ICAMP

CONFERENCE 2024

LEARNING FACTORIES FOR ADVANCED MANUFACTURING IN EDUCATION

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The Canadian Learning Factory: Approaches and Aspirations

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CAMOSUN COLLEGE

LCAMP

Learner Centric Advanced Manufacturing Platform

Plans and Intentions

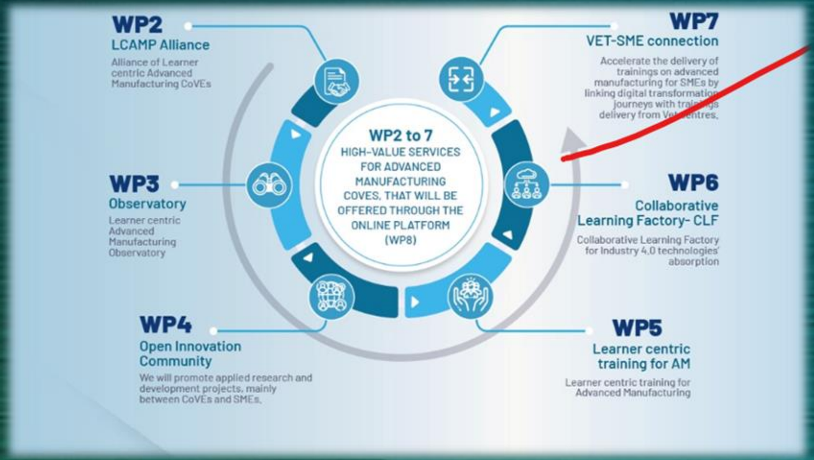
- Introduction to Camosun College – us and them
- Roles and Relationships – working with LCAMP
- The Canadian Learning Factory – what it is
- The Canadian Learning Factory – what it could be
- The Canadian Learning Factory – what it means to us

Introduction to Camosun College

- Situated on the territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples
- City of Victoria, province of British Columbia, on Canada’s west coast
- More than 160 programs, more than 14,000 students
- ≈ 1,700 international students and 1,100 Indigenous students
- One of 213 public colleges and institutes (95% within 50km)

LCAMP Roles and Relationships

- The only non-EU partner in LCAMP
- Engaged in academic and vocational training
- Involved in all of the dedicated work package areas
- Working to build connections with similar institutions
- Committed to aligning advanced manufacturing practices



The Canadian Learning Factory

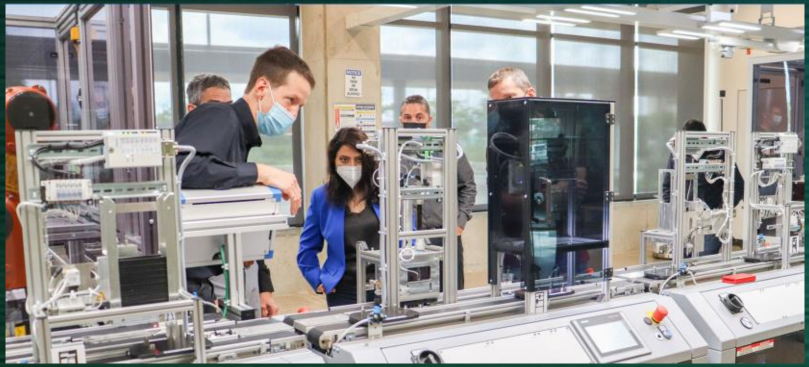
- Universities offer degrees with limited hands-on undergrad training
- Polytechnics combine applied and degree-granting programming
- CEGEPs and CCTTs offer a different model in the province of Quebec
- Colleges provide vocational education and TACs

The Canadian Learning Factory

- The most complete learning factories are found in universities
  - Allfactory Aquaponics 4.0 Learning Factory @ U of Alberta
  - Composite Research Network (CRN) Learning Factory @ UBC
  - Intelligent Manufacturing Systems (IMS) Centre iFactory Laboratory @ U of Windsor
  - W. Booth School of Engineering Practice and Technology Learning Factory @ McMaster U

The Canadian Learning Factory

- Polytechnic Applied Research Centres
  - BCIT Centre for Applied Research and Innovation (CARI) facilities include a full-scale fabrication lab, motion capture lab, textile fabrication lab, electronics fabrication lab, and simulation facilities.
  - Humber College Barrett Centre for Technology Innovation (BCTI) boasts Canada's only Cyber-Physical Factory combining a Festo Industry 4.0 Digital Factory with a Product Prototyping Facility.
  - Red River College Polytechnic Smart Factory, inspired by GE's "Brilliant Factory," combines emerging technology elements to build on aerospace and manufacturing training programs.



The Canadian Learning Factory

- CEGEPs and CCTTs in the province of Quebec
  - Composites Development Centre of Quebec (CDCQ)
  - Innofibre - development and treatment of cellulosic and bio-based products and materials
  - Mechanium - mechatronic learning/innovation in a controlled and supervised environment
  - Merinov - fisheries, shellfish/seaweed farming, aquatic biotechnology, blue economy
  - Vestechpro - smart clothing, specialized/adaptive garments, circular economy

The Canadian Learning Factory

- Technology Access Centres (TACs)
  - NAIT Centre for Sensors and System Integration helps address digitization transformation challenges in preparation for commercialization. Includes training industry HQP.
  - Lambton Manufacturing Innovation Centre supports manufacturing with an emphasis on product/process development/improvement and creating an enriching learning experience.
  - Camosun Technology Access Centre provides product development/process improvement to helping manufacturers adopt advanced technologies and link to college students/faculty

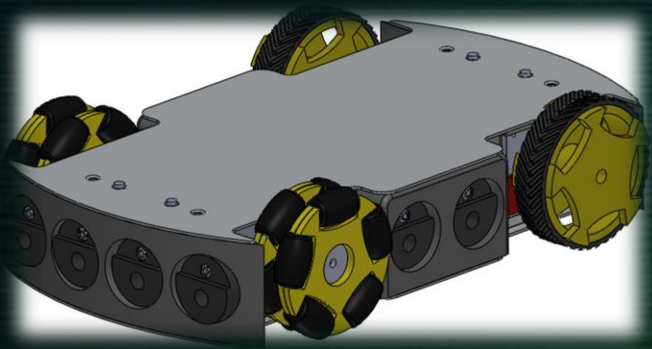
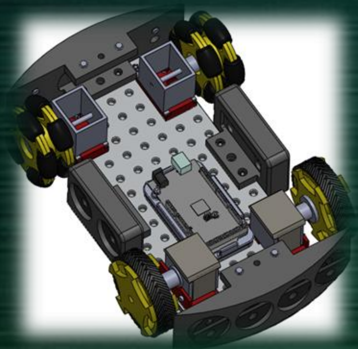
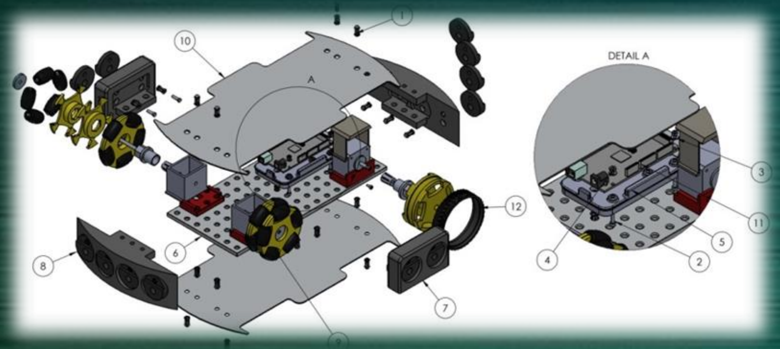
The Canadian Learning Factory

- Building a Collaborative Learning Factory (CLF) with LCAMP
  - Creating more specialized learning environments that replicate real-world industrial settings and provide additional hands-on learning experiences for students
  - Developing work environments with appropriate equipment, materials, and tools to scaffold the learning trajectory from classroom to work room to workplace employment
  - Simulating industrial processes that allow students to apply the skills and knowledge they have acquired in the classroom to a real-world environment
  - Working with Canadian colleges to better understand the premises and principles of CLF establishment and operation in support of learner-centric training and talent development



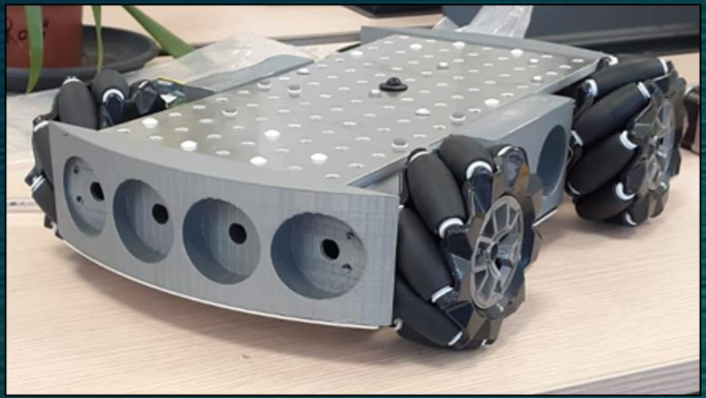

The Canadian Learning Factory

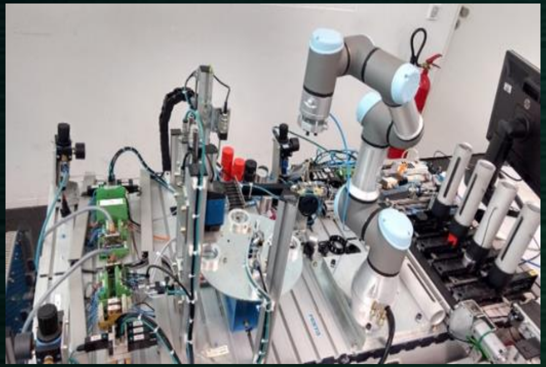
- CLF Product and Process
  - Control: Arduino/ESP32
  - Connectivity: BT, WiFi
  - Drive system: Stepper Motor
  - Wheels: Mecanum
  - Sensors & Indicators: Ultrasonic, infrared, RGB LEDs, loudspeaker (future options: Lidar, RFID markers, Microphone, Camera)

The Canadian Learning Factory

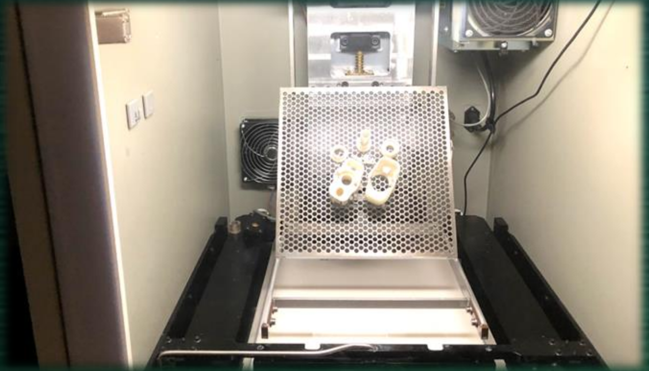
- CLF Layout, Plans & Changes over time
  - Sensor Assembly
  - Wheels Assembly
  - Chassis Assembly
  - Final Assembly
  - Dissemination

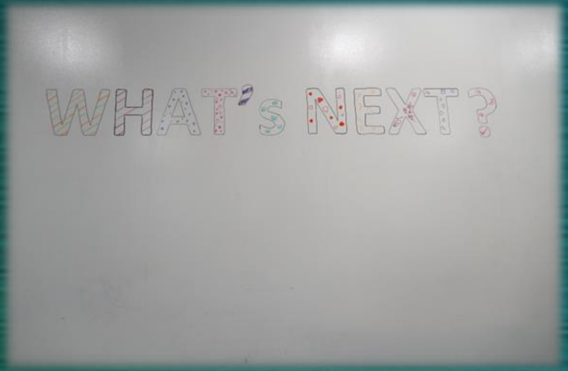




The Canadian Learning Factory

- CLF Status and Next Steps
  - Space and resource allocation for the establishment of workstations
  - Identification of student and technologist labour support for CLF implementation
  - Determination of CLF product manufacturing processes
  - Development of CLF product assembly processes
  - Project information dissemination through conferences, meetings, outreach, and webinars
  - Curriculum integration
  - Expanded influence to other colleges





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- Lambton Manufacturing Innovation Centre https://www.lmic.ca/
- Camosun Technology Access Centre https://camosun.ca/innovates

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Centro de Investigación en FP Euskadi
Basque VET Research Centre

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Questions?

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