THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Land and Food Systems

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UBC Dekaban Proposals 2022/2023

- **Supervisor: Dr. Juli Carrillo**
  Email: juli.carrillo@ubc.ca
  Website: juli.carrillo@ubc.ca

  Research Topic #1: Intercropping with aromatic companion plants to reduce crop pests (invasive fruitfly, *D. suzukii)* in berries. Work will be carried out at the UBC Farm and also in the UBC greenhouse.s

- S**upervisor: Dr. Simone Castellarin**
  Email: simone.castellarin@ubc.ca
  Website: http://wine.landfood.ubc.ca/people/simone-castellarin/

  Research Topic #1: Evaluation of blueberry quality in new breeding selections. The study involves methodologies such as LC/MS, SPME-GC/MS.

  Research Topic #2: Effect of drought on grape berry composition. The study involves methodologies such as LC/MS, SPME-GC/MS, gene expression analysis.

- **Supervisor: Dr. Tamara Cohen**
  Email: tamara.cohen@ubc.ca
  Website: https://www.landfood.ubc.ca/tamara-cohen/

  Research Project #1: Assessment of adherence to diet using different self-monitoring tools, including mobile applications.

  Research Project #2: Understanding how biological sex, gender, social influences and body shape impact teens' eating habits

  Research Project #3: Assessing the Suitability and Acceptability of a Nutrition Education Resource Among Registered Dietitians: A Mixed-Methods Study

- **Supervisor: Jean -Thomas Cornelis**
  Email: jt.cornelis@ubc.ca
  Website: https://www.landfood.ubc.ca/jean-thomas-cornelis/

  Jan-May 2023

  Research Topic #1: Soil-plant feedbacks which aims to study the effects of root exudation on soil processes involved in organic carbon stabilization and nutrient acquisition.

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- **Supervisor: Dr. Derek Dee**

  Email: derek.dee@ubc.ca

  Website: https://www.landfood.ubc.ca/derek-dee/

  Research Topic #1: Inducing plant proteins to form novel structures that mimic meat proteins for use in food". This project will examine plant protein assembly into nanofibrils, and how to optimize these nanofibrils for use in food.

  Research Topic #2: Control and functionalization of protein nanofibrils using genetic and chemical modification". This project uses genetic code expansion to insert non-standard amino acids into proteins that can be specifically targeted for labelling (e.g., with other functional molecules or structure-modifiers). The aim is to create amyloid-based functional materials for bionanotechnology applications.

  Research Topic #3: Examining the safety of protein nanofibrils for use in food". Protein nanofibrils are of great interest in nanotechnology and food applications, yet they have amyloid-like properties that might be of concern for direct applications in food. This project examines nanofibril cross-seeding between food and human proteins, and cell toxicity of nanofibrils.

Conversion of plant proteins into nanofibrils: Using biophysical and biochemical tools, our research explores the mechanisms of protein aggregation. Understanding how to control functional protein aggregation could be used to induce plant proteins to mimic animal proteins (e.g., for use in plant-based 'meat' and 'cheese'). This project examines the mechanisms of how legume proteins self-assemble into amyloid-like fibers, and seeks to correlate their structure with functional performance in food and biotechnology applications. Tools we use include recombinant protein expression, protein extraction and FPLC purification, SDS-PAGE, LC-MS/MS, TEM, AFM, bioinformatics, fluorescence, and bioconjugate chemistry."

- **Supervisor: Dr. John Frostad**
  Email: john.frostad@ubc.ca
  Website: http://www.landfood.ubc.ca/person/john-frostad/

  Research Topic #1: In situ microscopy of starch gelatinazation kinetics as a function of starch source, composition, and pre-processing treatment.

  Research Topic #2 Optimization of encapsulated polyunsaturated fatty acids by tuning interfacial mechanics"

- **Supervisor: Dr. Mahsa Jessri**
  Email: mahsa.jessri@ubc.ca

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Website: https://www.landfood.ubc.ca/mahsa-jessri/

Research Topic #1: Burden of poor lifestyle and dietary behaviours.
Research Topic #2: Simulating the impact of nutritional policy interventions on health outcomes.
Research Topic #3: Development and validation of personalized nutrition assessment tools.

- **Supervisor: Anubhav Pratap Singh**
  Email: anubhav.singh@ubc.ca
  Website: http://www.landfood.ubc.ca/person/anubhav-pratap-singh/

- Project #1 Nano-encapsulation of bioactive compounds for delivery through buccal and non-GI routes.
- Project #2 Novel process technologies (cold plasma and pulsed UV light) for processing of food products.
- Project #3 Extraction and Characterization of vitamin B12 and other bioactive compounds from seaweed using sustainable approaches.

- **Supervisor: Dr. Alexandra Protopopova**
  Email: a.protopopova@ubc.ca
  Website: https://www.landfood.ubc.ca/alexandra-protopopova/

  Research topics : Behaviour and welfare of companion animals
                      Behaviour and biology of free ranging dogs
                      One Welfare in animal sheltering
                       Social justice in companion animal sheltering
                       Climate change and companion animals
                       Improving efficacy and ethics of dog training practices

- **Supervisor: Dr. Sean Smukler**
  Email: sean.smukler@ubc.ca
  Website: http://www.landfood.ubc.ca/sean-smukler/

  Jan – May 2023

  Research Topic #1: Using Fourier transform infrared spectroscopy for rapid, cost-effective prediction of soil, plant and soil amendment properties. We have a large data set of mid-infrared spectra for these materials and have achieved reasonable predictions of their physical and chemical properties using partial least squares regression. We are looking for someone who would be interested in exploring other statistical approaches to improve these predictions. I expected that we could co-author a least two papers on the approach.

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- **Supervisor Name: Siyun Wang**
  Email: siyun.wang@ubc.ca
  Website: http://foodsafety.landfood.ubc.ca/

  Project #1 Develop biological control methods to reduce the presence and growth of Salmonella in food products.
  Project #2 Understand genetic factors contributing to the risk of Listeria monocytogenes in foods.

- **Supervisor Name: Tianxi Wang**
  Email: tianxi.wang@ubc.ca
  Website: https://www.landfood.ubc.ca/tianxi-yang/

  Project #1: Development of novel analytical tools for the rapid detection of contaminants in the agri-food system.

  Project #2: Stimuli-responsive nanoplatforms for smart and precise delivery of agrochemicals on crops.

  Project #3: Biopolymer-based nanocomposites for intelligent food packaging applications.

- **Supervisor: Hannah Wittman**
  Email: Hannah.wittman@ubc.ca
  Website: http://www.landfood.ubc.ca/person/hannah-wittman/

  Research Topic #1: Implementation of newly developed prototype farm management software for monitoring the socio-ecological outcomes at the UBC Farm. Head up development of new modules for biodiversity and ecosystem service monitoring. Strong fluency in node.js and Javascript required.

- **Supervisor: Marina Von Keyserlingk**
- Email: marina.vonkeyserlingk@ubc.ca
- Website: https://www.landfood.ubc.ca/marina-von-keyserlingk/
- Research Topic: Automatic monitoring of individual behavioral differences
  The advancement of precision livestock farming in the past decades has enabled the collection of large amounts of behavioural data on individual cows in the herd. Using data collected from sensors and computer vision systems, many have proposed to monitor cattle behaviours longitudinally to detect early signs of disease. However, to date there has been limited commercial success. One key challenge is the lack of reliable behavioural data on healthy animals. The aim of this project is to investigate repeatability (i.e., variation between individuals),

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predictability (i.e., variation within individual over time), and plasticity (i.e., variation due to environmental changes) in behaviours of dairy cows. High resolution behavioural measures will be obtained using an established algorithm considering various technology sources (e.g., automatic feeder, drinker, locomotion data logger, milking robot, mechanical brush). We will investigate how extrinsic (i.e., due to environmental changes) or intrinsic (i.e., due to biological changes in the individual or biological differences between individuals) variation influences the proposed automatic behavioural measures. The project will contribute to a better understanding of potential automated measures that can serve as sensitive and specific welfare indicators.

- **Supervisor: Dan Weary**
- Email: dan.weary@ubc.ca
- Website: https://www.landfood.ubc.ca/daniel-weary/
  - Project: Automatic monitoring of lameness: A longitudinal approach

Lameness impacts the health and welfare of dairy cows, whilst reducing productivity. Lameness is typically assessed by humans through visual assessment and assigning a gait score using a 4 - or 5 - point scale based on a number of behavioural traits. However, these assessments are subjective, time-consuming and error-prone, especially when applied infrequently given that a cow's gait can change over time. To address these concerns, we have created a methodology combining human and automated methods of lameness scoring, based upon the finding that relative assessments are more reliable than absolute scores. We propose to collect weekly videos of cows walking over multiple months to conduct longitudinal lameness assessment. The aim of this project is to create an innovative algorithm that facilitates the early detection of lameness for individual dairy cows housed in indoor systems.