History
The oldest known example of stained or colored glass is from around 2700 BCE in ancient Egypt. By the 10th century, what we think of as stained glass windows appeared. However, the science behind how different colors form is a more recent discovery.

Science
Stained glass is not painted, but changes color through the addition of tiny pieces of metal to melted sand. For example, nanoscale particles of gold and silver can create nearly any color of the rainbow by changing their size, shape, and environment.

Simulation
The colors associated with each nanoparticle model were obtained by finite difference time domain (FDTD) simulations. The FDTD method provides solutions to Maxwell's equations, facilitating the simulation of the light scattering and absorption properties of the nanoparticle models in various media. The output spectra were then mathematically converted to RGB color.

Visualization
This app lets users create their own stained glass pieces by manipulating nanoscale metals. Originally imagined as a museum exhibit, the app was redesigned as a responsive web application in the wake of the COVID-19 pandemic. Select a design, set the medium and particle characteristics to color each glass segment, then download the design to share with friends!

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Take a photo or visit https://go.iu.edu/4syX to try the application

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