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Why I Love My Job

Actually, there are many reasons why I love my job. I interact with interesting people — leaders in their fields who are doing fascinating work in all corners of the chemical engineering universe, including energy, bioengineering, materials, nanotechnology, sustainability, and much more. Every month, I'm rewarded with tangible evidence of my efforts — it's gratifying to see what began as a mere idea turned into something that thousands of people will read. I'm proud to work for an organization as respected as AICHE.

One of the most fun parts of my job is looking for news to report in *CEP*. To prepare the short news Update section, we look at hundreds of press releases and select some of the most interesting breaking news related to chemical engineering. But there are many other interesting developments that lie outside of chemical engineering that don't make it into *CEP*. For instance:

As we finalize this issue, the U.S. release of *Harry Potter and the Deathly Hallows: Part 1* is right around the corner, making a press release about a "space-time cloak" particularly timely. Building on earlier work by colleagues at Imperial College London showing that a new class of materials, called metamaterials, could be used to make an optical invisibility cloak, a team of researchers has mathematically extended the idea of a cloak that conceals objects to one that conceals events.

"Light normally slows down as it enters a material, but it is theoretically possible to manipulate the light rays so that some parts speed up and others slow down," says physics professor Martin McCall. "When light is 'opened up' in this way, rather than being curved in space, the leading half of the light speeds up and arrives before an event, while the trailing half is made to lag behind and arrives too late. The result is that for a brief period, the event is not illuminated and escapes detection." The space-time cloak would open up a temporary corridor through which energy, information, and matter could be manipulated or transported undetected. "If you had someone moving along the corridor, it would appear to a distant observer as if they had relocated instantaneously, creating the illusion of a Star-Trek transporter," he says.

There are serious applications for this research. Paul Kinsler, a postdoctoral research physicist, has developed a proof-of-concept design using customized optical fibers that would deploy the event cloak in signal processing and computing. Graduate student Alberto Favaro explains: "Imagine computer data moving down a channel to be like a highway full of cars. To allow a pedestrian to cross without interrupting the traffic, you slow down the cars that haven't reached the crossing and speed up the cars that are at or beyond the crossing, which creates a gap in the middle that the pedestrian can use to cross the street. Meanwhile, an observer down the road would only see a steady stream of traffic."

McCall believes that there are many other possibilities opened up by the introduction of the concept of a space-time cloak, but points out that the work is still theoretical and many details need to be worked out.

Although much of the current cloak research is being performed by mathematicians, physicists, computer scientists, and electrical engineers, chemical engineers are sure to play an important role in turning these concepts into reality. Stay tuned — an article in an upcoming issue will explore metamaterials in more detail.

But, that will be in 2011. Meanwhile, best wishes for a happy holiday season and a prosperous new year.

Cynthia F. Mascone, Editor-in-Chief