. Just as the hero in a variety of situations throughout the film the villain is also confronted with options of choosing empathy, which means helping or saving others and risking their own life, or choosing the easy way out, often on the cost of others. Besides, just as in fairy tales the evil enemies often have some extraordinary features, for instance physical abnormalities, strange accents, or very unusual ways of talking.

- 6. The hero of the fairy tale always has helpers, individuals or creatures that from a societal point of view are often perceived as odd or extraordinary, if not social misfits or marginal members of society. In the James Bond movie, there are helpers along the way, while the most important one is often the female helpers of the enemy. Whether she is just a mistress or herself a spy, she is on the edge of the criminal world with dubious moral character that during the film will be tested and seduced. In MI II the key helpers are a female thief and the computer geek Luther, and in Die Hard IV, the helpers are also young odd computer geeks moving in the online landscape between official rules. In high tech society high tech experts are of special importance, all the films have variants of whizz kids such as Q (for *Quartermaster*) in James Bond that equip the hero with counter high tech that ensures a sort of symmetry between the hero and the villain. In the fairy tale it was often magical objects that there were given to the heroes so that they could defeat the threats posed through powerful opponents.
- 7. Fairy tales are stories of everyday life wrapped in the costume of an extraordinary or fantastic narrative. They often start in a kind of everyday or private setting, and proceed into the landscape of adventure. The thing is though, that the creatures and agents that are made visible when the story is put in motion, do not represent a parallel magic world. The story shows that these protagonists are always there, though they are normally not seen or interacted with. Particularly the position of the helpers are often one of those on the edge of the visible world, and their skill is that they can maneuver also in the 'underworld' though they themselves still live in the 'upper world'. It seems fair to say that this is a feature of the fairy tale: the ability to make the invisible driving forces of everyday life visible may also be a reason why psychology and psychoanalysis back to Sigmund Freud and C. G. Jung have been intrigued by fairy tales.⁶
- 8. The fairy tale is repetitive and the key hero is seriously challenged several times, each time more dramatically than in the former case, until the final fight when the hero wins and defeats the enemy. In the three movies, the challenges are repeated several times, moving the hero and the enemy closer and closer together until the final encounter in which the hero wins.

⁶See also the best selling book *Women Who Run with the Wolves*, Estés [1996]. The classic *The Use of Enchantment: The Meaning and Importance of Fairy Tales*, Bettelheim [1976].

- 9. In the fairy tale the hero does not appear, in the beginning, to be more skilled than the enemy, and therefore one needs to know the whole story in order to learn how the dangerous and mighty enemy is actually defeated in the end. Several things are to be expected; the hero, despite being a bit odd and undisciplined, always rises to the occasion. He or she is creative and inventive, learns from mistakes and can turn, by themselves or in collaboration with the helpers, everyday things into effective or deadly weapons. For example in a dramatic action scene in the Die Hard film, a car is used to crash the enemy's helicopter that is up in the sky. To rise to the occasion here means inventiveness and timing.
- 10. The success of the hero and the lack of success of the enemy rely on the moral laws of this genre. This inventiveness and timing is closely related to luck, and luck in turn is generated from the hero's willingness to protect the weak and fragile. It is in these situations that luck occurs, just as the enemy's bad luck is made visible in situations where he shows a 'heart of stone', which generates misinterpretation and lack of timing in the long run of the story.
- 11. In the end of a fairy tale there are no loose ends. The hero gets his or her reward and the enemy is punished. The reward might be prosperity, but most of all, the reward is represented by transformed relations and a new or regained position in society. This idea fits well with the Hollywood action movies we have looked into.
- 12. The fairy tales do not criticize the society they describe, though they underline the importance of individual agents' attitudes and how the individuals feel and act towards others. The three films analyzed here do not take a stance for or against present high tech high risk society, they just take them for granted. However all three movies underline that moral standards are required to stay healthy and alive in such societies, and that key helpers, when crisis occurs, are the marginalized ones who can see the drivers of present society that are invisible for others, and who also know and manage to navigate in the present society's underworld.
- 13. The fairy tale tradition is filled with good story-tellers, it is not only the story but the way it is told that makes it worth listening to. The same might be said about James Bond, Mission Impossible and Die Hard, they are films that have involved well-known professional visual storytellers to secure all aspects of the film, director, stunts, costumes, exotic locations etc.
- 14. Fairy tales are action driven. The story moves forward as different scenes are played out, generating a next scene, following a particular narrative pattern. The action movies are action driven in a similar manner.
- 15. When fairy tales are transmitted in various contexts through time and various locations, their exteriorities change. That means that when the fairy tale travels, through time and geographic location, the key agents will be changed depending on the tales' present contexts to keep their relevance, for example may the abbot become the priest when times or locations change from Catholic to Protestant eras. In the terms of action movies that means current products of research, science and technology act as time markers, that are used to identify particular eras, for instance the atomic age versus the chemical age, followed by the age of biotechnology and the digitized society, or in terms of technologies of destruction the first and second world war, the

cold war, or the transition from industrialized modern to the globally networked world society. In this sense science, research and technology do not only provide the context of the story, they also often impinge on how a particular story has to be told so that it makes sense.

Risk analysis

The action movies chosen here are all representing risks that fit Ulrich Beck's understanding of modern society as risk society [Beck, 1992], a society where risk is generated from and inseparable from modernity. From a governmental perspective, risk has been approached with the possibility of being prevented by reason, based on scientific knowledge. Though in the aftermath of Beck's classical book, and in opposition to official policies, various analyses have shown the limitation of a pure rationalist approach to risk, in particular regarding risk behavior in everyday life [for instance: Kemshall, 2014].

The action movies we are dealing with here present situations where the governance of risk has ultimately failed. The risks that new technologies produce are set in motion not by the lack of informed knowledge or by technological failure, but by individual actors driven by personal interests. Such situations cannot be prevented by education or informed knowledge on risks attached to technology. Quite the opposite; the risks are closely attached to the economy and society and often mobilized by the villain of the movie, who often has a particularly good understanding of and close connection to science, research and technology The potential risks embedded in new technologies are, from the perspective of the villain, often what make emerging technologies particularly valuable. The embedded risks ultimately empower the villain. They have a goal that makes the risk worth taking. The villain reveals a different logic than that of the hero or state agencies, not a lack of logic.

Further analyses

Fairy tales have been analyzed for generations. Some of the themes that have been discussed we find worth also mentioning here. First, the fairy tales are tales that are well and widely known, often repeated, as such the retelling and variants ensure an astonishingly stable narrative structure as well as content, crossing both time, cultural and geographic context.⁷ In genre analysis scholars early on understood how a narrative could move from one genre to another, from religious myths to legend, to fairy tale and even back again [Kirke, 1984 (1973)]. The content of the three Hollywood films are not generated from religious myth, but from present day science, research and technology and contemporary debates on science, risk and governance. We find it interesting and striking that science, research and technology can be identified as a central element in these modern fairy tales.

Fairy tales make society's invisible driving forces and agents visible. In the case of the three movies we have looked at here, the invisible driving forces are

⁷Standard overviews of the international research history of fairy tale studies are standard introductions in national academic publications of folks narratives. In Norway that would be the introductory chapters of the academically produced series of folk stories: introductory chapter in *Norske Folkeeventyr I* (introduction in first edition 1936 by Knut Liestøl; additional introduction by Olav Bø for the 3rd edition 1977, Publisher: Det Norske Samlaget); *Norske Eventyr*, introduction by Olav Bø. Ronald Grambo, Bjarne Hodne and Ørnulf Hodne, 1982, Publisher: Det Norske Samlaget.

represented by criminal parts of society, and also the complicated relations between society's visible and invisible sides. By displaying the driving forces, it is 'the world as such' that is displayed, and for all of the three movies, the scene of society is global, not national and not local.

The key technologies of these three movies concern the digitalized communication and globally networked media, biotechnology and pharmaceutics, and digitalized society and interconnected infrastructures. All three films depict illusion as an important part of reality, something we have to deal with, and also something to be played with. In the movies the limits of safety in (high tech) society is made visible, and when risk occurs, it is through illusions. Risks are staged by the villain through manipulation of reality, e.g. in James Bond by staging a fake communication between individuals and state (due to media interference), or like in MI II manipulating health by creating a pandemic, or as in Die hard, undermine societal infrastructure. It is the villains that create societal illusions. It is the hero's task to reveal the illusion, and at the same time reveal what and who is good and bad. In addition, illusion is a key means, used by both the hero and the villain as strategy to push or change the course of events in their own favor.

These widely distributed high budget films are seen by 'everyone', and despite their status as entertainment people are obviously willing to see them over and over again. As popular culture, and in contrast to part of the elite culture, they present society as a coherent whole. Communication, health etc. are not something individuals can escape. To keep away from disaster, the totality need to be properly governed by society. One might say that it also contains a class perspective in the sense that both the hero and the helpers are on the edge of the respectable society, and through that position, able to have a perspective that keeps together the whole of society's different arenas and agendas, an insight as old as that of the court jester.

These films also add to present discussions on the relation between knowledge and risk behavior. The villains of these films are not ignorant or dumb but selfish, and driven by personal identity-projects. And these inner drives of the villains, whether understood as urges, revenge or bitterness, is even in the films themselves, explained as a reflection of the society and culture surrounding of the villain. It is the social context that brings meaning to the villain's drives, and to the power the villains actions are meant to achieve.

The cultural importance of these films, as entertainment and as stories, is further emphasized by movies that in a more humorous and self-ironic way retell these stories by including explicit references to them, as for example in the film *Kingsman: The Secret Service* (2014).⁸ Particularly noteworthy is the villain of the movie: super intelligent high tech billionaire genius Richmond Valentine (impersonated with a lisp by actor Samuel L. Jackson), who particularly enjoys conversations with scientists. The cause of his anger against humanity is the fact that nobody seems to care about anthropogenic Climate Change and he is determined to change the course of things to come. In his first encounter with the hero Harry Hart, whose job it is to hunt him down and to stop him, the conversation is about James Bond movies, of which Hart thinks they have become

⁸See: http://www.imdb.com/title/tt2802144/.

too realistic and serious to be entertaining. Funnily enough they also address the role of the villain: ⁹ "the old Bond films were only as good as the villain".
The story of this movie also follows the pattern and characteristics of the fairy tale we outlined above, though with a different tune in it. One might say that it is the 'same' story but by a different storyteller, that adapted the familiar content for a younger audience and so passes on the cultural heritage. The last example also further exemplifies the vitality of such stories in present society. It shows that this genre and content represent an established relationship between the narrative and its audience, and that topics and themes from science and research are crucial elements in this relationship that define story contexts and nourish popular culture.
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⁹The following transcript of this conversation is available online at: http://www.imdb.com/character/ch0500185/quotes

[&]quot;Valentine: Do you like spy movies [...]?

Harry Hart: Nowadays, they're all a little serious for my taste. But the old ones...marvelous. Give me a far-fetched theatrical plot any day.

Valentine: The old Bond movies. Oh, man. Ah, when I was a kid, that was my dream job: gentleman spy.Harry Hart: I always felt that the old Bond films were only as good as the villain. As a child, I

Harry Hart: I always felt that the old Bond films were only as good as the villain. As a child, I rather fancied a futuristic colorful megalomaniac.

Valentine: What a shame we both had to grow up."

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