



# Robert Potra

BESc. Mechatronic Systems Engineering  
Western University

15 months as 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](#)



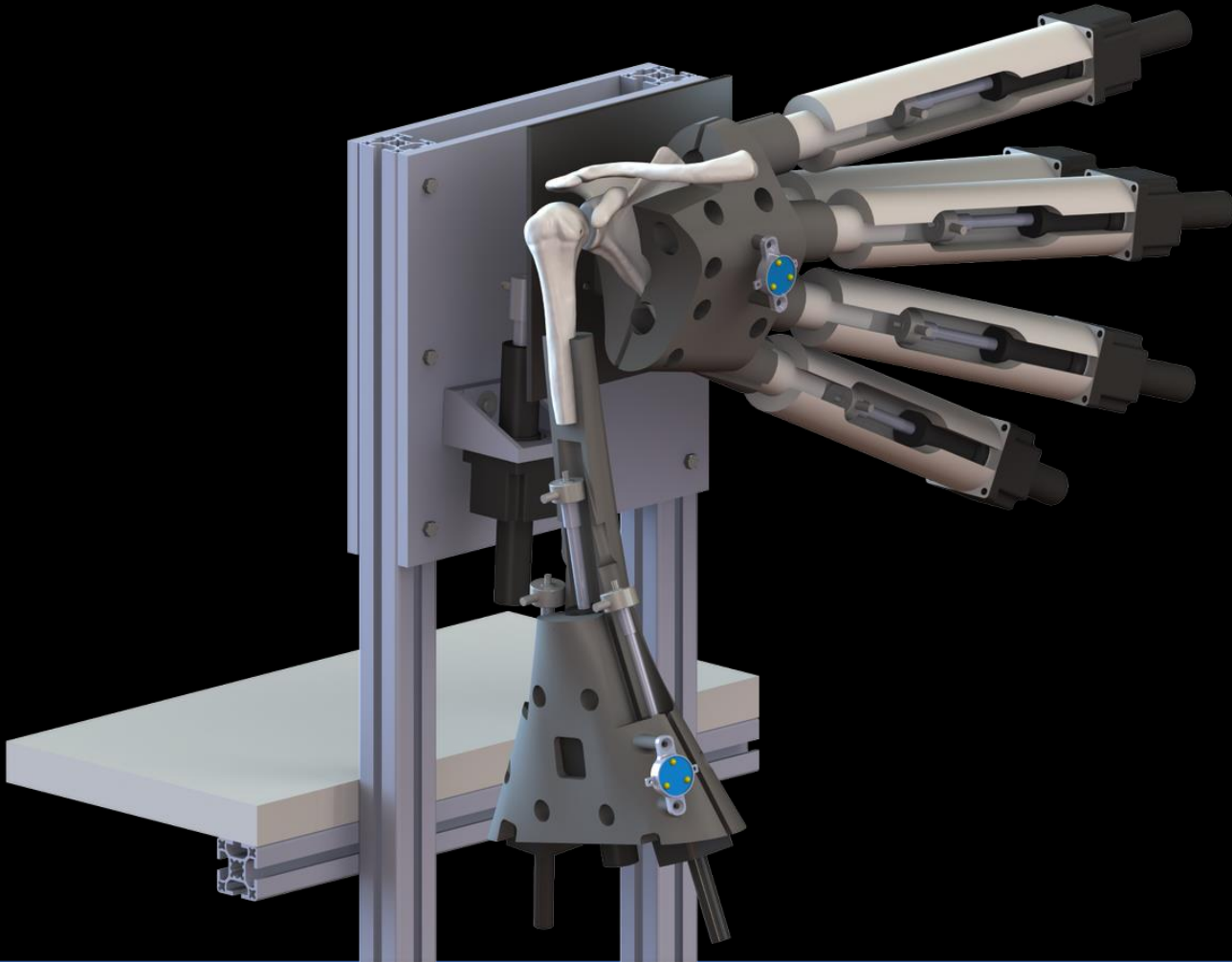




# MACQUARIE University

SYDNEY · AUSTRALIA

- [Hexapod Shoulder Simulator Animation](#)



# 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







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HAND & UPPER LIMB CENTRE  
ST. JOSEPH'S HEALTH CARE LONDON



## Research Assistant

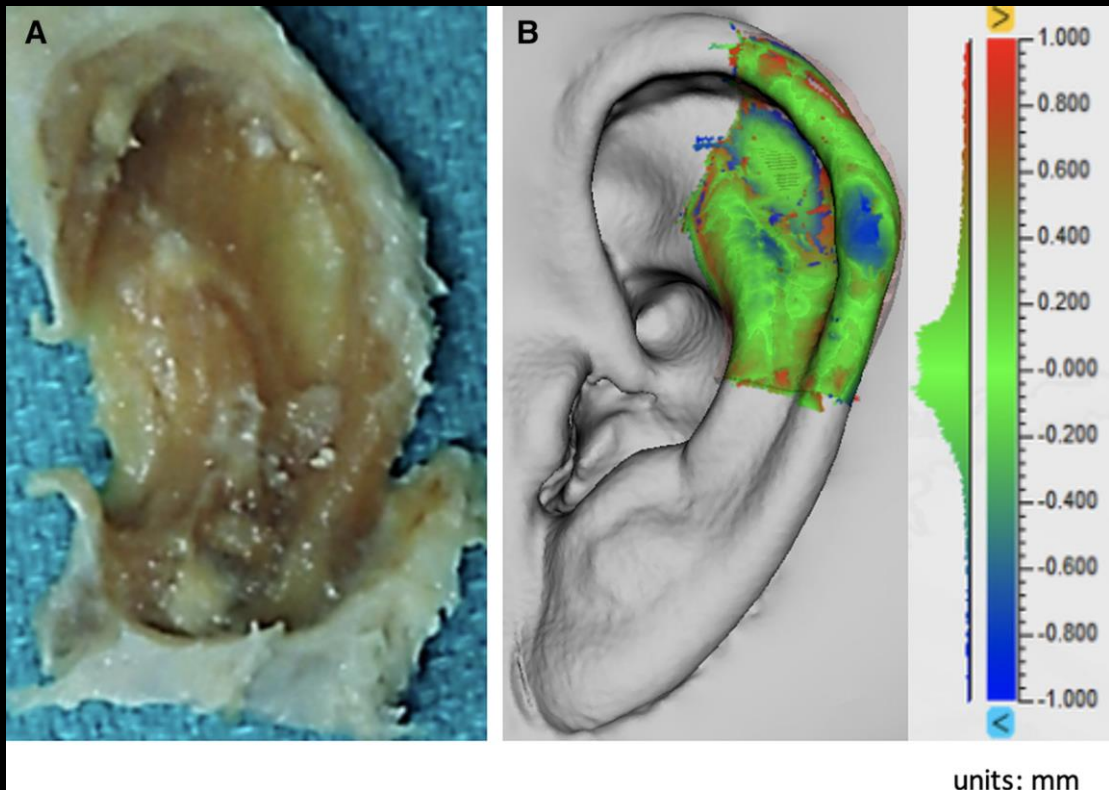
- Conducted cadaver studies with surgical fellows
- Performed statistical analyses to compute repeated measures ANOVA and reliability measures
- 3D scanned patients to reverse engineer splints for chronic conditions
- 3D printed and post-processed splints for patients
- [Interactive splint render](#)



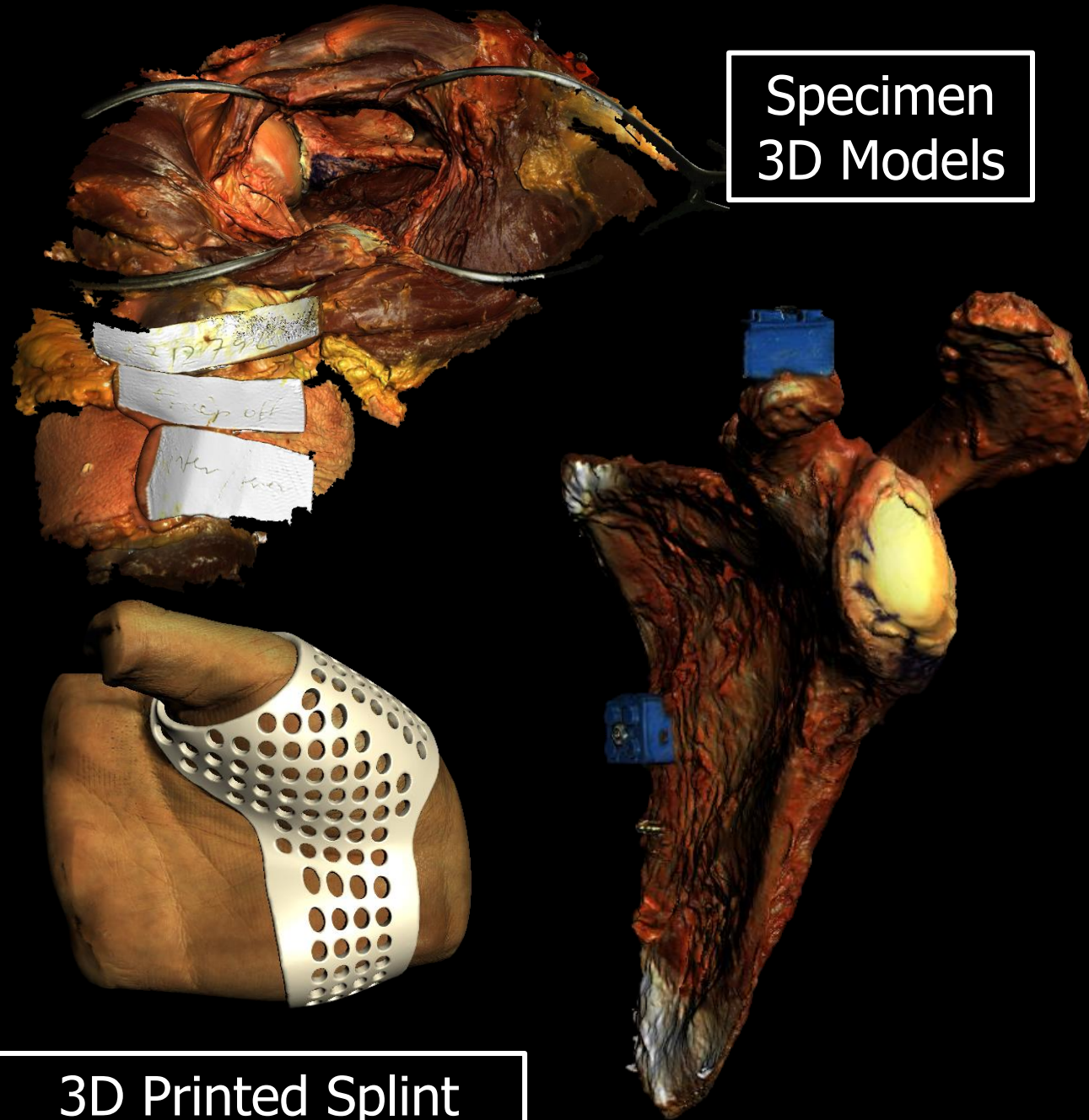




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Robot Contouring for  
Ear Reconstruction

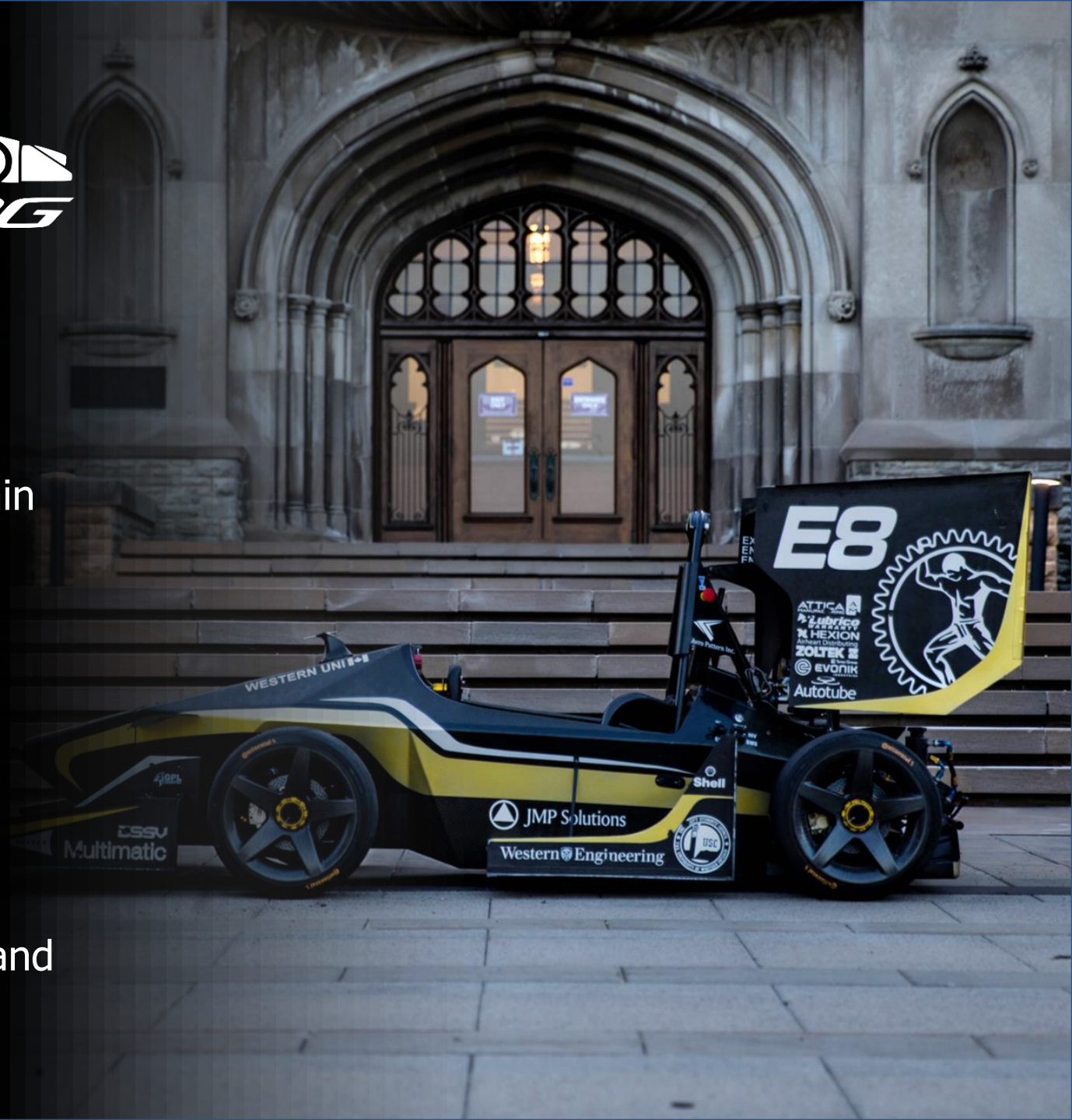






## Low Voltage Lead

- 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 with improvements in modularity, reliability, and design documentation
- Mentored junior team members
- Integrated sensors using CAN protocol and MoTeC M150 engine control unit

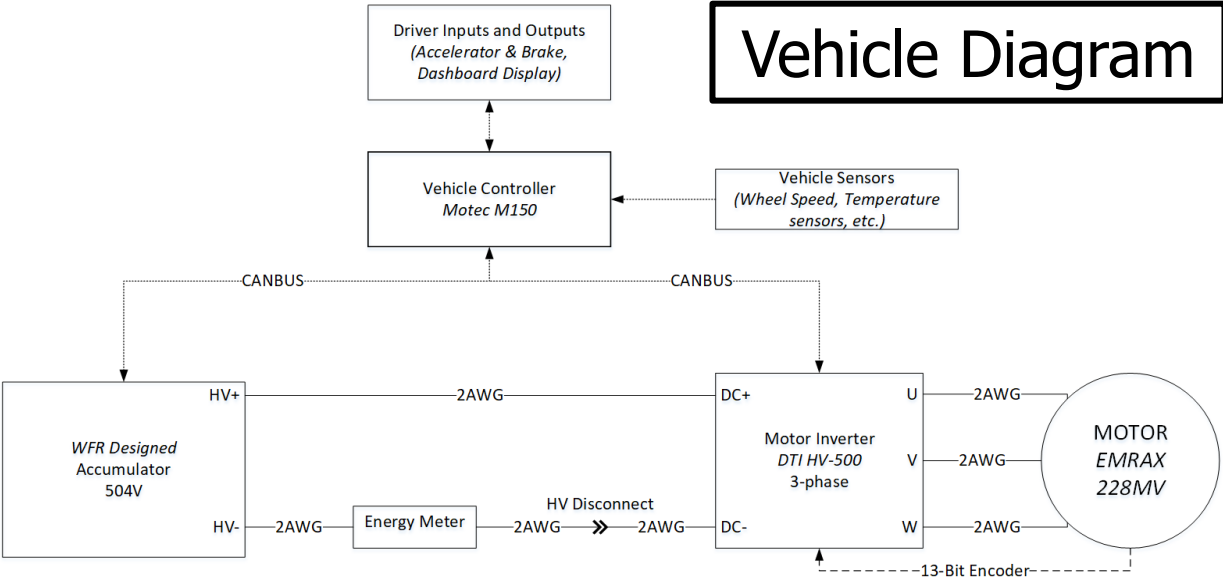




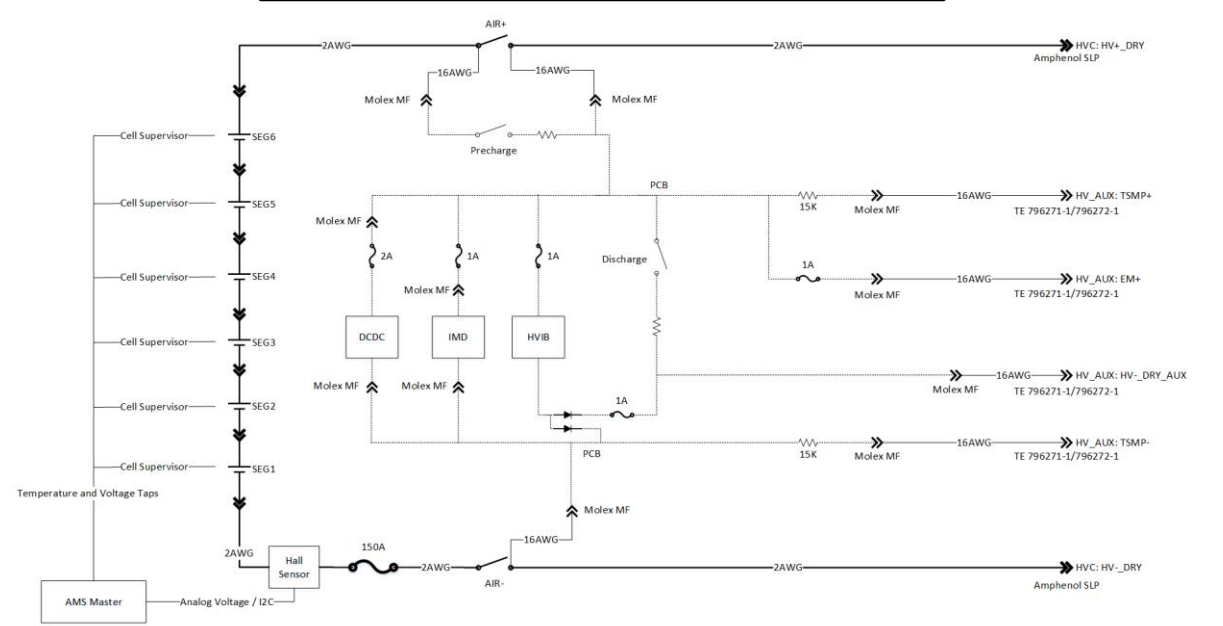
Interactive Vehicle Render



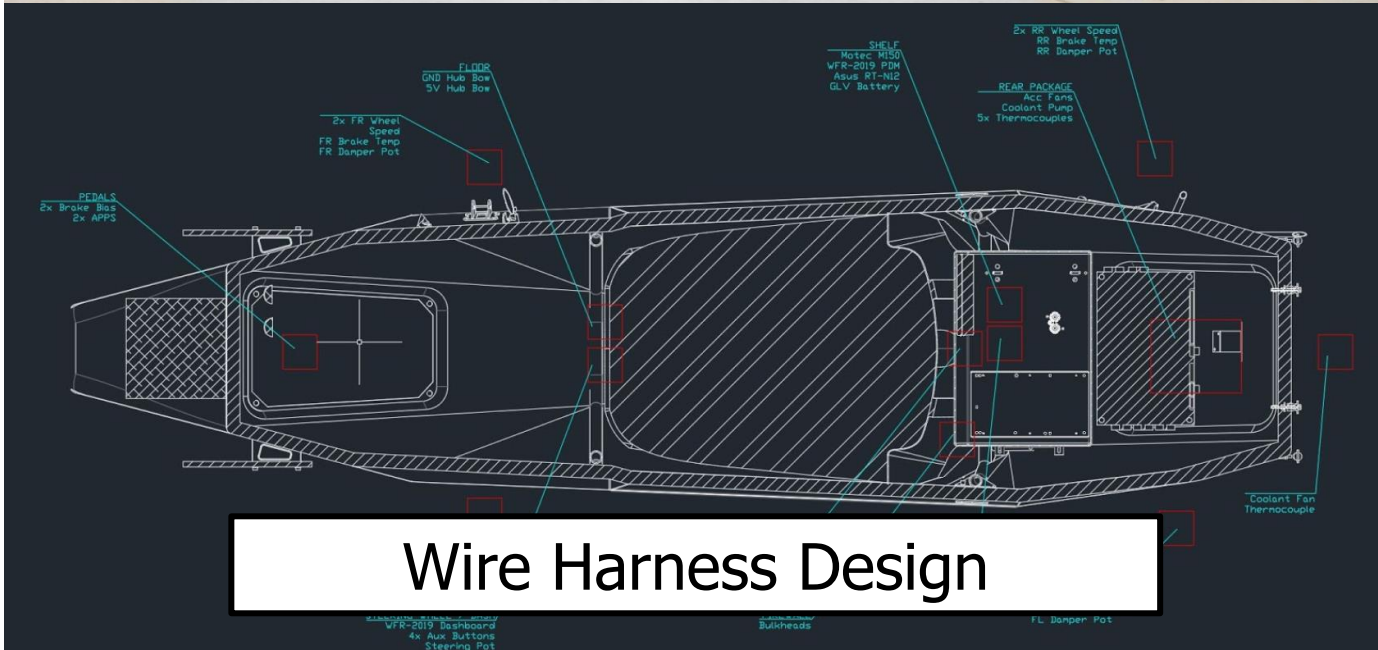
Vehicle Diagram



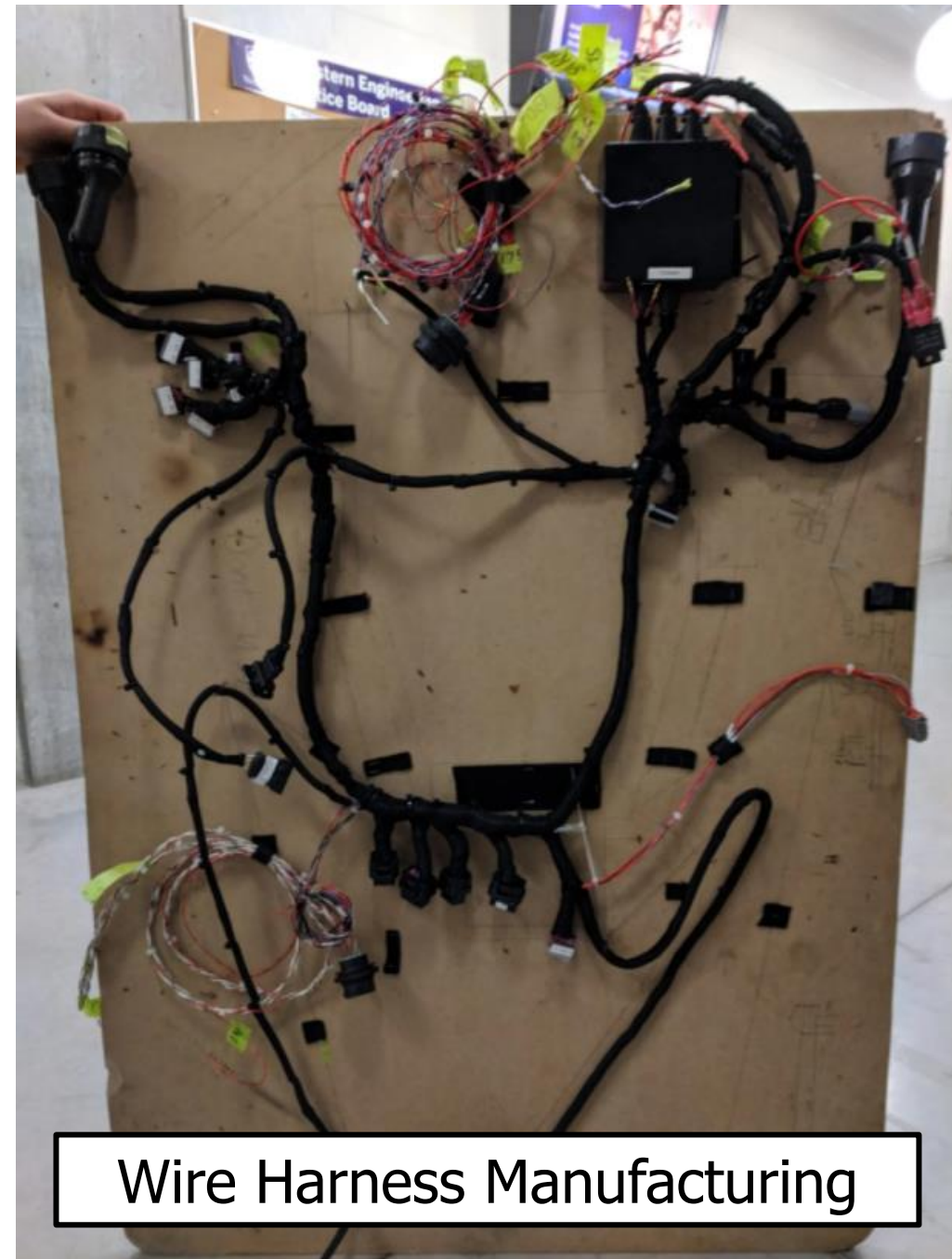
Accumulator Diagram







Wire Harness Design

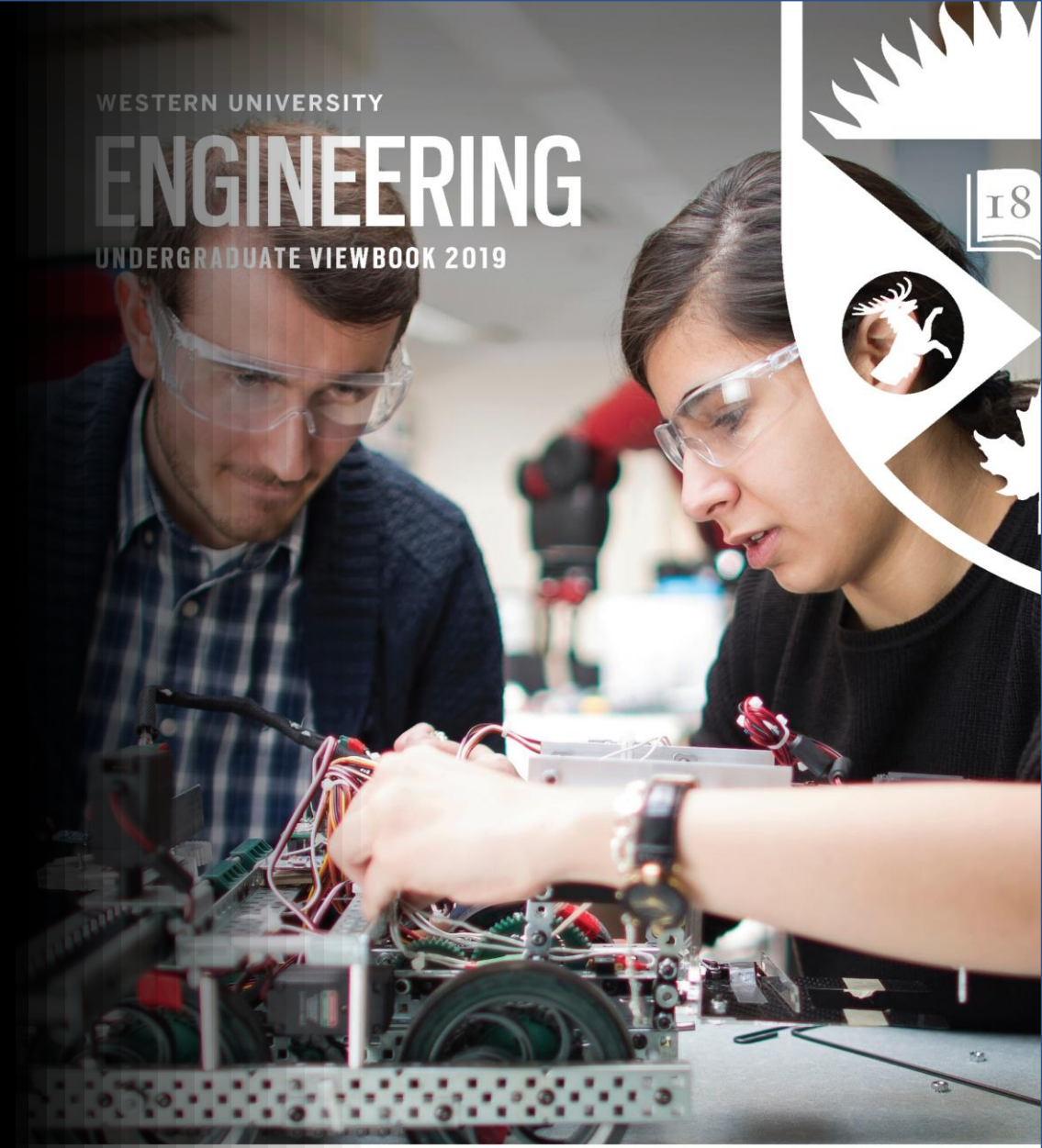


Wire Harness Manufacturing





- BEng. 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
- Implemented gradient descent algorithm and control in MATLAB





# Technical Skills

## Computer-Aided Design

- SolidWorks
- Artec Studio
- Geomagic Wrap
- Autodesk EAGLE

## Biomechanics and Medical Imaging

- Materialise Mimics
- Optotrak Certus
- The MotionMonitor

## Programming

- MATLAB
- LabVIEW
- Python
- Simulink

## Creative Design

- Microsoft Office
- Photoshop
- PhotoView 360
- Keyshot
- LaTeX

## Prototyping

- Arduino
- Soldering
- 3D Printing
- 3D Scanning
- Wire Harness Construction





# Personal Projects

## LED Cube

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

