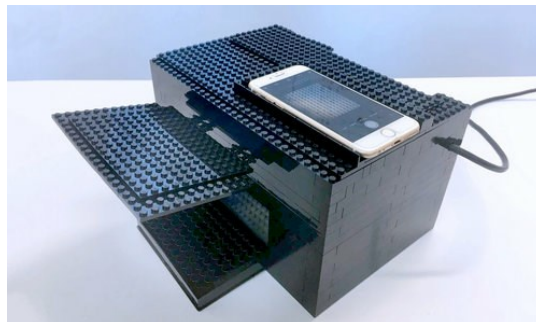


Nerve Gas Detection and Legos

DISCOVERY ZONE, CHEMISTRY, RESEARCH

In a nerve gas attack, first responders and scientists get called in to identify deadly and difficult-to-detect agents such as VX and sarin. These odorless, tasteless chemical weapons can cause severe illness and death, sometimes within minutes. Identifying them correctly and promptly becomes a life-or-death matter. Now UT Austin scientists and students have developed a powerful method for sensing dangerous chemicals using a rig made of little more than a smartphone, software, some unique chemistries and a box made from Lego bricks.



Credit: Vivian Abagiu

Professor [Eric Anslyn](#), the Welch Regents Chair in Chemistry, has spent decades studying nerve agents and previously developed chemical compounds that neutralize them. The compounds also create a glow with distinct colors and brightnesses that signal the presence, class and quantity of specific nerve agents, information that helps responders know which nerve agent was used and how to decontaminate an area and treat victims. Most recently, Xiaolong Sun in the Anslyn group created methods to amplify the intensity of the glowing to improve the sensitivity.

But there was a challenge to overcome: the compounds interacting with different agents fluoresce in ways that are hard to distinguish with the naked eye. Graduate student Alexander Boulgakov worked with Anslyn and his team, including undergraduate researchers, to develop a software that, when paired with a smartphone's camera, can capture differences in fluorescence and complete the analysis. For the best readings, there also needed to be a light-tight space to hold the smartphone and other components. Students tried out a 3D-printed box, but clinical assistant professor Pedro Metola suggested a more cost-effective and accessible option: using Legos to craft the box. The solution is inexpensive, portable and adjustable on the fly.

"Chemical weapons are dangerous threats to humanity," Anslyn said. "Detection and neutralization are key to saving lives."



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