



# Robert Potra

BSc. Mechatronic Systems Engineering  
Western University

Visiting Scholar at Macquarie University  
Formula SAE





# MACQUARIE

## University

SYDNEY · AUSTRALIA

### Visiting Scholar Engineering Intern

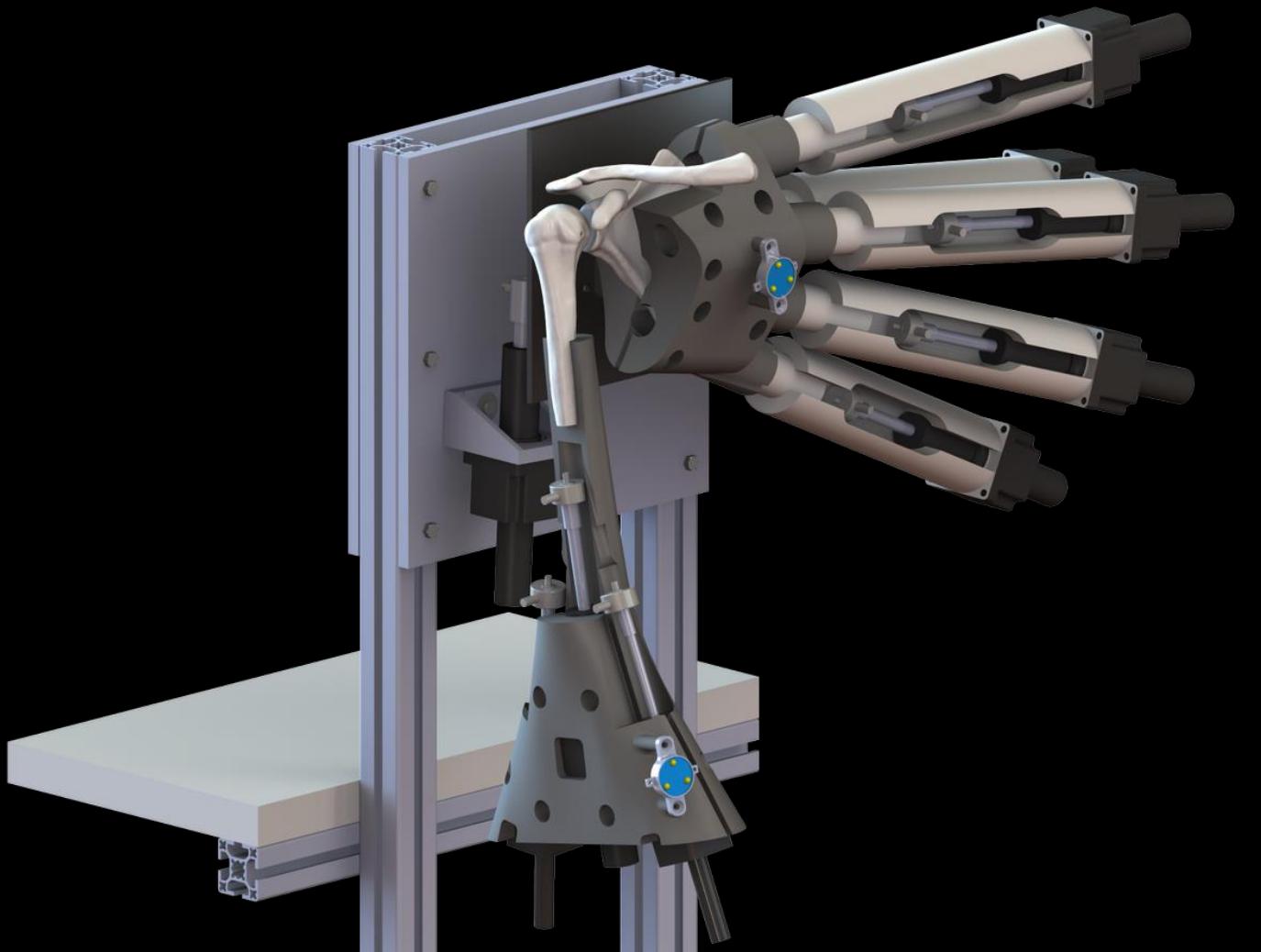
- Mechanical design of specimen-specific, parametric shoulder simulator
- Control system design and implementation with kinematic and force feedback
- Developed software and user-interfaces for conducting biomechanics experiments
- Conducted cadaver biomechanics pilot experiments
- [Shoulder Simulator Video](#)
- [Shoulder Simulator Article](#)





# MACQUARIE University

SYDNEY · AUSTRALIA



# FRONTIER

THE MAGAZINE OF MACQUARIE UNIVERSITY HOSPITAL | SPRING 2020



## Evolution of the most advanced cadaveric shoulder simulator

MQ HEALTH RESEARCHERS HAVE SUCCESSFULLY CONDUCTED THE FIRST CADAVERIC PILOT TESTS – MADE POSSIBLE THROUGH A MULTI-PARTNER INTERNATIONAL COLLABORATION AND THE UNIVERSITY'S WORLD-CLASS CADAVERIC SURGICAL SKILLS CENTRE.

International satellite link overcomes Covid-19 obstacles for heart patients

The future of healthcare beckons

Weight loss patients access much-needed surgery

## Research Assistant

- Conducted cadaver studies with surgical fellows
- Performed statistical analyses to compute repeated measures ANOVA and reliability measures
- 3D scanned patients to reverse engineer splints for chronic conditions
- 3D printed and post-processed splints for patients
- Interactive splint model

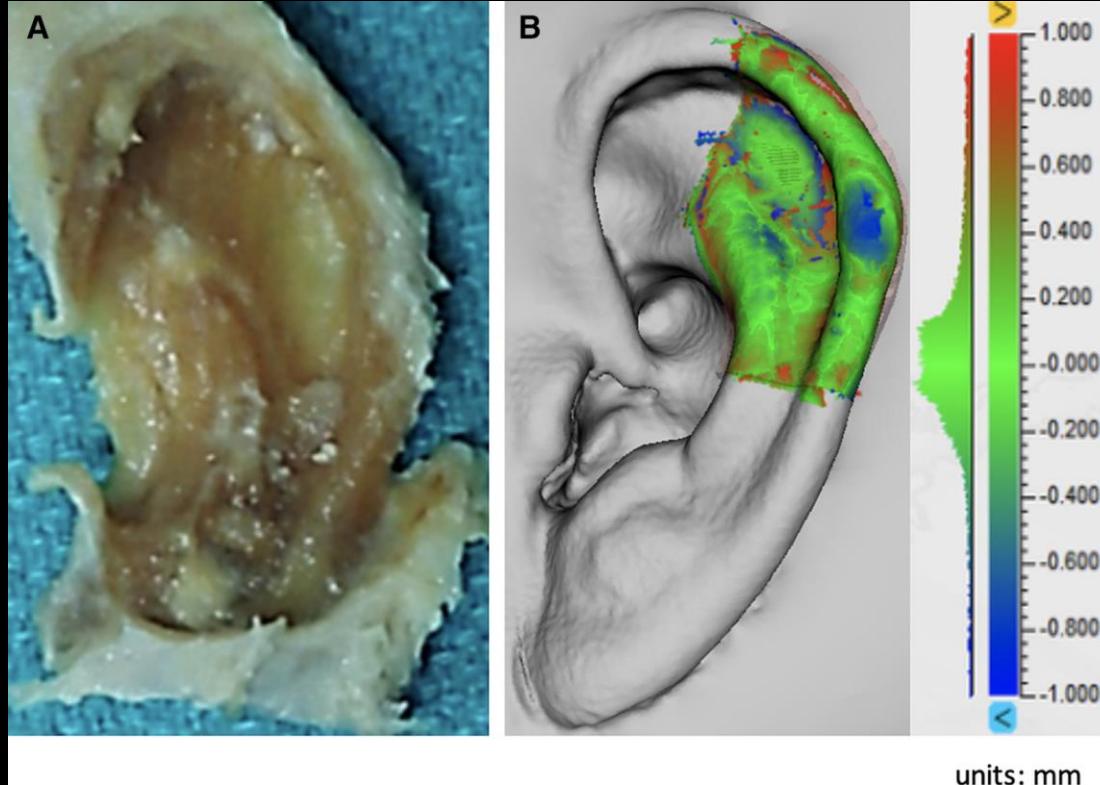




# ROTH | MCFARLANE HAND & UPPER LIMB CENTRE

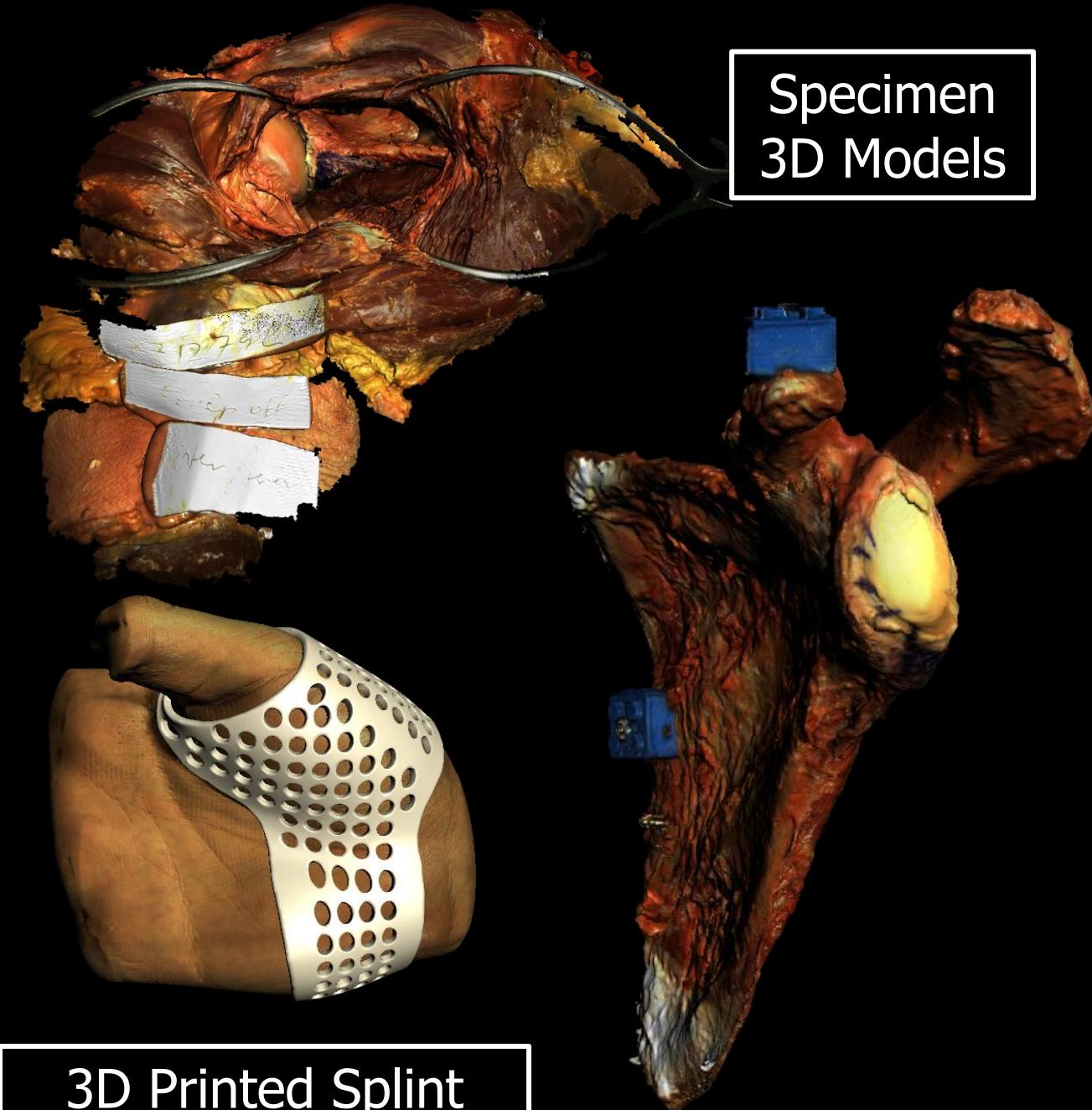
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## ST. JOSEPH'S HEALTH CARE LONDON



Robot Contouring for  
Ear Reconstruction

3D Printed Splint



Specimen  
3D Models



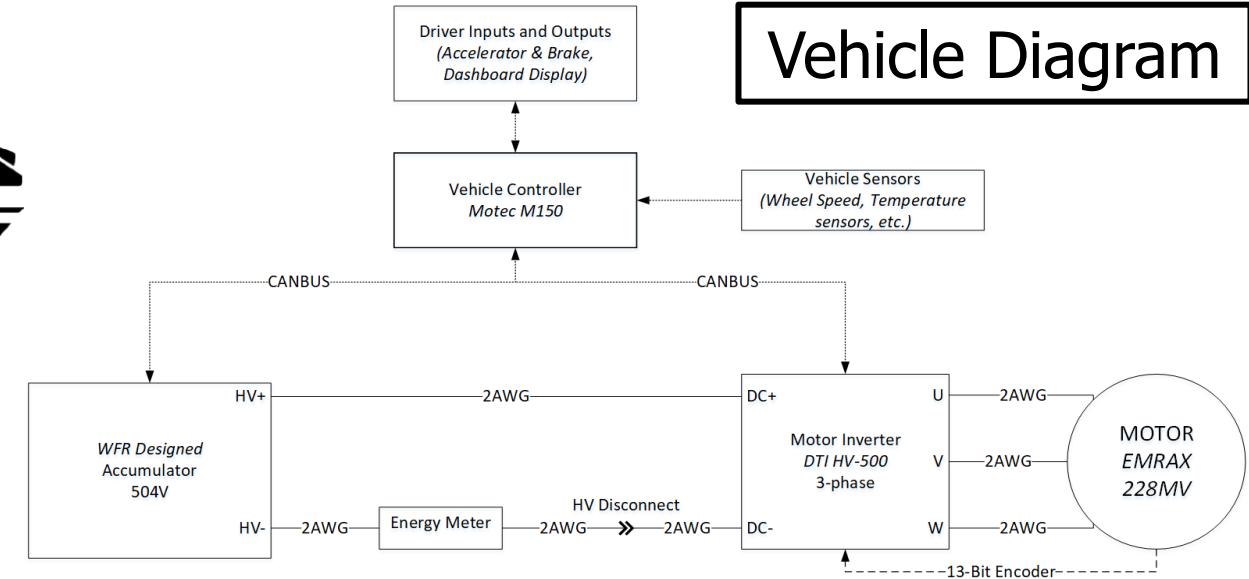
## Low Voltage Lead

- Designed low voltage systems for 2018-2019 and 2020-2021 seasons
- Final year project of electrified powertrain using an Emrax 228 motor, DTI HV-500 inverter, and 500 V Lithium-ion battery pack with custom battery management system
- Designed and manufactured wire harnesses for multiple vehicles with improvements in modularity, reliability, and design documentation
- Mentored electrical team members
- Integrated sensors using CAN protocol and MoTeC M150 engine control unit





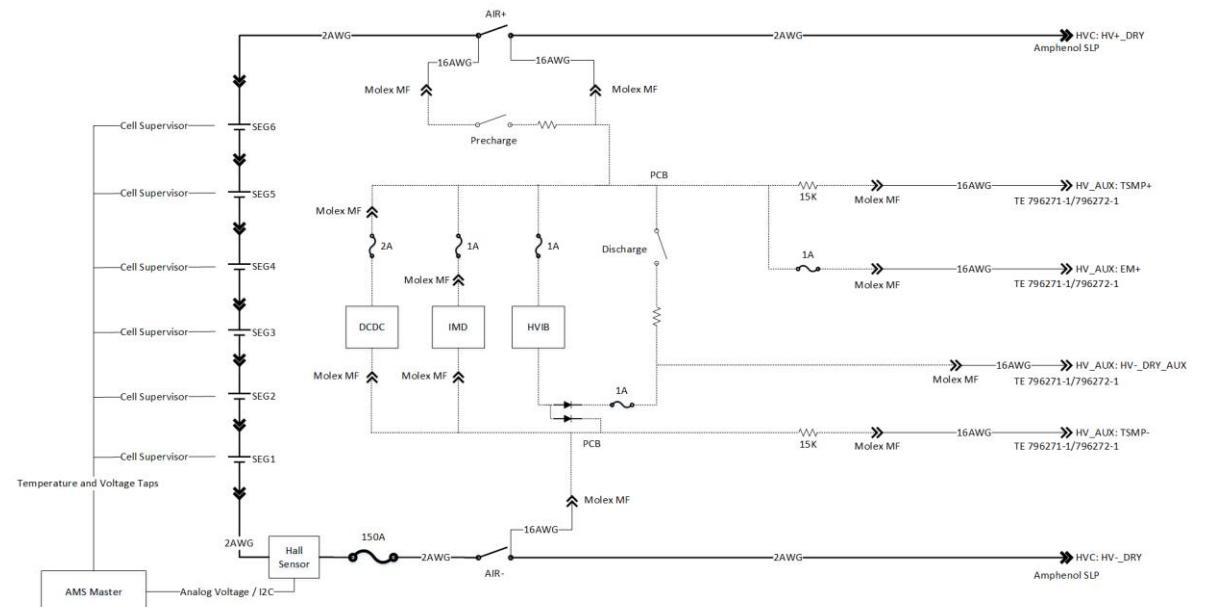
## Vehicle Diagram

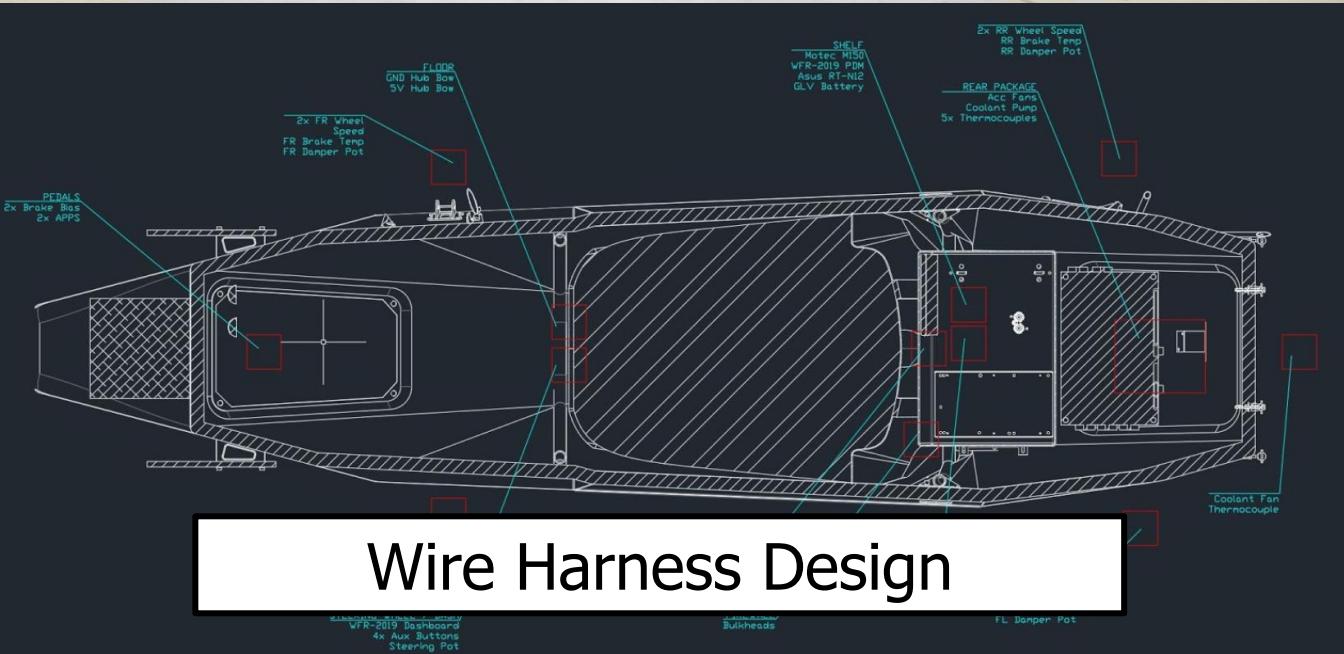


## Interactive Vehicle Render

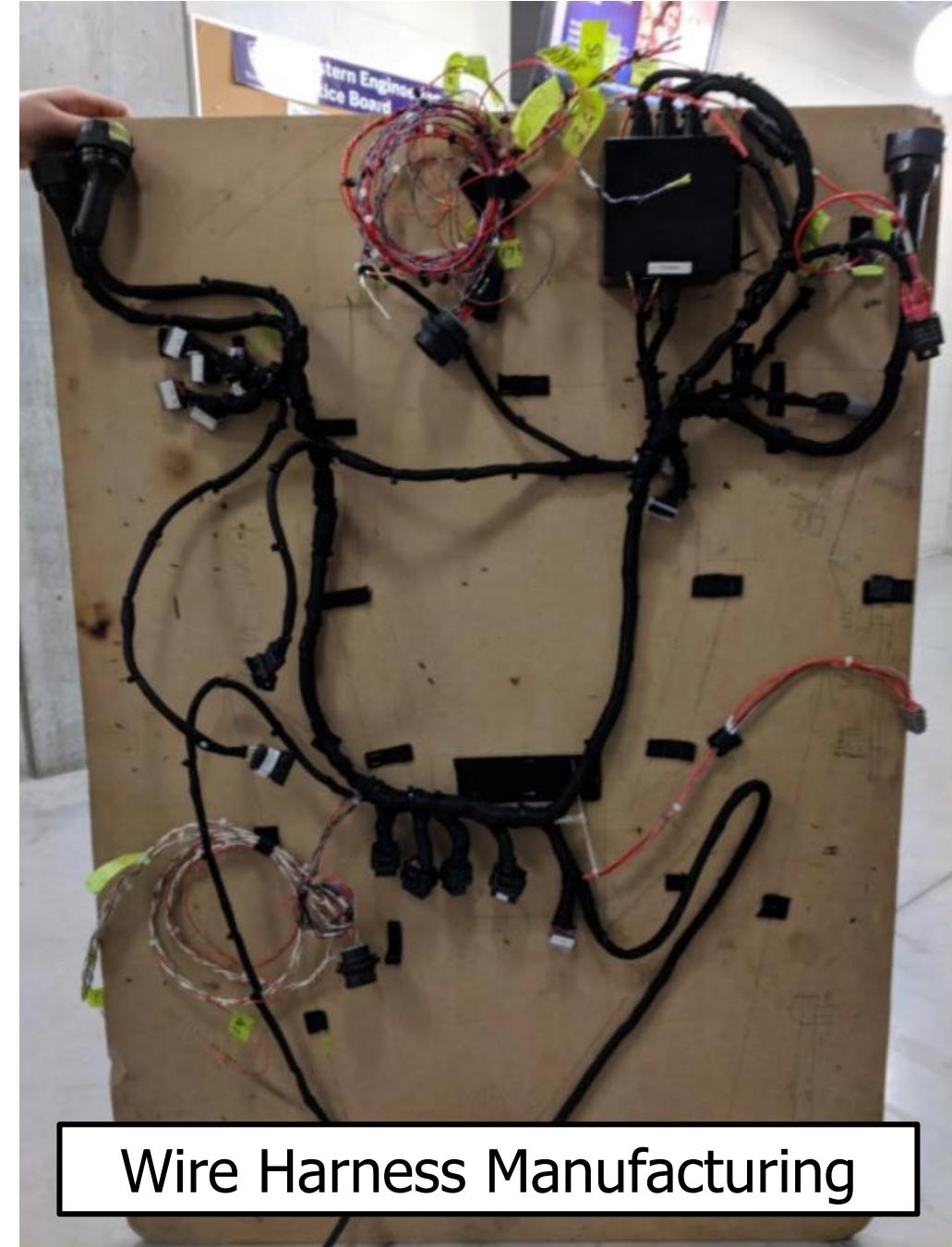


## Accumulator Diagram

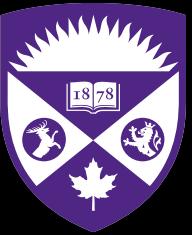




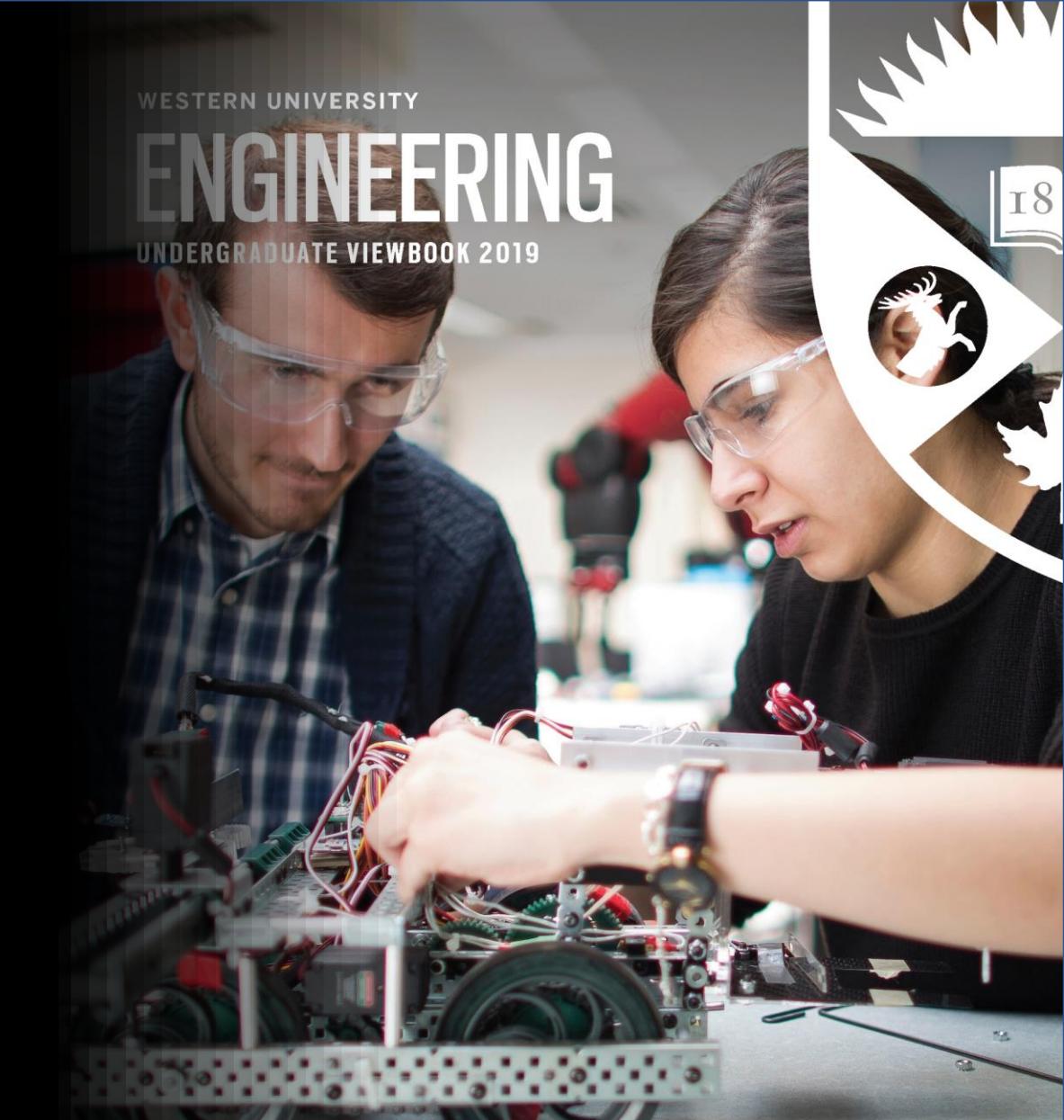
Wire Harness Design

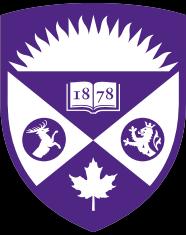


Wire Harness Manufacturing



- BSc. Mechatronic Systems
- Dean's Honour Roll
- Certificate of Leadership and Innovation





## Robotic Manipulators

- Serial manipulator kinematics and dynamics
- Path planning with via points, attractive fields, and repulsive fields
- Implementation of gradient descent algorithm and control in MATLAB



# Technical Skills

- MATLAB
- SolidWorks
- Microsoft Office
- 3D Printing
- 3D Scanning
- Artec Studio
- Geomagic Wrap
- Spoken Romanian
- LabVIEW
- Python
- Arduino
- C++
- Git
- Autodesk EAGLE
- SPSS
- Simulink
- LaTeX
- Materialise Mimics
- Soldering



# Personal Projects

## LED Cube

- Serial Peripheral Interface (SPI)
- Daisy-chained 74HC595 shift registers to control 8x8x8 cube of LEDs
- [YouTube Video](#)

