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## A High-Tech "Nose" Will Protect Mickey Mouse and Simba During Their Visit to China

A new sensor detects tiny amounts of pollutants that can ruin artwork



Steamboat Willie, aka Mickey Mouse, one of the Disney animation cells protected from pollutants by a new artificial "nose" (Disney Enterprises, Inc., Courtesy of Walt Disney Animation Research Library)

By [Jason Daley](#)

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Last summer, Mickey Mouse went to China—or at least some of the earliest artwork of the iconic cartoon character did. Museums in Beijing and Shanghai displayed a Disney traveling exhibit called “[Drawn from Life: The Art of Disney Animation Studios](#)” that included 300 sketches and animation cells ([short for celluloid](#), a type of plastic previously used for animation), covering the studio’s 90-year history—from *Steamboat Willie*, the first cartoon in which Mickey Mouse appears, to later films like *The Lion King* and *Frozen*.

The Magic Kingdom is more than a little protective of these historic crown jewels, so they tested out a new piece of technology to protect their sensitive artwork: an artificial nose that is 500 times more sensitive and much cheaper than most

museums' current monitoring systems. This device can sense both if the artwork is degrading and releasing gas or if there are pollutants present in the air, which can cause color changes and decomposition.

Kenneth Suslick, a researcher at the University of Illinois at Urbana-Champaign, presented this innovation recently at a meeting of the [American Chemical Society](#) in San Diego, California. Suslick previously invented an artificial nose for biomedical applications. But the self-professed "museum hound" thought the technology might be useful for protecting art and artifacts too, according to a [press release](#).

"Many pollutants that are problematic for human beings are also problematic for works of art," says Suslik in the press release. "The ability to monitor how much pollution a drawing or painting is exposed to is an important element of art preservation."

That's why he contacted the Getty Conservation Institute, a Los Angeles research group that works on preserving and restoring cultural artifacts. With their help, Suslick redesigned his optoelectronic "nose," which is actually a small array of sensors similar to litmus paper that changes color in the presence of certain chemicals. The new model is 100 times more sensitive than his previous device and is capable of detecting minute amounts of pollutants, like ozone, nitric oxide, formaldehyde and acetic and formic acids.

But it's not just contaminated air that is a problem. Artworks can also release chemicals that, when sealed up in a display case or glass frame, eventually damage them. Early animation cels like the ones in Disney's traveling exhibit [are particularly susceptible to flaking and delamination](#).

The frames and cases holding the sketches and animation cels were protected by sheets or packets of silica that pull pollutants from the air and are often hidden in frames and display cases in museums. But knowing when to replace these sheets is difficult. That's where the nose came in. Conservators placed the sensors on the backs and insides of the frames and cases. If any of the sensors began to change color, conservators knew pollutant levels were rising and it was time to swap them out.

While pollutant levels in the Chinese museums surprisingly stayed within acceptable levels, the nose indicated that some of the display cases themselves released sulfide contamination. Suslik says he'll continue to improve his sensor array and one day hopes the technology may make its way into museum across the world.

We often worry about pollutants harming people, but as Suslik emphasized in a [press conference](#), "the recommended levels of air pollutants acceptable for museum artwork are about 100 times lower than those acceptable for human beings." But unlike people, artworks do not heal or have finite lifetimes, he said in the press release. "[I]deally works of art should last for future generations."

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**About Jason Daley**

Jason Daley is a Madison, Wisconsin-based writer specializing in natural history, science, travel, and the environment. His work has appeared in *Discover*, *Popular Science*, *Outside*, *Men's Journal*, and other magazines.

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