

The 'sci' behind the 'fi'

December 11 2009, by David L. Chandler



As the voyagers of the Starship Enterprise boldly went to explore new worlds week after week on Star Trek, they used a host of futuristic technologies — including tricorders, holodecks, teleportation systems and warp drives — that may have seemed almost beyond possibility to many of the shows' (and movies') legion of devoted viewers. But, say many scientists interviewed on a new program airing on public television, real science and technology is starting to catch up to — and sometimes even surpass — some parts of that future.

The program, Science Trek, is hosted by LeVar Burton, better known as

Geordi on Star Trek: The Next Generation. Among the technologies discussed on the program is the visor that Geordi (who, in the show, was supposedly blind from birth) always wore over his eyes, which not only restored his vision but allowed him to see some things ordinary vision could not, such as [infrared light](#).

Ed Boyden, assistant professor in the Media Lab and the Department of Biological Engineering, says he has been working on systems to make neurons in the brain directly respond to pulses of light — something that might eventually allow visual data to be transmitted directly into the brain, bypassing the normal optical channels for people whose visual systems have been damaged. “It might be the missing part of that puzzle,” he says, referring to the fact that the show never explained how the visor’s output was conveyed into Geordi’s brain.

Another featured MIT participant is Hugh Herr, associate professor of media arts and sciences, who specializes in biomechatronic devices — ones that interact with human muscle, skeleton, and nervous systems with the goal of assisting or enhancing human motor control. The program notes that Herr, a double amputee who uses such devices himself, is a kind of “Borg” — a reference to the race of cybernetic organisms from the Star Trek universe. Herr says the technology has the potential to not only substitute for lost functions, but ultimately to improve on them. He says that as the technology matures, he expects that by the time he reaches the age of 80, his biomechatronic legs will actually give him better balance than most 20-year-olds. “At some point they’ll be superior to biological legs,” he says.

The program also features Institute Professor Emeritus Mildred Dresselhaus, as well as Tomas Palacios, assistant professor of computer science, talking about the properties of carbon fibers and a recently discovered material called graphene, a single atomic layer of carbon, which is the strongest material known. Dresselhaus points out that

carbon fibers have been an essential enabling technology for a variety of technologies in the space program, to the point that “the space industry wouldn’t exist without [carbon fibers](#).” Palacios adds that graphene also is “one of the best materials for electronics” that could someday lead to computers embedded in clothing — a point illustrated in the program with a scene of an alien wearing clothing with embedded electronics, who gets zapped by the [Star Trek](#) crew.

Dresselhaus stresses that real research often produces results more amazing than those dreamed up in science fiction. “The reality of what comes from the lab goes beyond anything we can think of,” she says.

The program, which has already aired a few times on PBS stations, will next air on Boston’s WGBH at 5 a.m. on Sunday, Dec. 13, and again at 1 a.m, on Tuesday Dec. 15, and Friday Dec. 18.

Provided by Massachusetts Institute of Technology ([news](#) : [web](#))

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