Universal Screwdriver

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The goal of this project was to design and construct a Universal Screwdriver, a device that could unscrew any screw without the need for changing bits or other modifications. Using research, based largely on existing socket wrench designs, we developed an idea that used pins tensioned by springs. When pressed against a screw, the pins would compress to fit the shape of the screw head, and it could be turned. We began with our design phase, detailing the steps of construction so we knew what materials would be needed. Most of the Universal Screwdriver is made of 3D-printed PLA (plastic) parts, but the inner mechanism uses springs and steel pins supported by PLA. The Universal Screwdriver (V2) was tested on ten different screws of various shapes and sizes, when they were both fully tightened into a piece of wood and when they were considerably loosened. Using this system, we estimated the universal screwdriver to have a success rate of 40%. As a control, we repeated this method with a regular Phillips screwdriver and estimated a success rate on the same set of screws at 30%. Although the Universal Screwdriver currently doesn't perform as anticipated, these tests proved the potential for wide applications of this device. It outperforms a regular screwdriver in tests with loose screws, where shape is essentially the only concern. Considering circumstances where the device was more successful, it would be a more convenient tool that will make a wide variety of work far easier to accomplish.

Awards Won:
Arizona State University: Arizona State University ISEF Scholarship (valued at up to $52,000 each)
University of Arizona: Renewal Tuition Scholarship