Binary Weight

Designing for relatively **hard materials** that do not deform too much **is** commonly **handled by software that calculates** and optimizes **structures** using mathematical models that are well understood and easily applied. But there is **an expanding class of design challenges for things that incorporate soft materials** -- biological materials, engineered tissues, membranes, and even shape-shifting fluids that respond to electromagnetic fields. **Predicting how** these **soft** and fluidic **materials respond to forces is more challenging** than predicting the behavior of hard materials. **Real world applications** can **include design of artificial hearts** and **heart valves or robot materials** that mimic flesh and soft tissue.

To meet this challenge, a team of **Tufts researchers** led by Tim Atherton, professor of physics, **created Morpho, an open-source programmable environment that enables researchers** and engineers **to solve shape optimization problems** for soft materials. **The software** recently described in Nature Computational Science **is meant to be easy to use,** free to use, **and applicable** to a broad range of scenarios. Among the team developing the software were **James Adler,** professor of mathematics, **and Chaitanya Joshi,** postdoctoral scholar in physics.