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## Inventors

**Thomas Sugar**

**Thierry Flaven**

**Matthew Holgate**

**Jason Kerestes**

**Jeff Ward**

## Contact

Shen Yan  
shen.yan@skysonginnovations.  
com

## A Device for Adding or Subtracting Energy to Body Motion

As we move, our human strength, speed, and endurance is limited by our bodies' metabolic constraints. One solution to assist human movement is through the development of exoskeletons. Most designs for exoskeletons apply torque to individual joints. These systems are complex, but they can help humans to carry heavy loads, walk further, jump higher, and improve endurance. Unfortunately, exoskeleton designs are in the early stages of development and have very limited ability to raise human metabolic capacity.

Researchers at Arizona State University have developed a new device that can add or remove energy from the human metabolic system. Through the use of masses that apply pushing and towing forces, improvements can be made in human strength, speed, and endurance. Use of this device can allow a human to carry heavier loads, run faster and further, jump higher, be less fatigued, and have greater stamina. In addition, the innovation can be used to remove forces acting on the body. An example of this would be to add resistive forces on the body of someone carrying a heavy load downhill. The resistive forces reduce the energy the body uses to slow its descent. This innovation is simple, and uses a method that allows masses to oscillate with the correct timing, direction, and phase, thus applying forces that assist human movement.

### Potential Applications

- Exoskeletons
- Prosthetic devices
- Sports enhancements
- Physical therapy

### Benefits and Advantages

- Lower Costs – Simple, inexpensive design.
- More Power – Increases strength and operator ability compared to existing innovations.
- Retrofit – Can be used to improve existing products.

For more information about the inventor(s) and their research, please see [Dr. Thomas Sugar's directory webpage](#)

