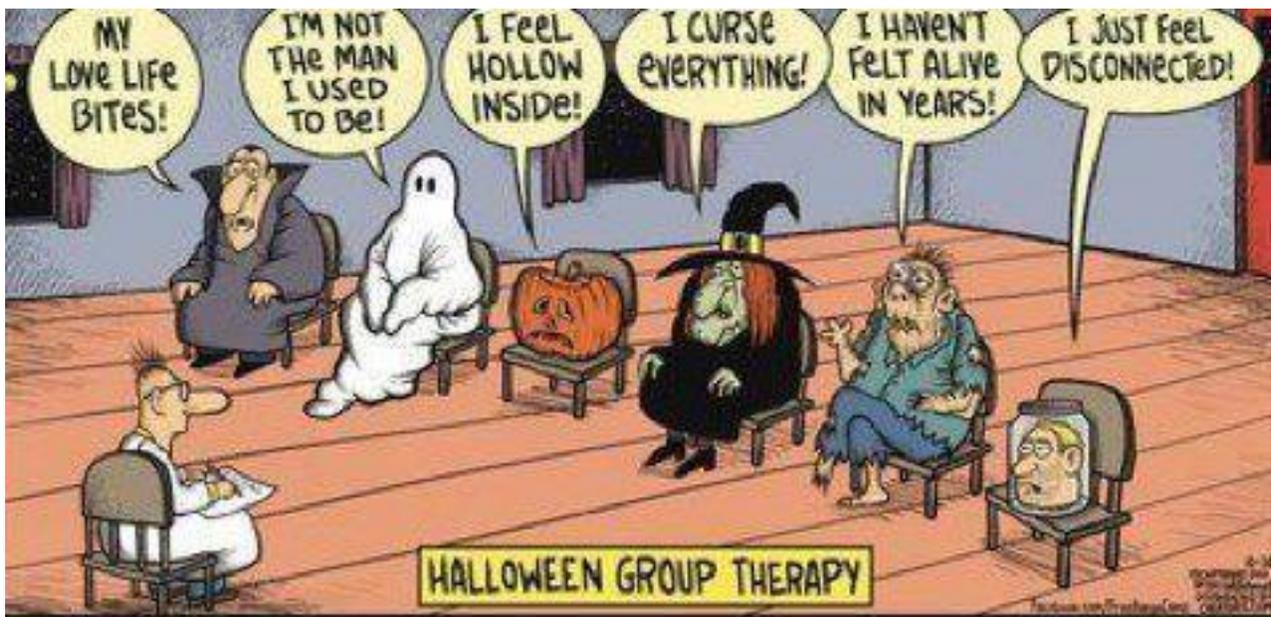


All Hallows Eve Edition

It's that time of year again where you dress up and run around scarring folks, looking for free treats, going to parties, and pretty much acting all weird and stuff!

This year's Halloween edition, we will explore the tricks and treats of systems engineering!

Enjoy!



Tricks

The Great Wave of Reform

THE PROPHETIC FALLACY OF THE FUKUSHIMA DAIICHI MELTDOWN

March 11, 2011, off the Pacific coast of Tohoku, Japan: At 14:46 (2:46 p.m.) Japan Standard Time (JST) a magnitude 9.0 earthquake occurred 43 miles east of the Oshika Peninsula. The undersea megathrust earthquake shifted the mainland of Japan an estimated 8 feet east and deviated Earth's axis by estimates between 4 to 10 inches. The Great East Japan Earthquake generated massive tsunami waves that peaked at heights of 133 feet and travelled up to 6 miles into areas of mainland Japan. According to the latest accessible Japanese National Police Agency police reports, the earthquake and tsunami are responsible for 15,891 dead, 6,152 injured and 2,584 missing persons. In addition to the horrific loss of life, 129,290 buildings have been reported collapsed, with another 1,020,777 structures sustaining varying degrees of damage. The disaster also triggered the second Level 7 International Nuclear Event (after Chernobyl) in history — the Fukushima Daiichi nuclear disaster.

<https://nsc.nasa.gov/SFCS/SystemFailureCaseStudy/Details/158>

Lessons from Macondo

THE SENIOR MANAGEMENT WALKAROUND

April 20, 2010, Macondo Prospect, Gulf of Mexico, 7:45 p.m. Central Daylight Time (CDT): Two Transocean executives and two British Petroleum (BP) executives flew aboard the Deepwater Horizon oil rig for a management visibility tour. The purpose of the tour was to meet the 126 rig workers and to check for and discuss key occupational hazards recently found on other Transocean oil rigs in the fleet. The agenda included crediting the crew for their outstanding seven-year safety record with no lost time injuries. During the next seven hours, the executives watched the crew prepare to cap off the well and move to a new site. However, deep beneath their feet, incredible pressure built inside the well casing. Two safety indicators occurred concerning the oil well's dangerous unsealed state that went undetected. This story, adapted from a 2011 analysis by sociologist Andrew Hopkins, describes how these two precursor events went unnoticed and resulted in the worst oil-well blowout and oil spill in U.S. history.

<https://nsc.nasa.gov/SFCS/SystemFailureCaseStudy/Details/153>

Smoke and Mirrors

WHAT WENT WRONG AT L'ENFANT PLAZA

On Jan. 12, 2015, Washington Metropolitan Area Transit Authority (WMATA) experienced one of its "more serious" train accidents to date, according to the Federal Transit Administration (FTA). At 3:15 p.m. EST, train 302, which was headed southbound on the Yellow Line with about 380 passengers on board, stopped on the tracks after encountering smoke in the tunnel between the L'Enfant Plaza station and the Potomac River Bridge in Washington, D.C. Some passengers started to self-evacuate to escape the smoke, causing the train control center to shut off third rail power until emergency services could evacuate the victims. In total, the accident resulted in one death, 91 injured people and \$120,000 in estimated damages.

<https://nsc.nasa.gov/SFCS/SystemFailureCaseStudy/Details/170>

Treats

The MIT Physicists Who Infused Ghostbusters with Real Science



JANET CONRAD'S OFFICE is full of books and plaques, scientific models and toy demos—exactly what you'd imagine an MIT nuclear physicist's base of operations should look like. Paul Feig must have thought so too: Much of the décor makes unbilled cameos in the director's *Ghostbusters* reboot, along with other elements of Conrad's life and work.

The textbooks in the office of Kristen Wiig's character Erin Gilbert, a tenure-seeking physics professor at Columbia? Real. They're the exact books Conrad had when she was at Columbia. The proton packs, the labs, the grant applications, the awards, and the papers? Real—or at least real-ish. "They wanted it to be authentic," Conrad's colleague Lindley Winslow says, "right up to the point when the ghosts show up."

When the *Ghostbusters* reboot hits theaters on Friday, it will introduce a team of pioneering women accomplished not just in bustin', but in science of the non-paranormal variety as well. And to help get the details right, Feig and crew sought out two scientists whose work helped give a little precision to the proceedings.

<https://www.wired.com/2016/07/ghostbusters-mit-physicists/>

Iron Man: The Science Behind the Fiction



A couple of things make [Iron Man](#) different to your regular comic-book superhero movie. First, there is the hero himself, Tony Stark, a scientific genius who for once is not the timid or bespectacled geek we are used to in Hollywood, but is charismatic, confident, and a hit with the ladies. Stark is played by Robert Downey Jr, and we think he deserves to go in any [list of the top 10 coolest fictional scientists](#)

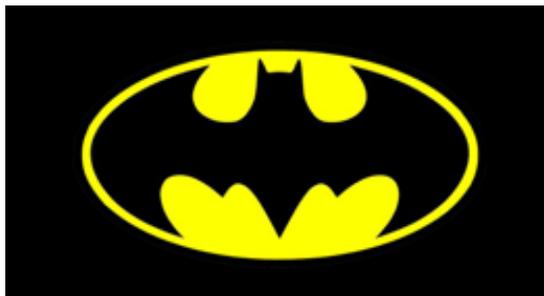
But it is the technology that Stark uses to turn himself into Iron Man that gets us going. The tech in the movie is probably more firmly rooted in reality than you might think - unless, that is, you are a regular New Scientist reader.

We have spotted at least five classes of tech in the movie that we have written about before. So, for those keen to find more about the real science behind the fictional Iron Man, read on!

<https://www.newscientist.com/article/dn13815-iron-man-the-science-behind-the-fiction/>

Science of Batman!

Bruce Wayne, The Caped Crusader, The Dark Knight, The Greatest Detective in the World, or, just simply, BATMAN! No matter the name, Batman has etched himself into pop culture history with his sad past and his cool gadgets. But, what does it take to be The Dark Knight? Let's take an in-depth look at the science of Batman! <https://www.scienceworld.ca/blog/science-batman>



The Science of Star Wars

From light speed to hyper drives to lightsabers and autonomous robots, Star Wars was certainly way ahead of its time despite occurring a long time ago.

The technologies of tomorrow were on full display as Luke, Leia, Han and the Rebel Alliance fought Darth Vader's Galactic Empire beginning in 1977. Some have become reality (holograms, heads-up displays, robotic arms). Others are in sight (landing people on other planets, robots in every home). Some may never be (manmade stars and, sadly, real lightsabers).



<http://www.news.gatech.edu/features/science-star-wars>



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INCOSE's Certification Program Office oversees three groups on LinkedIn: [INCOSE SEPs, the Official Interest Group](#) is open to all [INCOSE SEP, the Official Group for Systems Engineering Professionals](#) is limited to those individuals who are already ASEPs, CSEPs, or ESEPs. [INCOSE ESEP, the Official Group](#) is limited to those individuals who are already ESEPs.

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