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# Kinetic Energy Harvesting Suit

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This suit must:

- Maintain homeostasis without creating compression
- Keep all sensors in their proper location
- Washable
- Comfortable
- Base layer
- Be able to conduct and transfer the energy collected from the Sensors to the Central Circuit Board
- Secure the sensors
- Allow the proper stretch of the sensors
- Create pockets that cover and protect without restricting sensor stretch (Figure 1)

**Background**

Figure 1.

DAVWIRE reached out to Fanshawe College in the summer of 2019, looking for a suit to house their new technology. DAVWIRE has developed an elasto-polymer fabric with properties that retain small amounts of energy within the fibres. The theory or potential application behind this elasto-polymer is that it will be capable of harvesting kinetic energy produced by humans when wearing the fabric as a suit.

**Methods**

Prototypes were designed and studied through human movement and measurements. Great care was taken in finding anchor points and how they worked with body mapping and stretch factors.

1. Study of the sensors stretch factors
2. Research in strategic body mapping, contours and body movement.
3. Understanding of the skeletal and muscular systems and the connection the two through tendons and ligaments.

4. Cut & Sew and wiring of the energy suit
5. Final testing at high performance, of fit and fabric and sensor stretch

Channels, pockets and anchors created by design and sewing technics (Figure 2).



Figure 2.

## Results

Successful research, design and development of the human kinetic energy harvesting suit.

This suit was worn during high endurance performance and maintained proper fit, placement and stretch. This allowed the sensors proper stretch and recovery.

- Adjustable straps were created to allow adjustable sizing along the knee and ankles (Figure 3).



Figure 3.

## Conclusion

This suit proved to house the elasto-polymer developed by DAWIRE. There is a possibility of future research in the use of conductive yarns and inks within this project.

## Acknowledgement

None.

## Conflict of Interest

No conflict of interest.