# Project Summary Guidelines:

As you read the summaries, consider which type of project may best suit your working style. We will post the detailed list of project summaries that will include the supervisors (if known).

On the first day of class, the list will be confirmed and posted on Moodle as the final list.

**Project Type**

Proposals will fall into one or more of the below categories. Each category affects different aspects of what you can expect from your project over the course of capstone.

This year, there are 5 types of Capstone projects.

**Competition Projects: (rigidly defined project, HPV, SAE)**   
Rigidly defined projects. Requirements are pre-determined and defined by the competition board, therefore teams need to review and comment on these rather than generate them. Has well defined, restricted requirements for the project, published document form, official, must be within an official competition. Work with related to clubs need defining. Need to ensure the project innovation is present (need to show their design isn’t just a “copy-paste”).

**Well-Defined Projects:**   
Project with a clearly defined problem to address. Expert requirements. Resources available. Stakeholder lists available. Students can reduce the scope. Students may be able to push back on requirements with expert stakeholder. Some of these projects come from external stakeholders directly, and others are taken from procurement or problem websites (buyandsell.gc.ca, Kaggle). If you want to focus more heavily on the design space, likely a well-defined project

**Loosely Defined Projects:**

Non-expert project definition. Students need to turn needs statements into requirements. Students need to identify actual need. Differentiate want from need. These projects normally come from industry or the local community, with a problem of something not working, and they need a way for someone to solve it. Teams on loosely defined projects, will spend more time defining the problem space. In this type of project - the first phase will be for you to define what the real problem is, work with stakeholders to properly define. most of first phase will be coming up with the correct requirements

**C4 Projects**

These projects will involve students from across York campus, to tackle many different facets of them, and most have some focus on sustainability. Lassonde students in C4 will be expected to address, in part, the engineering design aspects of the projects, but in close collaboration with their peers from many other disciplines. ENG students who participate in a C4 project will remain enrolled in ENG 4000 but will only be required to attend the C4 class (on Monday evenings). You will have an engineering supervisor for your projects and all your marks will be through ENG 4000 course director. More information on C4 can be found at [https://capstone.yorku.ca](https://capstone.yorku.ca/) and more detail on C4 projects can be found at https://yorku.ca/c4

# EXTERNAL PROJECTS

## Conversation Analysis

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| --- | --- |
| Project Title: | Conversation Analysis |
| Stakeholder | Nascent Digital (Kathleen Lyew) |
| Project Type | Well-Defined  ENG or C4 |
| Objective | Design and build a user experience that leverages voice technology to process and analyze conversations in real-time - providing insights and coaching to help users understand and improve their conversations. |
| Description | Technology has allowed us to connect with people all over the world, but it also has meant that most of our communication is one through a screen and not face-to-face. With increased language barriers and fewer chances to learn effective communication, we see a need to find a solution to help people to build relationships. This mobile application should utilize technology like sentiment analysis, word marking and, if possible, voice analysis. The related domains for this problem are:  - UX / UI Design  - Software Engineering / Computer science  - Business and Entrepreneurship  - Communications and Marketing  - Psychology and Behavioural Science |
| Supervisor |  |
| Disciplines |  |

## Fire Code Compliance Software

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| --- | --- |
| Project Title: | Fire Code Compliance Software |
| Stakeholder | Pro-Tech Fire Inc. (Kanan Halawani) |
| Project Type | Well-Defined  ENG-only |
| Objective | To streamline and improve the efficiency of the inspection reports and record keeping process. |
| Description | Inspectors cannot keep up with, completing mandatory Inspection Reports and record keeping, in order to be Fire Code & Building Code compliant.  Large organizations are struggling, to keep up with the demand of inspections and the bottleneck, is the time spent on completing reports and record keeping, as well as sharing it with the customer. These reports are required to meet ULC codes and standards. Fire Protection & Life Safety are essential.  We will provide the inspection reports which include (Fire Extinguisher, Fire Alarm etc.). These inspections are required on a monthly, quarterly and yearly basis. Must be able to customize for clients, auto-fill, we want to simplify the report process for inspections to make it easier for them. Ability to share reports with City officials/Authority having jurisdiction (AHJ) in real-time. Data management system |
| Supervisor |  |
| Disciplines |  |

## Ethics of Artificial Intelligence

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| --- | --- |
| Project Title: | Ethics of Artificial Intelligence |
| Stakeholder | CSA Group (Jennifer Teague) |
| Project Type | Loosely Defined  ENG or C4 |
| Objective | Create way to manage the current and future ethical challenges of A.I. |  |
| Description | As artificial intelligence becomes more ubiquitous, what are some of the ethical challenges we will face and how should they be managed using regulations, standards and/or best practices? |  |
| Supervisor |  |
| Disciplines |  |

## \*\*Virtual Showroom (Keep supervisor list; delete student list)

|  |  |
| --- | --- |
| Project Title: | Virtual Showroom |
| Stakeholder | Kablan Developments Inc. (Gabriel Krausz) |
| Project Type | Loosely-defined  ENG-only |
| Objective | Create a virtual showroom for our construction products. Display our porcelain tiles and solve the shortcoming of lacking a physical showroom. |
| Description | We have over 1300 products (~200 colours, 35 sizes, 3 finishes, and 10's of different pattern arrangements). which can be used in countless arrangements. It is not practical to display this is a physical showroom.  A virtual showroom could potentially solve this shortcoming of a physical showroom. Using the most cutting-edge VR equipment to create a user experience that rivals "the real thing". |
| Supervisor |  |
| Disciplines |  |

## Lithium Powered Electric Golf Cart

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| --- | --- |
| Project Title: | Lithium Powered Electric Golf Cart |
| Stakeholder | KPM Power Inc. |
| Project Type | Loosely-defined  ENG or C4 |
| Objective | We are looking to design hardware that will allow our Battery Management System to communicate with the Golf carts ECU (electric control unit) 2) We want to design a battery enclosure to fit all the electronics, cells and into the golf cart battery compartment |
| Description | Electric golf carts are used not just on golf carts but typically seniors use it to get around their properties specifically up north or in retirement communities. It is a cleaner way and safer way for them to get around. We are looking to solve a problem that requires them less maintenance of their vehicle.  Currently electric golf carts use lead acid as the power source. The challenge with lead acid is if the battery is not serviced frequently, it loses charge and cannot be revived. Many cottage owners or communities uses golf carts to get around their property instead of driving. It is a cleaner way to get around. Most golf carts are leased or rented so when there is a challenge with the golf cart, they need to send a technician to fix this which means someone needs to drive far just deliver a battery. We are looking for a way to transform the golf cart from lead acid to lithium. |
| Supervisor |  |
| Disciplines |  |

## MURB Fast Chargers with BESS

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| --- | --- |
| Project Title: | MURB Fast Chargers with BESS |
| Stakeholder | Toronto Hydro  Marc Simmons |
| Project Type | ENG-only |
| Objective | Address the following questions:  -What % charge should the batteries be kept to maximize longevity  Ð risk assessment: how to avoid failures with the BESS and manage if a failure occurs ?  Ð best times to charge and discharge BESS according to utilization patterns?  Ð how many L3 chargers can be used with a 100kWh BESS (effects of multiple vehicles charging during the same time, charging at different times)?  Ð how to avoid back-feeding into the grid  Ð fault contribution: in the event of a short circuit, any generator, including energy storage systems, can contribute additional currents to the fault levels. How should we design appropriate protection measure to isolate and protect the system?  Ð analysis for safe operating conditions for ESS in underground parking lots |
| Description | Toronto Hydro has proposed this project to support the electrification of Canada’s transportation sector. The project includes the installation of Level Two (L2), Level Three DC Fast Charging (L3 DCFC) Electric Vehicle Supply Equipment and a ~100 kWh Battery Energy Storage System (BESS) located within Multi Unit Residential Buildings (MURBs). The BESS will buffer the energy required for fast charging (L3 DCFC) events thereby limiting the power draw from the grid and avoid infrastructure upgrades to support fast charging. However, optimal use of the BESS is necessary to minimize the cost imposition to the host facility when charging and discharging the energy storage.  In many cases, MURBs do not have the electrical capacity or ready infrastructure to support the additional load of EVSE easily. Alternatively, MURBs might have the electrical capacity, but the cost associated with installing electrical and civil infrastructure to supply the parking spaces for EVSE support is steep, and when passed on to the resident can be extremely cost prohibitive. The project will deploy a battery energy storage system used to buffer the high-power requirements of the DC Fast Charger. |
| Supervisor |  |
| Disciplines |  |

# STUDENT PROJECTS

## Canard Hybrid Rocket Control System

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| --- | --- |
| Project Title: | Canard Hybrid Rocket Control System |
| Stakeholder | Student Submission, Arbalest Suborbitals |
| Project Type | Competition  ENG-only |
| Objective | A fully self-contained unit of 4 inch diameter that would be capable of controlling the pitch, roll, and drag of a high-power rocket during subsonic, transonic, and supersonic ( < Mach 1.5) flight.  The purpose of this unit will be threefold; to remove roll from the vehicle, to maintain a fully vertical flight path, and to adjust vehicle velocity to meet specified mission altitude objectives.  The system will be designed such that in the case of a loss of power, mechanical failure, or manual signal override, the canards will enter a passively stable state. |
| Description | The Launch Canada Rocketry competition is focused on inspiring student groups to develop rocket propulsion vehicles and skill sets in a safe environment and with a modular design philosophy in mind. The purpose of the Canard Hybrid-Rocket Control System is to provide a platform for the control of amateur built, high-power student rocket vehicles. This will allow future teams to have an off-the-shelf vehicle control option so that they can focus more of their efforts on other systems like propulsion, avionics, and structure.  A small unit that would be placed at the upper region (above propulsion segment) of the Arbalest Suborbitals 10,000 ft. Hybrid Rocket to control the pitch, roll, and drag of the vehicle in flight. |
| Supervisor | James Smith |
| Disciplines | ENG only |

## Dialysis Machines for Developing Countries

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| --- | --- |
| Project Title: | Dialysis Machines for Developing Countries |
| Stakeholder | Student Submitted (Hannah Yorke Gambhir) |
| Project Type | Loosely-defined  ENG or C4 |
| Objective | Not every region we would be designing for has a power grid which is why we would like to make our design adaptable. Dependant on the location there could be an opportunity to use renewable energy or long-life batteries. Using the batteries would also make this device more portable.  Dialysis machines use an immense amount of clean water that has been filtered several times. For our design we would like to eliminate that need. A possible solution would be to have pre-mixed dialysate solutions that are pumped into the dialyzer. |
| Description | Not everyone has access to western medicine and the majority of it is designed in a way that makes it impossible to use in a developing country. In engineering we are taught the 17 sustainable development goals and we would like to focus on number 3 - Good health and Well Being. Adapting the current dialysis machines to make them more accessible in developing regions would save countless lives.  To minimize the cost of producing a dialysis machine we would like to create one that is easy to manufacture with minimal parts. This would reduce the cost of manufacturing and make it easier to assemble. We need to ensure that these devices are durable have a long-life cycle. Selecting appropriate materials will be very important. |
| Supervisor | Marina Freire-Gormaly |
| Disciplines |  |

## Soil Sample Collector

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| --- | --- |
| Project Title: | Soil Sample Collector |
| Stakeholder | Student Submission (York University Robotics Society) |
| Project Type | Competition  ENG-only |
| Objective | The objective is to drill and collect multiple soil samples ranging from 5-100g, all while keeping them separate and uncontaminated. The soil samples must all be carried on the machine at once, and the equipment on the machine must maintain its sterility and limit cross-contamination. There should be 6-10 distinct samples collected on the machine, in designated locations within the machine. |
| Description | Design an apparatus to drill and collect 6-10 soil samples remotely on a rover. Cross-contamination between the samples should be limited. This will be used in the CIRC (Canadian International Rover Challenge) and the URC (University Rover Challenge).  Soil samples are needed in various scientific tests. In areas where sampling is impossible by a human, we can only turn to technology to retrieve soil samples. The apparatus that you will build will be used in the URC (University Rover Challenge) and CIRC (Canadian International Rover Challenge) competitions by the York University Rover Team. |
| Supervisor | Regina Lee |
| Disciplines |  |

## Robotic Gripper

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| --- | --- |
| Project Title: | Robotic Gripper |
| Stakeholder | Student Submission (York University Robotics Society) |
| Project Type | Competition  ENG-only |
| Objective | The objective of this project is to develop a gripper for a robotic arm. The operator should be able to view the gripper state to ease operations (such as weight/force feedback, laser pointer for visual feedback of where the gripper is pointed, etc). The gripper must be capable of enabling many dexterous actions such as: - Clicking buttons - Rotating screwdrivers (Philips/Allen) - Picking up containers that have a handle of at least 10cm x 5cm - Undoing latches, and placing objects into drawers - Typing on a keyboard, and pressing buttons - Operating a joystick - Turning hand cranks and knobs - Carrying rocks and other objects, up to 5 kg |
| Description | Design a gripper that, combined with our pre-existing wrist, enables many dexterous tasks that a human may perform. The gripper designed will be used in the CIRC (Canadian International Rover Challenge) and the URC (University Rover Challenge).  A dexterous end-effector allows robots to flip switches, turn screwdrivers, and manipulate items. For competitive purposes, this allows the Rover to complete tasks such as equipment servicing and search-and-rescue. The apparatus that you will build will be used in the URC (University Rover Challenge) and CIRC (Canadian International Rover Challenge) competitions by the York University Rover Team. |
| Supervisor | Regina Lee |
| Disciplines |  |

## Automatic Soil Sampler

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| --- | --- |
| Project Title: | Automatic Soil Sampler |
| Stakeholder | Student Submission (York University Robotics Society) |
| Project Type | Competition  ENG-only |
| Objective | The objective is to run tests on soil samples on a machine that helps prove the existence of organic life forms. The machine must be capable of being controlled remotely on a rover. |
| Description | Design an apparatus to analyze soil samples to detect the presence of organic matter. The apparatus designed will be used in the CIRC (Canadian International Rover Challenge) and the URC (University Rover Challenge).  Once a soil sample is collected, a skilled chemist or biologist can run multiple tests to find proof of the organic matter. When there is no formal laboratory to run these tests, a machine that can analyze the sample must be developed. The apparatus that you will build will be used in the science challenge of the URC (University Rover Challenge) and CIRC (Canadian International Rover Challenge) competitions by the York University Rover Team. |
| Supervisor | Regina Lee |
| Disciplines |  |

## Web-based GUI for a rover

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| --- | --- |
| Project Title: | Web-based GUI for a rover |
| Stakeholder | Student Submission (York University Robotics Society) |
| Project Type | Competition  ENG-only |
| Objective | The objective is to develop a web-based GUI to control the rover drive and arm subsystems and view the robots’ current state. The GUI must show the camera feeds and telemetry data received from the rover in an intuitive way.T |
| Description | his challenge will involve developing a web-based GUI combining camera feeds, telemetry data, and an intuitive control scheme. The GUI designed will be used in the CIRC (Canadian International Rover Challenge) and the URC (University Rover Challenge).  A graphical user interface is useful to show needed data to the operator in order to control the robot efficiently. For example, a robotic GUI often contains camera feeds, telemetry data, and an intuitive control scheme. The GUI that you will develop will be used in the URC (University Rover Challenge) and CIRC (Canadian International Rover Challenge) competitions by the York University Rover Team. |
| Supervisor | Regina Lee |
| Disciplines |  |

## FSAE Brake Systems

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| --- | --- |
| Project Title: | FSAE Brake Systems |
| Stakeholder | Student Submission (Lassonde Motorsports) |
| Project Type | Competition  ENG-only |
| Objective | Students will design a brake system that will fit into an existing Lassonde Motorosports FSAE competition vehicle chassis. All designs must follow the FSAE competition rule book |
| Description | Team will design, manufacture and assemble a brake system compatible with the Lassonde Motorsports FSAE vehicle. The brake system of an FSAE vehicle is a hydraulic, manual (no power assist) system. The braking system consists of the following components; brake rotors, brake caliper, brake pads, pedal box, master cylinders, electronic safety devices and telemetry, . Design challenges include static, dynamics and thermodynamic calculations, rotor and brake pad material selection, designing a pedal box which follows FSAE rules and mounting solutions. |
| Supervisor | Garrett Melenka |
| Disciplines |  |

## FSAE Drivetrain system

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| --- | --- |
| Project Title: | FSAE Drivetrain system |
| Stakeholder | Student Submission (Lassonde Motorsports) |
| Project Type | Competition  ENG-only |
| Objective | Students will design a drive train that will fit into an existing Lassonde Motorosports FSAE competition vehicle chassis. All designs must follow the FSAE competition rule book |
| Description | The drive train system delivers the engine power to the driven wheels of the vehicle. In a FSAE vehicle the most common type of drive train is a chain driven system. Components which would have to be designed/spec’d include chain, sprocket, differential, differential mounts, CV joints/axles, wheel hubs and telemetry. Some design challenges involved would be designing a system that is lightweight but can withstand the drive train forces, selecting a differential/gear ratios for best performance and packaging constraints within the vehicle. |
| Supervisor | Garrett Melenka, Solomon Boakye-Yiadom |
| Disciplines |  |

## FSAE Upright/knuckle design

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| --- | --- |
| Project Title: | FSAE Upright/knuckle design |
| Stakeholder | Student Submission (Lassonde Motorsports) |
| Project Type | Competition  ENG-only |
| Objective | Students will design a upright that will fit into an existing Lassonde Motorosports FSAE competition vehicle chassis. All designs must follow the FSAE competition rule book |
| Description | Team will design, manufacturing and assemble uprights to FSAE vehicle. The knuckle/uprights connect the following subsystems of a vehicle; brakes, suspension, steering, drive train and wheels hubs/wheels. With all the interconnected systems the knuckle must be designed to include performance considerations of all subsystems, be light weight for overall vehicle performance, and be strong enough to sustain all vehicle loading conditions. Telemetry includes brake temperature sensors, wheel speeds, strain. |
| Supervisor | Garrett Melenka |
| Disciplines |  |

## Whiplash Reduction System in Automobiles

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| --- | --- |
| Project Title: | Whiplash Reduction System in Automobiles |
| Stakeholder | Student Submission (Gurnek Tak) |
| Project Type | Loosely-defined  ENG-only |
| Objective | The objective is to create a system in which the force of whiplash is reduced when the user is impacted. The solution can be through several areas including mechanical or electric systems. The system can also be either universal for all vehicles or for one particular model. There are generally no limitations other than the physical constraints of a vehicle itself. |
| Description | The idea is to use different engineering backgrounds and applying them to the automotive industry in an effort to increase safety within the vehicle and decrease health risks.  Whiplash is the most common injury in all car accidents and can even occur from hard braking. Spinal issues and recoveries are extremely expensive and painful to go through. Most vehicles have protection built on the outside of the car with a reinforced body and crumple zones, however, there are very little mechanisms within the car to reduce the most common of injuries. |
| Supervisor | Garrett Melenka |
| Disciplines |  |

## Solar Fuels Production Unit (SOFPU)

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| --- | --- |
| Project Title: | Solar Fuels Production Unit (SOFPU) |
| Stakeholder | Student Submission (Liam Cope) |
| Project Type | Loosely-defined  ENG-only |
| Objective | Designing a product that generates carbon neutral fuels at the single-family residential scale. |
| Description | We are trying to address the growing energy problem our world has been facing.  As the world pushes towards electrification, we are challenged with the transformation of our infrastructure and lifestyle of our society. By building a cost-effective method of generating carbon neutral fuels, we can smoothen out the transition from fossil fuels.  Each component of the proposed system exists on its own but has never been compiled in this manner for this purpose. By generating Solar Fuels at the residential level, we may be able to accelerate the reduction of individual carbon footprints by removing the need for an entire overhaul of their current energy consumption assets. |
| Supervisor | Thomas Cooper (MECH) |
| Disciplines |  |

# C4: CROSS-CAMPUS CAPSTONE CLASSROOM PROJECTS

## Equitable Tech Access, outside the classroom

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| --- | --- |
| Project Title: | Equitable Tech Access, outside the classroom |
| Stakeholder | Story Planet  Liz Haines - Creative Director/ Exec Director  Lisa Srisuro Operations Directory and Volunteer Coordinator |
| Project Type | Loosely Defined  C4 only |
| Objective | Find ways to ensure equitable access outside of the traditional classroom setting for students without technology or full internet access.  Find other ways we can reach students |
| Description | During the pandemic we have witnessed huge inequities in online access, with some students lacking computers or stable Wi-Fi. How do we find ways to ensure equitable access outside of the traditional classroom setting for students without technology or full internet access? What other ways can we reach students?  Research around inequities in education, specifically access to technology and internet |
| Supervisor |  |
| Disciplines |  |

## Safe Digital Hub

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| --- | --- |
| Project Title: | Safe Digital Hub |
| Stakeholder | Story Planet  Liz Haines - Creative Director/ Exec Director  Lisa Srisuro Operations Directory and Volunteer Coordinator |
| Project Type | Loosely Defined  C4 only |
| Objective | Create a safe digital hub (using one or all of these platforms integrated; website, app, youtube, instagram) that allows kids (grades 3 to 7) to write and share stories, both collaboratively and independently |
| Description | How do we engage in partnerships with like-minded organizations with a focus on disrupting the K-12 education system?  Engagement & Partnership Education Hub for K-12  1. Social Justice and Community Engagement  2. Digital Communication  3. Education and Mentorship |
| Supervisor |  |
| Disciplines |  |

## Tech Connections for long-term care residents

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| --- | --- |
| Project Title: | Tech Connections for long-term care residents |
| Stakeholder | YU - Centre for Vision Research  Susan Murtha - Assoc Dean Robert Allison – LSE Prof |
| Project Type | Loosely Defined  ENG or C4 |
| Objective | Use technology to enable a sense of connection between the residents of long-term care homes and their family and caregivers. |
| Description | How can current or new technology be used to enable a sense of connection between the residents of long-term care homes and their family and/or caregivers?  Solutions should include a consideration of privacy, impact of older age, individual sensory capabilities, ease of use, sanitation, flexibility, and aesthetics.  Covid-19 in long-term care homes and subsequent impact has put a huge spotlight on systemic issues in long term care facilities (<https://www.cmaj.ca/content/192/23/E632>).  As such, we see this as an opportunity to improve the mental wellness and potentially physical safety of residents with dementia, as well as possibly protect against burnout in their family and caregivers. There are examples in the literature of using technology to support the care of older adults but often these don't really involve supporting care-givers and are more about environmental additions or changes (Cox, Burns, Savages, 2004) For this project students should become familiar with 1) behavioral and psychological symptoms of dementia (e.g., Cerejeira, Lagarto, Mukaetova-Ladinska, 2012); 2) What is known about technology interventions for patients with dementia and their caregivers (e.g., Topo, 2009); and 3) User-Centered design and related methodologies to ensure prototype will be accessible to the target audience. |
| Supervisor | Rob Alison |
| Disciplines |  |

## SDG Progress at York University

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| --- | --- |
| Project Title: | SDG Progress at York University |
| Stakeholder | YU - Office of Sustainability  Nicole Arsenault - Program Director, Sustainability |
| Project Type | Loosely defined  C4 only |
| Objective | How might York University make progress on the SDG's? |
| Description | University Academic Plan  https://secretariat.info.yorku.ca/files/UAP-2020-2025-Final.pdf?x58469  Sustainable Development Goals  https://www.un.org/sustainabledevelopment/sustainable-development-goals/  York U Sustainability  https://sustainability.info.yorku.ca/ |
| Supervisor |  |
| Disciplines |  |

## Local Food Growing Ecosystem

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| --- | --- |
| Project Title: | Local Food Growing Ecosystem |
| Stakeholder | Peel Community Climate Council (PCCC)  Shalina (Shelly) Jameer - Council Member |
| Project Type | Loosely defined  C4 only |
| Objective | How can the local food growing ecosystem enhance or help support sustainable food security? |
| Description | Students should have a basic understanding of gardening and how to pick crops to grow based on the season.  Resources include: https://www150.statcan.gc.ca/n1/en/subjects/health/lifestyle\_and\_social\_conditions/food\_insecurity https://www.thespruceeats.com/guide-to-seasonal-fruits-and-vegetables-2216387 |
| Supervisor |  |
| Disciplines |  |

## \*Reduction of commercial food waste in landfills / Waste Geographical Tracking System

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| --- | --- |
| Project Title: | Reduction of commercial food waste in landfills / Waste Geographical Tracking System |
| Stakeholder | Peel Community Climate Council (PCCC)  Amy Kolisnyk |
| Project Type | Loosely Defined  ENG or C4 |
| Objective | How can businesses be incentivized to keep their food waste out of landfills? |
| Description | How can the Community Climate Council, a youth-led not-for-profit work to divert food waste in the Region of Peel?  Waste Geographical Tracking System |
| Supervisor |  |
| Disciplines |  |

## \*Business Adoption of Closed-Loop Reusable Packaging System

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| Project Title: | Business Adoption of Closed-Loop Reusable Packaging System |
| Stakeholder | Peel Community Climate Council (PCCC)  Alex Srdoc |
| Project Type | Loosely Defined  ENG or C4 |
| Objective | Create a system that incentivizes businesses to adopt a closed-loop reusable packaging system |
| Description | What does a closed loop waste management for businesses look like?  The Peel Community Climate Council (PCCC) is looking for a way to incentivize businesses to adopt a closed-loop reusable packaging system in order to eliminate single-use packaging |
| Supervisor |  |
| Disciplines |  |

## Communal System for Proper Waste Disposal in Public Spaces

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| --- | --- |
| Project Title: | Communal System for Proper Waste Disposal in Public Spaces |
| Stakeholder | Peel Community Climate Council (PCCC)  Estefania Palacios |
| Project Type | Loosely Defined  C4 only |
| Objective | Create a system for Peel that engages residents in the proper disposal of their waste in public spaces. |
| Description | How can we empower and engage community members in proper waste disposal in public spaces?  The Peel Community Climate Council (PCCC) want to create and maintain a solid network of Peel Region residents to connect with municipal leaders and local organizations that provides impact on and feedback around proper waste disposal in public spaces. |
| Supervisor |  |
| Disciplines |  |

## \*Global Commons for Local Artists

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| Project Title: | Open commons for artists and artisans to market their products and services |
| Stakeholder | Markham Arts Council Shruti Ganapathi - Executive Director |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Create shared community Shopify for local arts & artists |
| Description | How do we create a global “common” for local artists and artisans? Backend UI and UI design + create business market for it |
| Supervisor |  |
| Disciplines |  |

## Hospital Communication System

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| --- | --- |
| Project Title: | Hospital Communication System |
| Stakeholder | City of Vaughan/ Activate Vaughan |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Communication system for hospitals that creates seamless connection for patients to staff. |
| Description | How can we enable health care providers, technicians and administrators with a system that will give a seamless monitoring of a hospital experience?  The system should allow the patients and their loved ones to to track and view their progress, see results immediately etc. Lending to a more exceptional patient experience, and better connect hospital stakeholders. |
| Supervisor |  |
| Disciplines |  |

## Online tools for socio-emotional programming

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| --- | --- |
| Project Title: | Online tools for socio-emotional programming |
| Stakeholder | Moorelands Kids  Helen Gaans - Communications and Stewardship Manager |
| Project Type | Loosely defined  C4 only |
| Objective | Create a tool set that can promote online, socio-emotional youth programming. |
| Description | What tools are necessary to promote existing/new online socio-emotional youth programming in the hopes of reaching a wider audience and how can we implement them? |
| Supervisor | With Lisa Cole |
| Disciplines |  |

## Using A.I. to find Dream Jobs

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| --- | --- |
| Project Title: | Using A.I. to find Dream Jobs |
| Stakeholder | Jobster  Loewe Ke -Founder |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Design a tool for students to identify their dream job – while avoiding the pitfalls of A.I. technologies and mass data collection |
| Description | What are the benefits and pitfalls of using AI as a tool to help students identify what their "dream job" might be?  Ethical questions - protecting the data from organizations. What information do you need to come up with a persons’ ‘dream job’? |
| Supervisor |  |
| Disciplines |  |

## A (truly) plurilingual United Nations

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| Project Title: | A (truly) plurilingual United Nations |
| Stakeholder | Glendon / UN  Dominique Scheffel-Dunand - Assoc Principal, Research & Graduate Studies |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Create a way for simulated debates to be plurilingual |
| Description | How can an online UN-simulated debate platform be made truly plurilingual? |
| Supervisor |  |
| Disciplines |  |

## Rideshare YU Commuters

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| Project Title: | Rideshare YU Commuters |
| Stakeholder | YURide  Artem Solovey |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Devise a ride share service specifically for YU community that reduces transport costs and eco-footprints |
| Description | How can a rideshare service, specifically for York University community commuters, in conjunction with public transportation options be implemented in a way that can reduce transportation costs and environmental footprints? |
| Supervisor |  |
| Disciplines |  |

## Face to Face tools for business in social distance

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| Project Title: | Face to Face tools for business in social distance |
| Stakeholder | TechConnex  Kelley Phillips |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Develop/create the video conferencing tool and frameworks for businesses |
| Description | Develop the tools and frameworks of Zoom and other communication tools for business that rely on face-to-face and in person interactions. Adapt these tools to be able to pivot in the current social distancing environment This cannot be ENG only project team |
| Supervisor |  |
| Disciplines |  |

## \*\*Cancer Bio-Marker Failures

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| Project Title: | Cancer Bio-Marker Failures |
| Stakeholder | YU - Centre for Research on Biomolecular Interactions  Sergey Krylov – Prof; Director of CRBI |
| Project Type | Loosely defined  ENG or C4 |
| Objective | Try to address the challenges interdisciplinarity has faced when looking for cancer biomarkers. |
| Description | Why are the interdisciplinary efforts to develop therapy-guiding biomarkers of cancer so ineffective? different tools |
| Supervisor |  |
| Disciplines |  |

# WEB-BASED PROJECTS

## Tactical Handheld Multi-Modal Biometric Data Capture, Storage and Matching Device

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| Project Title: | Tactical Handheld Multi-Modal Biometric Data Capture, Storage and Matching Device |
| Stakeholder | E-Portal:  LD - Communications, Air and Missile Defense Programme  (NATO Nations) |
| Project Type | Well-defined  ENG-only |
| Objective | Delivery of supply of tactical mobile, handheld, lightweight, ruggedized, man-portable multi-modal biometric data capture, on-board storage and matching, and transmission device together with optional training and acceptance testing services |
| Description | https://eportal.nspa.nato.int/eProcurement/FBO/eProcurementFBODetails.aspx?OpportunityId=20LDS067  The following are some of the key specifications the device should have/be capable:  • Designed to meet for use in tactical/military-like operational environments  • Capability of multi-modal standards-based data capture, on-board storage and matching capability by rolled and flat fingerprint scan, iris scan of both eyes simultaneously, high-resolution camera image capture of facial images and body marks, such as scars, marks, and tattoos.  • Transmission of information in an Electronic Biometric Transmission Specification (EBTS) format from the on-board storage to a biometric database, and receive a “match or no match” response for use by the operator conducting the biometric collection activity  • Include standards-based mobile device security & encryption features regarding device/data authentication and authorization, data erase, on-board storage and transmission encryption, application launch control, device feature disablement |
| Supervisor |  |
| Disciplines |  |

## X-Ray Training Tool

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| Project Title: | ACAN – X-Ray Training Tool |
| Stakeholder | Buy & Sell:  Department of Foreign Affairs, Trade and Development (DFATD) |
| Project Type | Well-defined  ENG-only |
| Objective | DFTAD is now seeking to expand its ability to mobilise x-ray screening training through a computer-based training tool for X-ray screening. |
| Description | https://buyandsell.gc.ca/procurement-data/tender-notice/PW-19-00898677  DFATD operates some 179 diplomatic and consular missions across 110 countries and relies heavily on its Security Teams as the first line of defense charged in protecting its personnel, visitors, assets, and information at Canadian Missions and Embassies around the world.  Contracted security guards perform the bulk of the screening function at Missions and Embassies. DFATD’s security guards rely on an array of skills and tools to ensure that visitors and mail are adequately screened for threats. One tool used in this screening process is x-ray equipment combined with the security guards ability to detect threats at this point has direct impact on safety and continuous daily operations at Mission and Embassies; however a number of challenges exists with the varying competencies of the screeners using this equipment.  To ensure the safety and continuity of operations at Missions and Embassies, it is thus necessary to ensure that screeners using this equipment have enhanced training opportunities. Toward these efforts the Mission Readiness Programs division (CSI), within DFATD, has undertaken a brief analysis of the variety of training formats available, tested the use of Adaptive Computer Based Training (CBT). |
| Supervisor |  |
| Disciplines |  |

## High-Angle Search Equipment & Confined-Space Communication (HASE-COM)

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| Project Title: | High-Angle Search Equipment & Confined-Space Communication (HASE-COM) |
| Stakeholder | Buy & Sell:  Department of National Defence |
| Project Type | Well-defined  ENG-only |
| Objective | HASE-COM, which will be used by the Canadian Armed Forces (CAF) combat engineer sections in the role of advanced search teams |
| Description | https://buyandsell.gc.ca/cds/public/2019/10/08/39424298b023a642a1ca18f73aaebcd9/ABES.PROD.PW\_\_QF.B030.E27480.EBSU000.PDF  Both intermediate and advanced search teams will be deployed in support of Battle Groups during overseas and domestic missions. The role of the intermediate search teams will be filled by the combat engineer sections that will operate with the maneuver elements of the Battle Group. Advanced teams will be deployed on deliberate search operations or called forward as a result of discoveries made by intermediate search teams involving too high a risk for an intermediate team.  The intended use of the HASE-COM is to provide a suite of high-angle search equipment and a wired communication system providing the user a capability to safely access and search structures and high-angle surfaces and communicate when in confined spaces. |
| Supervisor |  |
| Disciplines |  |

## Eco-Friendly Waste Converter

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| Project Title: | Eco-Friendly Waste Converter |
| Stakeholder | Buy & Sell  Global Affairs Canada (GAC) |
| Project Type | Loosely-defined  ENG or C4 |
| Objective | Global Affairs Canada (GAC) is seeking a simple and eco-friendly solution to treat the waste that it produces, that is neither compostable nor recyclable, with the objective of lowering its emissions to reduce what is sent to landfills and the impact on the environment while managing refuse at GAC sites in Canada and abroad.  The intent is to manage the Department’s refuse as three streams: recyclable, compostable, and waste that can be converted into fuel, thermal energy, and/or a usable product. |
| Description | https://buyandsell.gc.ca/procurement-data/tender-notice/PW-20-00906570  At least 14 trucks a week are servicing GAC buildings in the National Capital Region for waste collection. GAC and the Government of Canada have identified a need to reduce waste, including the waste involved in the collection process. Contemporary waste management practices are no longer acceptable and need modernizing to better safeguard the environment.  Solutions sought through this challenge would support the third stream. Ideally, any materials that are not recyclable or compostable would become fuel or thermal energy for providing heat and hot water in GAC facilities, or a usable product.  The solution will also use the waste to fuel its own operation. Treatment of waste on site will reduce haulage and use of landfill, will help lower Green House Gas (GHGs) emissions, reduce use of fossil fuels and reduce the related effects on the environment.  Solutions will enable GAC to improve on its current waste management and allow for onsite and environmentally friendly alternatives that minimize the amount of product that must be transported off site. Ultimately, solutions would be deployable within Canada and where needed. |
| Supervisor |  |
| Disciplines |  |

## Sediment Profile Imaging of Disposal at Sea Sites

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| Project Title: | Sediment Profile Imaging of Disposal at Sea Sites |
| Stakeholder | Buy & Sell |
| Project Type | Well-defined  ENG or C4 |
| Objective |  |
| Description | Disposal at sea is the disposal of a substance at sea from a ship, an aircraft, a platform or another structure. It is permitted by Canadian law, which allow Canada to meet international obligations to prevent marine pollution by regulating the disposal of wastes and other matter in accordance with the London Convention and subsequent London Protocol.  Disposal site monitoring is an integral part of Environment and Climate Change Canada’s disposal at sea program. Monitoring helps ensure permit conditions are met and that assumptions made during the application review were appropriate to protect human health and the environment.  <https://buyandsell.gc.ca/cds/public/2020/05/01/9fdce0a34d12194c957b98083db728c2/5000049329_rfp_en.pdf> |
| Supervisor |  |
| Disciplines |  |

## Disaster Tweets -Real or Not: Natural Language Processing

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| Project Title: | Disaster Tweets -Real or Not: Natural Language Processing |
| Stakeholder | Kaggle |
| Project Type | Well-Defined  ENG or C4 |
| Objective | Build a machine learning model that predicts which Tweets are about real disasters and which one’s aren’t. |
| Description | <https://www.kaggle.com/c/nlp-getting-started/overview/faq>  Twitter has become an important communication channel in times of emergency. The ubiquitousness of smartphones enables people to announce an emergency they’re observing in real-time. Because of this, more agencies are interested in programmatically monitoring Twitter (i.e. disaster relief organizations and news agencies).  But, it’s not always clear whether a person’s words are actually announcing a disaster. |
| Supervisor |  |
| Disciplines |  |

## Deep Fake Detection Challenge

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| Project Title: | Deep Fake Detection Challenge |
| Stakeholder | Kaggle |
| Project Type | Well-Defined  ENG or C4 |
| Objective | build innovative new technologies that can help detect deep fakes and manipulated media. |
| Description | https://www.kaggle.com/c/deepfake-detection-challenge  Deep fake techniques, which present realistic AI-generated videos of people doing and saying fictional things, have the potential to have a significant impact on how people determine the legitimacy of information presented online. These content generation and modification technologies may affect the quality of public discourse and the safeguarding of human rights—especially given that deep fakes may be used maliciously as a source of misinformation, manipulation, harassment, and persuasion. Identifying manipulated media is a technically demanding and rapidly evolving challenge that requires collaborations across the entire tech industry and beyond. |
| Supervisor |  |
| Disciplines |  |

## Understanding Cloud Organization

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| Project Title: | Understanding Cloud Organization |
| Stakeholder | Kaggle |
| Project Type | Well-defined  ENG-only |
| Objective | In this challenge, you will build a model to classify cloud organization patterns from satellite images. |
| Description | https://www.kaggle.com/c/understanding\_cloud\_organization  Help us remove the haze from climate models and bring clarity to cloud identification.  There are many ways in which clouds can organize, but the boundaries between different forms of organization are murky. This makes it challenging to build traditional rule-based algorithms to separate cloud features. The human eye, however, is really good at detecting features—such as clouds that resemble flowers.  In this challenge, you will build a model to classify cloud organization patterns from satellite images. If successful, you’ll help scientists to better understand how clouds will shape our future climate. This research will guide the development of next-generation models which could reduce uncertainties in climate projections. |
| Supervisor |  |
| Disciplines |  |

## Data Science for Good (L.A.)

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| Project Title: | Data Science for Good (L.A.) |
| Stakeholder | Kaggle |
| Project Type | Well-defined  ENG or C4 |
| Objective | Help the City of Los Angeles to structure and analyze its job descriptions  The goal is to convert a folder full of plain-text job postings into a single structured CSV file and then to use this data to: (1) identify language that can negatively bias the pool of applicants; (2) improve the diversity and quality of the applicant pool; and/or (3) make it easier to determine which promotions are available to employees in each job class. |
| Description | https://www.kaggle.com/c/data-science-for-good-city-of-los-angeles  The City of Los Angeles faces a big hiring challenge: 1/3 of its 50,000 workers are eligible to retire by July of 2020. The city has partnered with Kaggle to create a competition to improve the job bulletins that will fill all those open positions.  The content, tone, and format of job bulletins can influence the quality of the applicant pool. Overly specific job requirements may discourage diversity. The Los Angeles Mayor’s Office wants to reimagine the city’s job bulletins by using text analysis to identify needed improvements. |
| Supervisor |  |
| Disciplines |  |

## Reduction of Commercial Aviation Fatalities

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| Project Title: | Reduction of Commercial Aviation Fatalities |
| Stakeholder | Kaggle |
| Project Type | Well-defined  ENG or C4 |
| Objective | Your challenge is to build a model to detect troubling events from aircrew’s physiological data. |
| Description | Most flight-related fatalities stem from a loss of “airplane state awareness.” That is, ineffective attention management on the part of pilots who may be distracted, sleepy or in other dangerous cognitive states.  You'll use data acquired from actual pilots in test situations, and your models should be able to run calculations in real time to monitor the cognitive states of pilots. With your help, pilots could then be alerted when they enter a troubling state, preventing accidents and saving lives.  [https://www.kaggle.com/c/reducing-commercial-aviation-fatalities](https://www.kaggle.com/c/reducing-commercial-aviation-fatalities ) |
| Supervisor |  |
| Disciplines |  |

# FACULTY PROJECTS

## Instrumented knee brace to improve patient healing times

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| Project Title: | Instrumented knee brace to improve patient healing times |
| Stakeholder | YU Faculty / YU Staff  Garrett Melenka, Gerd Grau, William Gage |
| Project Type | Loosely-defined  ENG or C4 |
| Objective | Demonstrate that an instrumented knee orthotic brace with integrated sensors is both technically feasible and meets the needs of patients and clinicians.  The goal of this project is to add functionality to knee braces, namely sensing and adaptability, which will have significant health benefits, without adversely affecting patient comfort and cost. |
| Description | Knee joint injuries are common in Canada, especially to the anterior cruciate ligament (ACL); over 350,000 ACL reconstruction surgeries are performed in the USA each year. Knee orthotics are used in treatment for both rehabilitation and injury prevention. Sixty-three percent of surgeons prescribe knee braces as part of rehabilitation with an estimated annual cost of $65M in the USA and Scandinavia. Current braces are purely mechanical without ‘smart’ technology to monitor patient outcomes. It is therefore impossible to determine in real time the effectiveness of a brace and alter its characteristics throughout the healing process. This is a problem for both practitioners as well as researchers who want to study the effectiveness of different interventions and the rehabilitation process more generally.  This project will assess how emerging technologies, novel materials, and new approaches to manufacture of knee orthotics can be used to improve patient outcomes.  To achieve this goal, a new multifunctional knee brace will be developed. The developed knee brace will achieve improved performance by self-adapting during rehabilitation through integrated sensing and actuation. This project will form the basis for a longer-term research program aimed at improving knee health and rehabilitation, and which can extend to other areas of medical device design and manufacture. Specifically, this prototype has the following goals:  1. Identify the most important capabilities and properties of an instrumented brace, in collaboration with clinicians.  2. Create an initial prototype and potential designs to be implemented in a larger study.  3. Gather feedback on initial prototype and designs and collect initial gait data with prototype. |
| Supervisor |  |
| Disciplines |  |

## Thermal Modeling and Validation of 3U CubeSat

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| Project Title: | Thermal Modeling and Validation of 3U CubeSat for ESSENCE Mission |
| Stakeholder | YU Faculty  George Zhu |
| Project Type | Well defined  ENG-only |
| Objective | Complete thermal modeling and validation analysis for 3U cubesat to meeting mission requirement |
| Description | Refine the 3D CAD model, run SDK to get temperature profile in orbit, build finite element model from the CAD model, conduct detailed thermal analysis in UX Design.  York will design, build, launch and operate a 3U CubeSat. A complete thermal analysis on cubesat is of most importance because it helps in (i) understanding of the temperature distribution in the compact cubesat in various working conditions in the Earth eclipse or exposed to Sun lights, (ii) development of thermal control system that can protect the satellite’s internal systems from the extreme condition of outer space, (iii) validation if the design meets the mission requirements. Lack of a properly designed thermal control system could potentially mean the failure of the mission. The work requires the use of following design and analysis tools: 1. Solidwork 2. AGI: Orbit Determination Tool Kit (ODTK) 3. UX/UI finite element tool |
| Supervisor |  |
| Disciplines |  |

## Electrical Circuit Design and Fabrication for 3U CubeSat

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| Project Title: | Electrical Circuit Design and Fabrication for 3U CubeSat - ESSENCE Mission |
| Stakeholder | YU Faculty  George Zhu |
| Project Type | Well defined  ENG-only |
| Objective | Understand the functions of CubeSat, design the system electrical circuit drawings, design custom PCB drawings, design PCBs with CAD and send the design drawings to PCB manufacturer |
| Description | CubeSat electrical system design and custom PCB design and fabrication.  The project is to design the electrical circuit for the 3U Cubesat to connect various modulus such as onbaord computer, communication system, GPS, power management system, batteries, solar panels, attitude control system, and payloads. Upon the design, custom PCB will be designed and fabricated using CAD and commercial PCB fabrication companies. |
| Supervisor |  |
| Disciplines |  |

## Design of Laboratory testing system for CubeSat radio communications

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| Project Title: | Design of Laboratory testing system for CubeSat radio communications - ESSENCE CubeSat Mission |
| Stakeholder | YU Faculty  George Zhu |
| Project Type | Well defined  ENG-only |
| Objective | Design and develop the working lab testing system. It requires the knowledge of satellite communication, ground station, digital circuit and hands-on skills of software and electronics hardware. |
| Description | This is part of the development of ESSENCE 3U CubeSat Mission. It will provide a useful lab testing system at AIT phase.  Design and build a laboratory testing system for testing CubeSat radio communication with ground station. The testing system will serve as a dummy ground station to mimic the radio communication between the dummy ground station and the communication module on the ESSENCE Cubesat. This is an important step before test the radio communication between the complete CubeSat and the ground station. |
| Supervisor |  |
| Disciplines |  |

## Microplastic detection system

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| Project Title: | Microplastic detection system |
| Stakeholder | YU Faculty  Alidad Amirfazli |
| Project Type | Well defined  ENG or C4 |
| Objective | There are three objectives:  1- To develop an automated sampling system to get water samples as the device is floating on a body of water.  2-To use smartphone for control of the sampling system.  3- To use the imaging capabilities of the smartphone to detect microplastics within the sample collected. |
| Description | Microplastics in lakes, sea and waterways, are harmful to people and animals. Given their accumulative nature, it is very important now to understand the degree of microplastic pollution in the environment, so mitigating strategies can be developed to help with people and animals health.  Microplastics are plastic particles with characteristic length scales less than 5 mm. These particles need to be detected and monitored in oceans and waterways, as they are harmful to people and animals. In situ detection is challenging and costly, and typically involves water sampling and laboratory analysis. We want to develop an automated sampling system to get water samples as the device is floating on a body of water. Furthermore, we want to use smartphone technology for control of the sampling system and use its imaging capabilities to detect microplastics within the sample collected. |
| Supervisor |  |
| Disciplines |  |

## Solar powered thermal desalination device

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| Project Title: | Solar powered thermal desalination device |
| Stakeholder | YU Faculty  Thomas Cooper |
| Project Type | Well-Defined  ENG or C4 |
| Objective | The objective of this capstone project is to develop a low-cost device that uses solar energy to produce clean drinking water. This project will specifically look at thermal desalination, which uses heat from the sun to transform salt water into clean vapor, which can then be condensed into high-purity distilled water. In order to make a broad impact, the technology should be low-cost and should be constructed from readily available materials. |
| Description | 1 in 6 people living today lack access to clean water, and 1 in 3 people lack basic sanitation which relies on a water source. It is therefore no surprise that providing access to clean drinking water is one of the Grand Challenges for Engineering currently facing our planet. Desalination is a process that can transform seawater into clean, drinkable water. But desalination is very energy intensive. Fortunately, solar energy provides a vast, accessible, and equitable source of energy that can be used to drive the energy intensive desalination process. In this way, this project simultaneously addresses two of the Sustainable Development Goals identified by the United Nations, namely: 6. Clean water and sanitation; and 7. Affordable and clean energy.  Desalination is a promising technology that can transform seawater into clean drinking water but is very energy intensive. This project will investigate how to use solar energy to enable a low-cost desalination system. Unlike some desalination technologies which utilize membranes and require electricity input, this project will investigate solar thermal desalination, or solar distillation. In this process, sunlight is collected and transformed into heat. This solar heat it then utilized to drive evaporation, which generates high-purity water vapor, which is finally condensed into clean drinking water. Solar-powered thermal desalination has the potential to be a low-cost system that can be deployed at small to large scaled, allowing widespread impact of this technology. |
| Supervisor |  |
| Disciplines |  |

## Golf Ball Launch Monitor

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| Project Title: | Golf Ball Launch Monitor |
| Stakeholder | YU Faculty  Ronald Hanson |
| Project Type | Loosely defined  ENG-only |
| Objective | Build a device to measure the flight characteristics of a golf ball |
| Description | There are two types of devices the to monitor lunch of a golf ball, optical vs radar. Some also monitor online the club face. The goal however is to monitor the ball in flight to determine the aerodynamic forces.  Measurement of aerodynamic forces occurring over golf balls (or other sports balls) is best done in a "firing range". However, only a few facilities exist globally and are highly specialized and expensive. The objective of this project is to produce an economical option that can also compacted and stored when not in use. |
| Supervisor |  |
| Disciplines |  |

## Golf ball launch system

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| --- | --- |
| Project Title: | Golf ball launch system |
| Stakeholder | Faculty  Ronald Hanson |
| Project Type | Loosely defined  ENG-only |
| Objective | The goal of this project is to engineer a type of launch system to shoot a ball at a know velocity and rational rate, each of which can be independently varied. The velocity and rates should be similar to those typical of drives made in the sport of golf. |
| Description | Golf ball launch system of aerodynamic testing  Aerodynamic testing of golf balls is often done by firing the ball in a specialized range at a given rotational rate, velocity and angle. This is a tool that can be used by golf ball designers to characterize aerodynamics of the balls. |
| Supervisor |  |
| Disciplines |  |

## Calibration jet for experimental demonstration of airflow measurements

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| Project Title: | Calibration jet for experimental demonstration of airflow measurements |
| Stakeholder | Faculty  Ronald Hanson |
| Project Type | Loosely defined  ENG-only |
| Objective | Design and build a jet that can deliver a uniform flow of air |
| Description | Design and build a jet that can deliver a uniform flow of air for 2 - 40m/s with a 4-axis motion control system using a blower as a pressure source. The jet performance should be quantified by measurements of the jet flow profile using a pressure-based system such as a multi-hole pressure probe with high frequency response.  Outlet of the jet should be round and should be at least 4 cm in diameter. |
| Supervisor | Ronald Hanson (MECH) |
| Disciplines |  |

# END OF PROJECT SUMMARY