Internship Poster Event

OCT 5 • 10AM-12NOON • FACULTY LOUNGE
SNACK AND BEVERAGES PROVIDED

ALL STUDENTS WELCOME
École-O-Champ Québec est un organisme qui favorise l'éducation des sciences agroalimentaires chez les jeunes, à travers le Québec. Sa mission est de permettre l'accessibilité à des ressources éducatives agricoles durables et locales tout en sensibilisant les élèves au pouvoir qu'ils ont sur leur environnement.

École-O-Champ mise sur une approche qui permettra la pérennité de l'agriculture et la valorisation des richesses québécoises en éduquant les consommateurs de demain.
Field Research Assistant at the Kenauk Institute

My role as an intern

My main responsibilities were helping with data collection, taking notes, carrying, preparing and handling material, and helping researchers in any other way.

I mostly assisted the project of a Master's student comparing the diversity of spiders and beetles across areas managed with different forestry techniques. We learned how to climb trees to install arthropod traps high in the canopy each week.

I also helped with other research projects:
- hydrogeology of a lake
- survey of nesting loon pairs
- fishing lure recognition by bass
- vernal pool hydrology
- wetland ecology
- ...

Other than research, other tasks included educational outreach and attending to visitors.

Individual Projects

Impact of angling pressure on nesting bass
I repeatedly snorkled along shoreline transects during spawning season to monitor the nests of largemouth and smallmouth bass. I took notes on egg stage and score, estimated length of adult male guarding the nest... I also surveyed fishing boats on the lake to monitor illegal fishing (before the start of the season).

Inventory of crayfish species
Together with one of my fellow interns, we started an inventory of the crayfish species in the property lakes by setting up baited traps at night and actively sampling them with flashlights and nets. It was a challenging project, but very fun and interesting.

What I benefitted from the internship

- Had the opportunity of working in a pristine watershed and wilderness area.
- Developed technical skills like tree climbing, boat driving, and species identification.
- Improved on soft skills such as communication, teamwork, creative problem-solving, and perseverance.
- Gained confidence in my abilities and acquired more independence.
- Met intelligent, passionate and lovely people with whom I hope to stay in touch.
- Confirmed my interest in aquatic biology.
- Discovered other career paths my Environmental Biology degree can lead to.
- Reinforced my enthusiasm for conservation and ecology.

All photos by Liane Nowell

Supervisor: Liane Nowell
info@kenaukinstitute.org

Student: Lise Coquilleau
lise.coquilleau@mail.mcgill.ca
Summer Internship with Nos Petits Frères et Sœurs In Port-au-Prince, Haïti
Faculty of Agricultural and Environmental Sciences, McGill University
Anne Isabelle Glaude
Employer: Reverend Enzo Del Brocco
enzo.delbrocco@gmail.com

Background
Nos Petits Frères et Sœurs (NPF) is an international non-profit organization whose goals focus on providing medical care, education, food, and shelter to deprived children in countries such as: Mexico, Peru, Guatemala, Honduras, Nicaragua, El Salvador, Bolivia, The Dominican Republic, and Haiti.

This organization has been in Haïti since 1987, and in 30 years has built a pediatric hospital, an orphanage, and a farm. My internship was in the summer of 2017 and took place at the farm. I learned much about agriculture and caring for animals such as chickens, ducks, and fish. My workday would start at 7:30 AM and end at 4:00 PM. Everyday I would help the staff with various tasks such as: feeding the fish and chickens, harvest fruits in the fields, plants crops, etc.

Duties as An Intern

At the Fish Farm

Fig 1. Preparing morning fish food.
Fig 2. Desensitizing tank border.
Fig 3. Morning feed at 8:00 AM.
Fig 4. Cleaning oxygen apparatus in tanks.

At the Poultry

Fig 5. Checking new chick arrival for malformation and disease.
Fig 6. Feeding new chicks.

Fig 7. Early harvest of cherries.
Fig 8. Planting tomatoes in the garden.
Fig 9. Eggplant sprout just planted.
Fig 10. Spinach sprouts two weeks after sowing.

Coffee Roasting and Grinding

Fig 11. Fresh coffee beans hulled in Klinsoff.
Fig 12. Roasting of coffee beans.
Fig 13. Coffee beans completely roasted.
Fig 14. Pounding/grinding of coffee beans into powder.
Fig 15. Finished coffee powder ready to be packaged.
An Analysis of the Insect Population Complex in Sunflower Fields in Tamil Nadu, India

Sunflower insect population analysis through the Sustainable Organic Agriculture department of Tamil Nadu Agricultural University

My work at the Tamil Nadu Agricultural University included researching insect population dynamics in sunflower fields in Tamil Nadu, India, in six fields with various percentages of organic vs. non-organic fertilizer to analyze the amounts of both pests and beneficial insects in each field.

I gave a presentation at the 2017 Agricultural Science and Tamil Research Conference, where I presented the results of my research and ended up winning first place in the entomology department for best presentation! Photo credit: Anonymous

I learned about how carnivorous insects can be used as effective pest control without the use of pesticides, and that pesticides actually harm the natural insect food web because they kill everything, including the beneficial insects that eat the pests! This provides evidence that organic fertilizer leads to more sustainable, self-regulating insect populations.

Aside from the scientific aspect of the internship, I also learned Tamil (தமிழ்), the local language, and conducted all my research and wrote all my reports in Tamil. Knowing Tamil will be a huge asset to my future career.

I am counting insects in a laboratory. Photo credit: Julien Malard

Yellow plates were placed in each sunflower field with soap and water, used to catch insects for weekly counting. Photo credit: Dune Dills

This picture was taken in a laboratory at the University, where I learned how to conduct a soil test. Photo credit: Julien Malard

Figure 1: These graphs compare the beneficial insects and pests in the 100% organic sunflower field and the 100% non-organic sunflower field.
ABOUT THE ORGANIZATION

Founded in 2013 in Peffler, Ontario, Shades of Hope Wildlife Refuge is a licensed wildlife rehabilitation centre dedicated to the care of wild orphaned and injured Ontario species. The registered Canadian charity provides its animal patients with the essential resources needed for them to make full recoveries and return to their natural habitats.

JOB DESCRIPTION

My responsibilities as an Animal Care Intern included:

- Intaking new patients
- Developing sense enrichment devices
- Administering oral & injectable medications
- Clinical lab work
- Bandaging
- Assisting the vet in surgeries
- Collecting donations
- Syringe-feeding, tube-feeding, & hand-feeding
- Physiotherapy
- Diagnosing ailments
- Food preparation
- Fluid therapy
- Record keeping
- Cleaning

OVERALL EXPERIENCE

As an aspiring veterinarian, it is crucial for me to gain hands-on experience with different types of animals. Working at Shades of Hope allowed me the opportunity to work directly with hundreds of Canadian wildlife species and learn about their characters, common ailments, diets, and how to nurture and rehabilitate them.

Though the long hours and difficult losses were wearing at times, nothing compared to the feeling of seeing my effort pay off when I released a healthy animal back into the wild.
Introduction

Non-Fourier heat conduction, associated with phase lags and nonlocal behaviours, is vital to understanding thermal effects in microscale. Cellular materials are ubiquitous in nature, and thus simulating cellular structures via non-Fourier heat conduction theory shall provide a guideline on the analysis of biological materials and the design of novel metamaterials for heat insulation.

The hyperbolic-like nonlocal three-phase-lag model, for instance, is shown as follows:

\[ q(t + \tau_0, t + \tau_0) = -[\dot{\varphi}(t + \tau_0, t + \tau_0)] \]

where \( \dot{\varphi} \) is the heat flux and \( \tau_0 \) is the nonlocal time. The model is based on the assumption that the heat flux is delayed by a time \( \tau_0 \).

I. Phase-lagging (PL) and nonlocal (NL) behaviours in 1D transient Fourier and non-Fourier heat conduction models.

II. Hyperbolic-like NL TPL on a cellular structure.

III. Mechanical and thermal responses to an innovative metamaterial.

Internship Descriptions

I worked as a research assistant in AM3L with an independent project on non-Fourier heat conduction through cellular materials. Engineering mathematics, CAD modeling, FEM simulations, 3D printing, and mechanical testing were utilized.

Minghan Xu
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Prof. Abdolhamid Akbarzadeh (Supervisor)
ahamid.akbarzadeh@mcgill.ca

Advanced Multifunctional and Multiphysics Materials Lab (AM3L)
Field Research: a “salad” foundation to reducing pesticide use in horticulture
Internship with Phytodata Inc.

**Intern:** Louis Erik Demers – louis.demers@mail.mcgill.ca

**Employer:** Phytodata Inc., a subsidiary of Consortium PRISME www.prisme.ca

**Tasks:** Support and assist scientists and agronomes with 20 research projects, such as field trials for biopesticides, fertilization trials, among many others!

**Challenges:** Having to adapt to the demands of field research

**Successes:** Providing useful input to my supervisor and the team

**Contribution to future career:** Motivated me to apply to graduate studies and stimulated my interest in research
Foraging niche and food preferences of *Lasius alienus* and *Camponotus novaeboracensis* (ants) in the temperate broadleaf and mixed forest

Samuel Collin-Latour
samuel.collin-latour@mail.mcgill.ca

**Employment Description**
I mainly collected data for Jessica Turgeon's Master's Arthropod Biodiversity Project; my personal project (see title); the Forest Tent Caterpillar Project and many other research projects. I practically learned to conduct an experiment from beginning to end with my project, which is especially important to pursue graduate studies.

**Introduction**
Objective: Discover the foraging niche and food preferences of ants in the temperate broadleaf and mixed forest, especially in the canopy.

**Materials and Methods**
We used bait traps to capture ants in niches combining:
- 3 forestry techniques:
  - Selective cut
  - Strip cut
  - No cut
- 3 habitat templates:
  - Ground leaf litter
  - Saplings
  - *Acer saccharum* (sugar maple) canopy
- 4 food resources:
  - Amino acids
  - Carbohydrates
  - Lipids
  - Salt

**Results**
- Ant Abundance: 67 individuals from 6 species in 4 genera
- Abundance by Food Resource:
  - 52/67 or 78% of ants significantly recruited in carbohydrates.
  - 50/52 or 96% of ants were *L. alienus* (cornfield ant).
- Species Abundance by Foraging Niche:
  - *L. alienus* foraged in all habitat templates.
  - *C. novaeboracensis* (New York carpenter ant) significantly foraged in the niche combining selective cut, canopy and amino acids.

**Conclusions**
- Ants majorly preferred carbohydrates.
- *L. alienus* preferred carbohydrates, but not a specific niche.
- *C. novaeboracensis* preferred the canopy to forage amino acids probably by preying upon *Malacomosa disstria* (forest tent caterpillar).

KENAUK INSTITUTE: RESEARCH ASSISTANT INTERNSHIP

1000 Chemin Kenauk, Montebello, Qc, Canada, J0V 1L0

KENAUK INSTITUTE
The Kenauk Institute resides in the heart of a private nature reserve just north of Montebello, where the forest remains largely unbothered by human activity. Here, we regularly see wildlife throughout the property, and provides an ideal location for studying the flora and fauna of the mixed forest.

INDEPENDENT RESEARCH
I conducted two small independent research projects at Kenauk:
1. Establish a partial inventory of the fungi present.
2. Study the abundance, diversity and activity of bats.

I am extremely grateful to the McGill Department of Natural Resource Sciences for lending me the necessary equipment for the chiropteran project.

INTERNSHIOP DESCRIPTION
As an intern, my job consisted mainly of helping various researchers with their respective projects. Research projects I helped with:
- Arthropod Biodiversity
- NCC Biodiversity Inventory
- Papineau Lake Hydrology
- Vernal Pool Hydrology

I also helped create new educational content. See some examples of my work on the Kenauk Institute Facebook page: https://www.facebook.com/kenaukinstitute/

Finally, I also worked with the Kenauk Nature team when they needed an extra hand, and was able to appreciate all the coordination required in managing a multi-outlet operation.

LEARNING EXPERIENCE
I gained both a broad and specific set of knowledge by working at Kenauk. From research methodology to the many forms of teamwork, the experience allowed me to appreciate the multiple angles of research from a single base of operations. My internship also reminded me of the value of getting involved and having an open mind.

CONTACT INFORMATION
Sebastien Levesque, Environmental Biology
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Liane Nowell, Kenauk Institute Director
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Empowering Youths and Women Through Agribusiness Entrepreneurship with CECI in Ngomène, Senegal

**Job Description:** Three months of fieldwork with a team of 6 interns in rural Senegal working with vegetable farmers on capacity building through workshops, conferences, and mentorships.

**Take-Away:** Unique opportunity for both an intercultural exchange and professional experience where I learned about working with NGOs, and producing and marketing vegetables in the region. I also got the chance to apply the knowledge and skills I’ve acquired throughout my studies towards positive and long-lasting change.
Job Description

The spring season involves caring for the animals indoors as babies. They get weighed regularly and formula fed according to their weight category. As the animals get older, we provide bowls of food and water to help them learn to independently feed themselves. Older animals are moved to outdoor enclosures before being released as a means of getting them used to the elements.

Other responsibilities include monitoring the animals’ health, clean and prepare cages, and calculate and administer medications as needed.

Best Parts

The best part of the internship was:
- caring for the babies,
- watching the babies grow and develop,
- watching them play, and
- releasing the animals after caring for them for weeks

Another aspect that made the whole experience so wonderful was the team I had throughout the summer.

What I Learned

The most valuable things that I learned include:
- general knowledge about the animals to provide the best care,
- recognizing the age based on specific characteristics,
- wound management,
- signs of illness and/or dehydration and their treatments, and
- calculating and administering medications

I also learned administrative skills, such as greeting customers, getting the information about the animal and relaying information as well as providing solutions and helpful tips to the public.
Fowlers Toad (Anaxyrus fowleri) Conservation with Dr. David Green
Gabrielle.rimok2@mail.mcgill.ca

Job Description
As a volunteer, my job was to do the night surveys (10 pm to 2:30 am) to collect data for the Fowlers population report that will be submitted later in the year. Our surveys would be on the “road” where we would drive to several locations that the Fowlers toads have been known to be spotted, and the “loop” where we would walk past the park boundaries in the Canadian Wildlife Services property. Our surveys consisted of taking the snout to vent length (SVL) of the toads, sexing them, and photographing their backs so we could identify them later with the toad identification software using MATLAB.

Things I’ve learned and their relevance to my field of study
Over my internship, I learned a lot about the behaviors and ecology of American and Fowlers toads. I learned how to identify males from females, how to measure the toads with callipers and how to spot them on the beach at night during our surveys (it’s harder than it seems since they camouflage with the sand). I learned a lot about other herptiles inhabiting the same areas as well; such as snakes, turtles and frogs and their ecology. The biggest challenge I faced was being able to stay up until 2:30 am surveying, which takes quite a lot of adjustment. My independent project “A Comparative Study on the Energetic Costs of Metamorphosis between the Fowlers and American Toads” was a big highlight of my summer. I got to study tadpole development and the energetics associated to it very intimately. It gave me a newfound appreciation for Herpetology as a field which I really look forward to studying for my honors and later, my MSc.

Employer
Dr. David M. Green
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Long Point Fowler’s Toad Project: Conservation of the Fowler’s Toad (Anaxyrus fowleri)

Pooja Harindranath | pooja.harindranath@mail.mcgill.ca

Job Description:
As a volunteer for the Long Point Fowler’s Toad Project, I went out on night surveys with the rest of the group and collected data on the Fowler’s toad population. The surveys generally lasted from 10 pm to about 2 am, sometimes later if there was an exceptional amount of toads out. I would help collect data such as the snout-to-vent length, sex, air/water temperature and the location they were found. Pictures of their backs and throats were taken for identification. I also helped with transcribing the data from the field notes into a notebook, which was then inputted onto the computer.

What I’ve Learned:
Through this experience, I learned the proper handling of frogs and toads, how to find Fowler’s toads and tell them apart from the very similar American toads, and how to tell the difference between males and females. The biggest highlight was being surrounded by so much wildlife and coming across many different species of frogs, turtles, snakes and birds and even some mammals like the Virginia opossum, coyotes, and lots of rabbits. It was also a privilege to be able to watch the American toad eggs develop into toadlets.

(A Top left) This is me helping with data collection of the toadlets by catching them, weighing them, and then taking their pictures. (Top right) Photo Credit: Gabrielle Rimok
(Bottom left) This is an American toadlet that had just finished being weighed and having its picture taken. (Bottom right) This is a Fowler’s toad who was found during one of the night surveys and is about to be measured and get its picture taken. Photo Credit: Pooja Harindranath

Employer:
Dr. David M. Green
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Synthesis and Characterization of Canola Protein Based Superabsorbent Polymer Hydrogel

Ann Pille, Daihui Zhang and Marie-Josée Dumont
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Introduction
Superabsorbent polymer hydrogels (SAP) are polymer networks that can absorb thousand of times their weight in water. These networks can be synthetic or bio-based in nature. Synthetic SAPs are generally synthesized from petroleum based chemicals and are traditionally used due to the fact that they offer rapid and high capacity swelling as well as stability. However, their poor biocompatibility and biodegradability can limit their applications. Bio-based SAPs can be made from either bio-based monomer or natural macromolecules, such as sugars and proteins. Bio-based SAPs are gaining in popularity due to their biocompatibility, non-toxicity and variation in physical properties. Due to these properties, bio-based hydrogels can be applied in fields such as agriculture, bio-medical engineering and soil remediation.

Objectives
- Investigate the effects of variations in initiator weight percent, crosslinker weight percent and ratio of acrylic acid to protein on swelling properties.
- Evaluate the physical properties of the optimized SAP.

Materials & Methods
1-SAP Preparation
Hydrolyzed canola protein powder (3 g) was dissolved in distilled water using agitation for 10 minutes at 70 °C in an oil bath. After cooling the protein solution to room temperature, it was mixed with potassium persulfate at 70 °C for another 10 mins. This solution was then cooled for 10 minutes. In another beaker 70% neutralized acrylic acid was mixed with a polyethylene glycol diacrylate crosslinker. The acrylic acid solution and protein solution were mixed at 70 °C for 5 minutes in an oil bath, and the reaction was allowed to proceed for 2 hours to synthesize protein-based SAP. This can be seen in the reaction scheme below.

After the reaction was completed the gel obtained was immersed in ethanol for 30 minutes. The gel was then cut into pieces and immersed in ethanol for 24 hours. The ethanol was decanted and the gel was dried in an oven for 3 days before being crushed into a powder using a mill. The powder was then stored in a desiccator.

2-Swelling and Reswelling Tests
Figure 1 shows the formulations used in the synthesis of SAPs. The swelling ability of each formulation was tested using the tea bag method with 50 mg of each sample. Reswelling tests were conducted using the tea bag method. The SAP was swollen for 24 hrs and then dried for 24 hours repeatedly until a significant drop in swelling capacity was observed.

The degradation of canola protein and the optimized SAP were tested by the TGA. For canola protein, a sharp peak in the derivative of mass was detected at a temperature range of 250 to 350°C where as the SAP showed a gradual increase from 200 to 400°C and a sharp peak from 400 to 500°C. The difference in thermal stability suggests that the canola protein has been converted into a SAP as it degrades at a different temperature. Figure 4 shows the SEM images of canola protein and both the coarse SAP powder and fine SAP powder. Morphological differences can be seen between the canola protein and both the finely and coarsely ground SAPs at 200 x magnification. At 1500 x magnification the pores of the SAP are evident.

3-Physiological Properties of SAP
The gel content was measured using a sol fraction test. The thermal stability of the optimized SAP was investigated using thermogravimetric analysis from temperatures of 25 to 800 °C with a temperature ramp of 10 °C/min.

The morphological properties of canola protein-based SAPs were examined using a SEM (TM3000, Hitachi High-Technologies Co., Tokyo, Japan) at an accelerated voltage of 5 kV.

Results & Discussion
The weight percentages of initiator and crosslinker as well as the ratio of acrylic acid to protein used affected the swelling ability of the SAP. As seen in figure 2, as the ratio of acrylic acid to protein increases the swelling reaches a maximum and then decreases. The initial increase is due to the increasing hydrophilicity due to carboxyl groups and the decrease can be attributed to the formation of a more densely packed network. Higher weight percentages of initiator and crosslinker lead to lower swelling ratios. This is due to the fact that the formed network is more densely packed, leading to less expansion capacity for water adsorption, between crosslinking points. Additionally, the swelling ability of a SAP crushed into a coarse powder using a mortar, pestle and liquid nitrogen was compared to a SAP crushed into a fine powder using a mill. As seen in figure 2, the coarse powder exhibited a higher swelling ratio than the fine powder. This could be attributed to the fact that the fine powder was more likely to float out of the tea bag during the swelling tests.

Figure 3: Reswelling test results

Figure 4: SEM A) Protein B) Coarse SAP C) Fine SAP B 200x D) Fine SAP B 1500x

Conclusion
- Canola protein can successfully be used as a macromolecule for the synthesis of superabsorbent polymer hydrogels.
- Changes in acrylic acid to protein ratio, crosslinker wt percentage and initiator wt percentage affect the swelling ability of the SAP.
- The optimized canola protein based SAP can be reused several times.

Acknowledgements
We would like to thank the Natural Sciences and Engineering Research Council of Canada (NSERC) for their financial support.
Taking a Few Steps in a Farmer’s Shoes

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Riva Khanna riva.khanna@mail.mcgill.ca

An ecological farm committed to offering nutritious food at an affordable price.
« Specialty Produce for Regular People »

Lettuce Harvest, photo Andrew Linnevers
Eggplant Dropping
Rasperry Harvest, photo Andrew Linnevers

Cosmos
Weeding with my faithful companion, photo Andrew Linnevers
100 of squash, photo Andrew Linnevers

Novelty Squash
Beneficial Insects Flower Bed
Okra
What I learned?
- How to work in a team
- Using new tools (BSÇ, wheel-hoe, seeders)
- Selling at market (marketing, table set up) & to restaurants
- Developing new business relationships
- How to manage a market garden CSA

Effect on my Future?
- Managing the farm next year
- More confidence to start my own business
- Acquired a lot of useful skills that are hard to teach in a classroom

Compost Project
- SPF static aerated compost bin project
- Tackling farm waste on a market garden scale
- 3 wooden boxes with PVC pipes and blower on a timer attached
- Help manage on farm waste by turning it into a useful resource

Macdonald Student-Run Gardens
macdonaldstudentgardens@gmail.com

Daily Tasks

MAY- JUNE
- Seeding
- Prepping
- Planting

JULY-AUG
- Weeding
- Harvest
- Selling

SEPT-OCT
- Harvest
- Cover cropping
- Closing fields

Challenges
- Keeping moral high
- Perseverance
- Stress (managing next year)
- Meeting expectations

Successful
- More confident farmer
- Team trust & reliability
- Met our financial goals set for market and memberships
- Feeling ownership

Chloe Trepanier
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MSEG 2017 team (Amiya, Chloe, Mathieu, Shaina, Florence and Mattson)
Studying whales in the Mingan Archipelago
Noémie Roy, Faculty of Agriculture and Environmental Sciences

Introduction
I completed my internship at the Mingan Island Cetacean Study (MICS), located in Pointe-de Mingan, Quebec. It is a research center on the cetaceans of the Gulf of St. Lawrence. I worked seven days a week: six days on land and one day on the water. I helped with research and the interpretation center.

Tasks on land
Guided visits of the museum:
I gave visitors information on marine mammals, the ecology of the St. Lawrence and the research done by MICS.

Photo identification:
I tried to match pictures of whale individuals to the known individuals in the MICS catalog through picture matching.

Filling a logbook:
I wrote the notes took on the water in a logbook for future consultation.

Learning:
Some time was allowed to learn marine navigation skills. For example, I learned knots and how to use a marine radio.

Mingan Island Cetacean Study contact information:
www.roquscal.com, mics@roqucal.com
My contact information: noemie.roy@mail.mcgill.ca

Background: Quarry Island, Mingan Archipelago. Photo credits: Sarah Paquet

What I learned
I had the chance to explore the field of marine biology, into which I want to master. I gained field data collection and boat navigation skills and I learned a lot about marine mammals. I wrote a research paper: "The effects of commercial fishing on mysticetes in the Gulf of Saint-Lawrence over the last 20 years".

Tasks on the water
Taking notes:
It was my main task on the water. I had to note what animals we saw, when, where and how they behaved.

Other:
I had to help around the boat with many other tasks.
- Take pictures of the encountered animals.
- Take whale feces samples.
- Survey the horizon to help spot animals.

Taking pictures to identify the encountered animals:
Picture of Stagmitite: a female humpback whale frequently encountered in the Gulf of St. Lawrence. Photo credits: Noémie Roy, MICS Photo
Mingan Island Cetacean Study (MICS)

Camille Mancion / U3 Environment Major / camille.mancion@mail.mcgill.ca

MICS is a non-profit research organization based in Longue-Pointe-de-Mingan, Québec. They study different cetacean species found in the Gulf of St. Lawrence, and focus on four types of whales: **blue whales**, **fin whales**, **humpback whales** and **minke whales**. Ongoing projects include health assessment of whales for entanglement rates, sensory and foraging ecology, trophic niche partitioning, measuring reproductive and stress hormones in humpback whales and a satellite tagging project. Data is collected through photos, satellite tags, data loggers and biological sampling methods (biopsies and feces). As an intern, I got to participate in research from the boat and at the station. For more information, read my activity report!

**Photo Identification**

Matching pictures of whales seen from the boat to individuals in the MICS catalogue.

**Data logging**

Transcribing notes taken in the field on a slate, into a logbook for every outing.

**Observer and note-taker**

I assisted the captain and team members on the boat with photos, notes, preparation of biopsies and tags.

**Interpretations**

Interns give guided tours of the museum, explaining the biology of whales and the research done at the station.

**What I learnt**

- Identifying whale species from a distance
- Matching of individuals using photo-identification on MICSPix
- Data collection methods
- Driving a boat
- Basic knots
- PLENTY of information on the biology and ecology of cetaceans

**MICS contact information**

Website: [www.rorqual.com](http://www.rorqual.com)

Email: mics@rorqual.com
What is the Mingan Island Cetacean Study (MICS)?

Based primarily in the heart of the Saint-Lawrence, MICS is a non-profit research organization that is dedicated to ecological studies of marine mammals. The station was founded in 1979 by Richard Sears, and was the first organization to carry out long-term research on cetaceans in the area. Today, research focuses mainly on blue whales and is also conducted in the Azores.

Study Areas of the Mingan Island Cetacean Study
https://www.ronquai.com/english/whale-research/our-study-areas

What I learnt working at MICS

There is so much I learnt about cetaceans from both different books and articles that were available at the station (the station has its own small library). I learnt about the different classifications of cetaceans, what is known about the different species' life histories, amongst many other things.

What I found to be the most useful learning tool, was being in the field with the animals, as well as the other field biologists who have dedicated their lives to the study of these animals. The workers at the station are incredibly passionate and knowledgeable about what they are doing, and learning from them taught me so much. As I would like to continue my studies in marine biology, this was an amazing experience for me.

Study species

Although the station was originally founded to conduct research on the endangered blue whale, the research done by MICS has grown to encompass the study of other species as well. Today, research done by the station focuses on:

- Blue whales
- Fin whales
- Humpback whales
- Minke whales

The study species may change over time, as species shift their habitat range. For instance, it is possible that North Atlantic right whales will eventually be included as a study species since they have been seen more frequently in our study area in the past years.

Contact information for MICS

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378 Bord de la Mer
Longue-Pointe-de-Mingan,
Quebec

Email:
mics@ronquai.com

Website:
https://www.ronquai.com/

Phone number:
(418) 949-2845

My role with MICS

In the Field

My primary role in the field was taking the photos of the cetaceans we encountered. These photos were later used for photo-identification of the individuals. As well, when needed, I was responsible for writing the field notes on the slate, driving the boat, preparing equipment for biopsies and taking fecal samples.

Work on the Research Boat
Ma driving the boat, with team member Christian Ramp to my right, and a guest to my left.
Mertin Demasiou, August 2017

In the Office

My main task in the office was processing and organizing opportunistic photos of blue whales taken in the North East Atlantic. These are photos that are sent to MICS from collaborators from various locations both inside and outside of our research areas including the Azores, Greenland, Iceland and Mauritania, amongst others.

As well, I was responsible for the processing and importation of photos into the photo catalogue, MICS-Pix, after each time on the water. I would also sometimes retranscribe the the notes taken in the field into the logbook, give guided tours in the museum, or assist with data entry.

Bmissive Sample

Top block section is skin, whereas the white section is blubber.
Rachel Sullivan-Land, July 2017. Property of Mingan Island Cetacean Study
Development of on-the-go Moisture Sensor
Connor Miller

Information
Intern:
Connor Miller (connor.miller@mail.mcgill.ca)
Employer:
Viacheslav Adamchuk, PhD
Location:
Macdonald Campus & Farm

The Lab Group
Over the summer, I was working as an intern for Professor Adamchuk’s Precision Agriculture and Sensor Systems lab. This lab not only specializes in development of on-the-go and on-the-spot soil sensing devices, but as well the creation of maps and geospatial data processing.

Some Recent Projects:
- Smart Tractor
  • Variable rate manure spreading
  • Prescription map-based tractor automation
  • Variable depth planting
- Machine Vision Guidance
  • Used to assist organic farmers during early stage between row scuffling

My Job
During the summer my main task was to complete an on-the-go (OTG) moisture sensor, but I also worked on many other projects as well:
- Development and building of computer vision yield monitoring mount
- CO2 gas chamber LabView program
- Design, construction and LabView program for automatic spectrometer

Moisture Sensor
My primary project for the summer was the redesign and construction of an capacitance based moisture sensor. This sensor will be mounted on a planter, to allow for variable depth planting based on the moisture levels of the soil.
During the redesign process I:
- Completed 3D SolidWork drawings of the newest version of the sensor as well as professional drawings for cost estimates and outsourced machining
- Wrote an addition to the current LabView program, to integrate an RGB colour sensor to the system
- Machined pieces of Teflon to build current test version of the sensor

The Experience
As an engineer focusing in agriculture, this experience was amazing and I am extremely happy with the knowledge that I have come out with. I have spent over the last year heavily involved in coding and program development, both in school with MUTRAC and as well this summer, and have come to see that mechatronics is something that I want to do for my foreseeable future.

Testing of the OTG moisture sensor.
Systems Dynamics Modelling for Comparative Food Security Policy Analysis in Guatemala

Glimpses of the Interesting Research

Challenges and Successes

Solutions

Future Aspirations

Acknowledgments
Internship at the Albert Bonniot Institute

Introduction
This summer, I did an internship at the Institut Albert Bonniot (IAB), a laboratory located in Grenoble, France. This institute specializes in fundamental biomedical research, particularly in the fields of epigenetics, cancer and chronic diseases.

Research Team
The team’s main goal is to understand how the genome communicates with its environment. They specifically study the epigenetic mechanisms that regulate male reproduction and cancer.

Activities
My job consisted in assisting the different projects happening in the lab, from the in vitro to in vivo models. I also had the chance to partake in the various conferences and talks held at the institute on a weekly basis.

Acquired Knowledge
I learnt a variety of basic laboratory molecular techniques such as PCR, Western Blotting, Immunofluorescence, cell culturing but also many techniques that are specialities of the lab such as a sedimentation technique to separate the different stages of spermatogenesis.

The results of a genotyping experiment to determine if the mice from a litter were homozygous controls, homozygous knock-outs or heterozygous.

The setup for the sedimentation experiment. Two BSA concentrations are used to create a gradient in the sedimentation chamber which allowed for a proper separation of the sperm cells. The sedimentation chamber is shown on the right.

The preparation of slides for immunofluorescence.

Contact information: ariane.lismer@mail.mcgill.ca
Internship in Nutrition Department at Shanghai General Hospital

Sichong Xu, U3, Global Nutrition
sichong.xu@mail.mcgill.ca

I worked as a summer intern in Nutrition Department in the Shanghai General Hospital. It was the first time that I could engage in the professional nutritional field. The nutritional science is in the stage of rapid development in China.

Background:
Shanghai General Hospital is one of the largest hospitals in China, and is specialized in maternal nutrition and nutrition of gestational diabetes.

Job description:
- Basic statistical work;
- Nutritional assessment on patients;
- Preparation and distribution of enteral nutrition powder;
- Outpatient consulting service;
- On-spot supervision.
- Help the director of Nutrition Department to work on the research of “Intervention on Advanced Maternal Age’s Gestational Diabetes”.

Calculate the recommended daily calorie intake for patients. Credit: Jiayin Fan, colleague

On-spot supervision at food company with director. Credit: Jiayin Fan, colleague

Take food sample for quality and food safety tests. Credit: Sichong Xu

Daily preparation the enteral nutrition powder. Credit: Lina Xia, assistant

Workshop with my colleagues and exchange student from department of endocrinology, designed specific diet for GDM. Credit: Jiayin Fan, colleague

Consensus workshop of SCHelTI (Sino-Canadian Healthy Life Trajectories Initiative), mainly focused on interventions on pregnant women to prevent obesity and gestational diabetes mellitus. Credit: Jiayin Fan, colleague
Soil and Water Plant-Microbial Remediation
Internship in Shanghai Chenshan Botanic Garden

Ting Tao
Life Science
Bio Agric
ting.tao@mail.mcgill.ca

Introduction of our team

• As one of the research groups at Shanghai Chenshan Botanic Garden, our ecological phytoremediation team must be the youngest one.
• Our team works closely with the Montreal Botanic Garden, University of Montreal and the École des Mines de Nantes France. Our common mission is to improve the water and soil quality at urbanization area by using phytotechnology.
• Our research focuses on an overall better understanding of the role of macrophytes in constructed wetland system and the role of woody plants in soil decontamination, development of relevant technology and application extensively.

Job description

• Help the researchers to collect macrophytes in the treatment wetlands and test their performance and pollutant removal ability
• Started a new experiment “Heavy metals polluted soil remediation by Salix and Fraxinus hosie, combined with arbuscular mycorrhiza (AM) and bacteriorhizia (53-1)”. We were going to compare the performance of two hyperaccumulator plants to see which one performed well in the polluted soil, and can absorb a certain amount of heavy metals.

Watering plants everyday
Credit by Pan Tan Shang, research assistant

Mixing soil and heavy metals
Credit by Shumeng Liou, research assistant

Adding AM to the soil
Credit by Ting Tao

Workers are planting Salix
Credit by Ting Tao

Adding highly eutrophic water to the water storage tank everyday
Credit by Guowei Zhang, research assistant

Constructed wetland with macrophytes
Credit by Ting Tao
INTERNSHIP EXPERIENCE IN EXCLUSIVE MARK (MALAYSIA)

ABOUT THE COMPANY
This company is located in Glenmarie, Shah Alam, Malaysia and it is recognized as one of the earliest food manufacturing companies in Malaysia to achieve Good Manufacturing Practice (GMP) standards. The factory is equipped with the latest processing machines and operates according to international manufacturing standards. Exclusive Mark specializes in a wide range of beverages such as coffee, tea, juices, health drinks, etc which cater to most consumers; local and international. It is a great learning environment due to its large scale food operation and various hands on experience to offer.

POSITIVE IMPACT
• Improved lab skills and critical thinking
• Better understanding of a food Science career especially in Quality Control/Assurance
• More self-confidence
• Improved professionalism skills

JOB DESCRIPTION
My daily job as a lab analyst is to conduct brix, pH and viscosity tests on various beverages to ensure that the results are within recommended specification. As a quality control intern, I would carry out stability tests on different products each month to evaluate the colour, taste and aroma characteristics. Besides that, my other task would be assisting the microbiologist in preparing necessary materials for microbe testing such as agar medium and diluents. I would also assist the quality assurance team in the production site to ensure that all equipment used are cleaned thoroughly. Checking of raw ingredients, ensuring good packaging condition and monitoring of factory workers are part of the job description.

Overall lab facility
Placing bottle jars into autoclave machine
Preparing agar medium for culturing microbes
Using an infrared moisture balance to measure moisture content in milk powder
Micropipette sample into respective petri dishes
Lessons Learnt: Working at Le Nichoir provided me with so much insight into avian biology and conservation. More importantly, however, working at Le Nichoir also provided me with a sense of hope for wildlife conservation as a whole! With the diversity of people who brought birds to Le Nichoir this summer, I have come to the realization that people from all walks of life have the capacity to genuinely care about wildlife! I plan to build on this new knowledge and work towards a Master’s Degree studying how sustainable social-ecological systems can be shared among communities and societies.

Some of my most memorable moments at Le Nichoir were in the company of this beautiful hummingbird (left). Initially unable to fly, walk, or even stand up, she was in very poor body condition when she arrived. After hand-feeding her a highly nutritious nectar (top) for several weeks, she recuperated extremely well and I was given the privilege of releasing her on a bright sunny day in August. Photo credits: Susan Wylie (left); Cody Danaher (top)

It was a true privilege to see threatened species, such as these Chimney Swifts (above), at Le Nichoir. To maximize their chances of survival, the chimney swifts were released on their migration route near London, Ontario. Photo credit: Cody Danaher.

The nursery room (bottom) was our main working station for feeding nesting birds at Le Nichoir. The blue-headed vireo (bottom left) and the rose-breasted grosbeak (top left) are among the most memorable nestlings we cared for this summer. Photo credits: Cody Danaher.

The newly-built outdoor aviaries (right) provided the appropriate space for birds at Le Nichoir to become acclimatized to the outdoor environment and to gain flying experience. Perches and natural vegetation decorated the inside of each aviary (top) so as to provide a more natural space for the birds as they approached their moment of release. Photo credits: Cody Danaher.

As a Wild Bird Rehabilitation Caregiver, my responsibilities at Le Nichoir were to provide nutritional and medical care for injured and nesting birds in order to release them back into the wild.

My primary duties were to:
A) Evaluate the health of birds brought to Le Nichoir;
B) Determine the proper treatment for any injuries or illness;
C) Ensure that each bird received the proper diet and shelter;
D) Educate the public on how humans can help protect birds from injuries in cities and human environments;
E) Release birds that had been successfully rehabilitated.
Summer internship at Schneider Electric

Ghali Bensaid, Department of bioresource engineering, FAES 300 (Summer 2017)
Supervisors: Amany Morgan & Lahcen Khirallah (Schneider), Kendra Gray (McGill)

The company

Schneider Electric SE is a French multinational corporation that specializes in energy management and automation solutions, spanning hardware, software, and services. Schneider Electric is a Fortune Global 500 company, with offices/factories in more than 100 countries, employing nearly 185,000 people (2014).

My internship took place in their Brossard site composed of three manufacturing plants.

Job description

In order to increase the energy efficiency of the factories, I was in charge of investigating all the various ways of decreasing their energy consumption. To do so, I focused on increasing the energy efficiency of the compressed air system on site, its HVAC system and its lighting.

In order to increase the recycling rate of the site, I chose to identify all the waste streams that weren’t recycled and try to find a way to recycle it. This included porcelain residues, polystyrene residues among others. The implementation of a composting was one of the solutions I chose.

Finally, throughout my internship I participated in various other projects, updating the environmental impact analysis of the site, the inventory of the chemical products and the inventory of the volatile organic compounds (VOC). I also helped the plant manager prepare for various certification audits including ISO 14001 or ISO 9001.

Overall experience

This internship exceeded my expectations as a learning experience. My work was technical and very hands on, the material I learned at McGill University was essential in understanding the principles that governed all my activities during this time. It has allowed me to work in a fast-paced environment and has helped me understand what to expect in the future.

By the end of the summer, the overall energy consumption of the site decreased by 3% and its recycling rate is now around 97%. For these reasons, I was able to finish my internship with a sense of accomplishment. I’m looking forward to my time at Schneider Electric as a part-time intern this coming Fall.
Internship in farm buildings construction
Les Consultants Lemay & Choinière Inc.

Phone: 450-293-8960
E-mail: consultants@lemaychoiniere.com

Intern: Francis St-Aubin
E-mail: francis.st-aubin@mail.mcgill.ca

Location: Ange-Gardien, Québec

Tasks:
- Environmental permits requests
- Field surveys
- Farm plans drawing on AutoCAD
- Concrete pouring supervision

Challenges:
- Limited experience in civil engineering
- Working on multiple projects at once

Skills developed:
- Work under pressure
- Communication
- Building standards

Fig. 1: Taking measures in a dairy barn before drawing concept plan

Fig. 2: All the 20 forms required for environmental autorisations

Fig. 3 and Fig. 4: Concrete pouring supervision of a future dairy farm

McGill FACULTY OF AGRICULTURAL and ENVIRONMENTAL SCIENCES
Genetic improvement of forage crops
Internship at Agriculture Agro-Food Canada, Quebec City
Philippe Vezina - U2, Life Sciences

Job description
As a summer Intern, my role was to carry out projects with my supervisors. Our projects mostly aimed at genetically improving forage crops species, mainly Switchgrass and Timothy grass. My team of 4 students planted 4 projects dealing on biomass and one looking at plant recovery after an initial harvest.

In total, we completed 5 tests on 9 plantation sites, which I explained in detail in my activity report.

Figure 1: The plantation on Timothy grass made at St-Augustin surrounded by an electric fence.

Figure Credit: Philippe Vezina

Additional tasks
- Taking care of previous tests performed during year 2016 and before, including weeding, watering, mowing and collecting samples;
- Ongoing harvest tests that were made on perennial crops to check how the plantations are doing over a given period of time;
- Monitoring the growth of seedlings from selected varieties aimed to be placed in the fields.

Figure 2: Equipment used for experimental plantations. Plants seedling in 4 straight staggered rows inside pre-delimited parcels.

Figure credit: Philippe Vezina

What I’ve learned
As a whole, my internship thought me a great deal about agricultural research and field work:
- The importance of rigorous and careful manipulation to ensure that no errors are introduced into the experimental protocol;
- The need to adapt to changing conditions that are not always under our control but that must be addressed to successfully carry out the work;
- The problem and objectives that are established together with the approaches to design the experiments;
- The importance of communication and team spirit when facing adversity.

Figure 3: The biomass team of students consisting of: Francis Boutet, Frederique Dube, Oumaima Zair and myself.

Picture credit: Unknown

Figure 4: Ordering trays on the planter and preparing to plant a parcel for the last plantation of the summer.

Picture credit: Oumaima Zair

Figure 5: Fertilizing an experiment on Timothy grass aiming to improve the superficial root system into one that goes much deeper.

Picture credit: Francis Boutet

Contact information
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Summer Internship at **Gault Nature Reserve**

Sophie Gadbois, Environment (Renewable Resource Management)

**Gault Nature Reserve, Mont-Saint-Hilaire**
- Private nature reserve owned by McGill
- Home of various university classes
- Welcome researchers throughout the whole year

**Field-Assistant Position**
- Assisting researchers & professors
- Participating in maintenance work
- Vulgarisation of scientific issues and communication with the public (Lyme disease & deer impact on the forest understory)
- Working on own-research (i.e. *Beaver Census at Gault Nature Reserve*)

![Beaver observation, Myself Credit: Frédérique Truchon](image1)
![Summer 2017 interns: Myself, Julia Norlund & Frédérique Truchon Credit: Sonya Tétrault](image2)
![Lyme disease kiosk presentation, Myself Credit: Frédérique Truchon](image3)

**Challenges and successes**
- Having to adapt data collection to the weekly weather
- Developing an entire research design: from the problem to data interpretation

*If you have any question, feel free to contact me by email: sophie.gadbois@mail.mcgill.ca*

Contact David Maneli (academic supervisor) for more information about the reserve and summer internships: david.maneli@mcgill.ca
What I’ve learned
To communicate the right messaging and answer the visitors’ questions. I have learned about the Park’s natural and cultural history. I have accumulated knowledge and gained communication skills. I also collaborated with members of different field units to make sure that the wildlife in the park was staying safe and wild. As part of my internship, I finally studied some pika communities of Wolverine, near Skoki. To do so, I used GPS data.

Job Description
- Connect with the visitors of Banff National Park and educate them about how to keep the wild in wildlife by roving the day-use areas of the Minnewanka Loop and the Bow Valley Parkway.
- Deliver point duties and activities about the natural and cultural history of the park.

Contact Information
Contact me:
gabrielle.lajeunesse@mail.mcgill.ca
Contact my supervisor:
lynda.holleman@pc.gc.ca
Environmental Intern with Itaipu Binacional - FAES 200

**Intern:** Cesare Caputo (cesare.caputo@mail.mcgill.ca)

**Location:** Ciudad del Este, Paraguay

**Employer:** Itaipu Binacional – Largest Hydroelectric power producer in the world in 2016 (+ 595 615998989)

**Description:** Working mostly in the Environmental Impact and Remediation Department performing a variety of functions as needed. Short periods in other departments related to the sustainable development in order to obtain more holistic view of actions undertaken. Work was mostly on the field with some office based tasks.

**Requirements:** Spanish fluency, Bioresource Engineering or Environmental related program

**Learned:** Breadth of actions undertaken for environmental impact assessment and remediation, field work

**Challenges:** Working on a timeline, performing new types of field work
**INTERNSHIP AT THE BIOSPHERE**

**MY EXPERIENCE WORKING AS AN ANimates AT AN ENVIRONMENT MUSEUM**

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**The Biosphere's mission**

The Biosphere is the only environment museum in North America. Its mission is to educate, raise awareness and encourage citizens to take action!

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**My job**

As a guide-animator, my role was to engage with visitors, answer any questions they might have, and give presentations.

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**What I learned**

- Extensive theory applicable to many of my university courses.
- How to connect to people in a way that makes them want to take action against global warming, climate change and various other environmental issues.
- How to adapt to different audiences (of all ages, beliefs, interests, cultural and educational backgrounds, etc.)
- How to break down complex scientific information so it becomes easier to understand.
- How to address large crowds as well as important people, such as Minister McKenna and her team.

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**Highlights**

- Learning from my colleagues and being part of a dynamic and creative team!
- Participating in a pilot project for ECCC, a meteorology and climate change day camp at the museum.

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**Contact Information**

If you have any questions about my experience or would like more information, feel free to contact me or my supervisor:

Roxane Richmond (supervisor): roxane.richmond@canada.ca
Isabel Julian (supervisor): isabel.julian@canada.ca

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Pictures by Tristan Richmond.

Giving a nature walk around Saint Helen's Island to look at local flora and fauna and touch upon the island's dynamic history.

TAKING OUR VISITORS THROUGH OUR BASES FILLED WITH "TRAUSURES FROM NATURE" AND ENCOURAGING THEM TO USE ALL OF THEIR SENSES TO DISCOVER EACH OBJECT. A STRONG SENSORY EXPERIENCE CREATES A LASTING MEMORY.

GIVING A PRESENTATION. VITAMIN K, WHICH HIGHLIGHTS THE IMPORTANCE OF RECONNECTING WITH NATURE AND OUTLINES THE HEALTH BENEFITS OF GOING NATURE.
As an intern at the Blue Ridge Wildlife Center, I assisted with the intake, feeding, medical treatment, and release of sick and injured wildlife. I also helped with the nature summer camp and the overall functioning of the facility.

The Blue Ridge Wildlife Center is a wildlife rehabilitation facility in Boyce, Virginia. It works to ensure the future of native wildlife through rescue, rehabilitation, education, and research.

I learned about various species, diseases, medications, causes for intake, animal handling, and government regulations that oversee wildlife rehabilitation facilities and conservation in general.

Learning about the biology of various organisms, zoonoses, and anthropogenic effects on the environment complement my studies in environmental biology and will give me a good foundation for a career in conservation biology or a related field. Additionally, the research that I did for my paper titled “Wildlife Rehabilitation Considerations and Effects” gave me a much better understanding of the complexity of rehabilitation around the world and whether or not it is a valuable conservation tool.
Brooding oysters, the future of climate change aquaculture?

Tania Couture1,2, Damian Brady1, Matthew Gray1

1Darling Marine Center, University of Maine, Walpole, ME; 2McGill University, Montreal, QC

INTRODUCING THE DARLING MARINE CENTER

The Darling Marine Center (DMC) is an extension of the University of Maine’s campus, located alongside one of the most important and productive rivers in Maine: the Damariscotta river. It is a center dedicated to marine research, education, and outreach, with an important theme around Maine’s local aquaculture.

INTRODUCING MAINE

The state of Maine is the northernmost state in the U.S. and shares a large portion of its border with Canada. Maine has more coastline than California due to its highly ragged and serpentine coast. Walpole is the town in which the DMC is located.

WHAT DID I DO ON MY INTERNSHIP?

➢ I worked as an intern mainly under Dr. Matthew Gray (Fig 1) who is a post doc and a specialist on shellfish, specifically oysters.

➢ I learned how to assemble LOBOS (Fig 1) (Land/Ocean Biogeochemical Observatories) which were deployed in order to collect data about temperature, salinity, chlorophyll fluorescence etc. of our river ecosystems.

➢ I was trained on lab and wildlife safety and was taught how to drive a boat (Fig 2) to collect data and help other interns with their studies.

➢ I did research in relation to a specific oyster species we were studying, Oostrea edulis (Fig 3). They are brooding oysters that retain larvae within the shell as opposed to broadcast spawning species.

➢ We did experiments looking at larvae (Fig 4) survival in high and low pH conditions. We also investigated what type of conditions were inside live and ventilating brooding oysters.

➢ We processed and analyzed data and found that the internal environment of O. edulis is highly variable and fluctuates frequently in oxygen content and pH. I presented my work at the SEA fellows science symposium (Fig 5).

➢ Processed and analyzed data and found that the internal environment of O. edulis is highly variable and fluctuates frequently in oxygen content and pH. I presented my work at the SEA fellows science symposium (Fig 5).

WHAT I LEARNED

I learned that science is far from straightforward. You’re likely to encounter set-backs before reaching successful results. Sometimes, it was disheartening to see something not work or when a new obstacle or problem presented itself from achieving our goals. However, struggling through those problems really showed me that science is a discipline of discovery and experimentation. Seasoned scientists around me met problems with understanding and resilience in that they would immediately start searching for a better method or a solution. It definitely showed me what it takes to be a good scientist and what kind of attitude you needed to make your research worthwhile.

TIPS FOR WORKING HERE

➢ Be prepared to work autonomously and think for yourself. Supervisors will trust you with responsibility of your project.

➢ Be open to the different opportunities there. There is always something going on with other researchers, don’t hesitate to ask.

➢ Explore the wildlife and bring sunscreen and bug spray. Have fun!

CONTACT INFORMATION

➢ Dr. Matthew G. Gray: matthew.gray@maine.edu
➢ Dr. Damian Brady: damian.brady@maine.edu
➢ Tania Couture (ME): tania.marine@mcgill.ca
Job Description

My role was to quote spare parts for airplane simulators by:

1) Interpreting the request from the customer
2) Identifying the CAE part numbers they were looking for using technical drawings
3) Seeking valid pricing for the part from vendors, buyers or the Manufacturing department
4) Providing a quote to the customer that included all of the information necessary for them to order the part

What I Learned

This internship allowed me to use skills I learned in Bioresource Engineering such as basic programming and interpretation of technical drawings. The most valuable thing I learned was how to work as a team with my coworkers in an office environment.

A photo of me flying Bombardier’s CL-350 simulator.

About CAE

CAE is a global leader in training for the civil aviation, defence and security and healthcare markets. I worked in the civil aviation division. CAE is the world’s leading supplier of civil flight simulators used to train pilots.

A photo of me and a fellow intern, Giovanni Prattico, inside an MD11 simulator CAE is currently working on.
Design Engineer Intern, R&D Department
Maxime Leclerc – maxime.leclerc3@mail.mcgill.ca
FAES 200 Internship 1

The Internship
My work at Valmetal was to start the design of a new product line in tandem with another intern from mechanical engineering at Sherbrooke University.

Major tasks over the summer:
- Understanding the machine to build and establish specification documents to follow throughout the design.
- Brainstorm on various sub-system mechanisms.
- Perform the necessary calculations.
- 3D modeling of the machine on Solidworks.
- Building, assembling and testing of some prototype sub-systems.

The Company
Valmetal is a family owned Quebec company, specializing in the manufacturing of dairy farm feeding equipment in Saint-Germain-de-Grantham. They started their operation in 1979 as a sub-contractor and launched their first of many product lines in 1983. Today, Valmetal is a leader in mechanization and automation of food preparation and distribution to livestock.

Contacts information:
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- Title: Research and Development Director
- Email: jean-francoisv@valmetal.com

Véronique Larouche
- Title: Human Resources Coordinator
- Email: veroniquel@valmetal.com

The Experience
My work at Valmetal was directed toward my interest of working in the design of agricultural machinery. Thus, the experience and knowledge gained are going to be beneficial to my future career.

Including:
- Application of the knowledge gained in classroom to the market.
- The link between marketing and engineering departments to determine a new products features.
- The link between engineering and production department on part designs and manufacturing.
- Design of steps and prioritization of work.
- Sharing of work efficiently in a team.
- Creation and follow up of milestones through a project.
Largemouth Bass Snorkel and Scuba Surveys in Northern Wisconsin

Nadia Facciola (nadia.facciola@mail.mcgill.ca)
Research assistant for Jacob Ziegler, McGill University
Supervisors: Chris Solomon Cary Institute of Ecosystem Studies Millbrook NY U.S.A, Elena Bennett Natural Resource Sciences, McGill University

Job Description:
Throughout the summer I assisted McGill PhD student Jacob Ziegler in quantifying the relationship between young of the year (YOY) Largemouth Bass survival and lakeshore development. Specifically we were looking at how the addition or removal of coarse woody habitat would affect the survival and recruitment of the YOY. We were based out of the University of Notre Dame Environmental Research center on the border of Wisconsin and Michigan.

An average work day:
• Arrive at lake, prepare our gear, put on our wetsuit, set up scuba equipment.
• Preform basic water chemistry.
• Scuba survey: We would scuba 2 transects of 40m in length parallel to the shore at 3 different locations in each lake (Figure 1).
• Snorkel: The surveys were performed at 6 sites along the perimeter of each lake. Each site consisted of 8 transects that were 20m in length (Figure 2).

What is Coarse Woody Habitat (CWH) and Why Should We Care?
• CWH is habitat created by trees, branches or wood fragments that have entered the lake.
• Cabin development around lakes = removal of CWH for aesthetics and recreational purposes (swimming, boating).
• The Problem: CWH is hypothesized to serve as refuge, foraging and spawning habitat for many fishes. Therefore, the removal of this habitat can potentially be detrimental to fish assemblages and populations.

Personal Statement:
The best part of my internship was being able to spend everyday on the lake, in the water looking at fish. Seeing the fish under water in their natural habitat was incredible. My main success this summer was getting scuba certified! This is a skill I will keep for the rest of my life and hopefully continue to use as I pursue a career in marine biology.

Internship at Creek Shore Farms: An Exploration of Small Scale Organic Agriculture

The Job: I was an apprentice at Creek Shore farms this summer, and did everything from harvesting vegetables to building a tractor attachment. It was an excellent experience in both agriculture and equipment fabrication which taught me a lot about how small scale organic farms operate, and how to design and fabricate the equipment that they use.

Highlights: The most interesting parts of the job for me were definitely the more mechanically inclined tasks. I got to have some crazy and unique experiences that I wouldn’t have found in many other jobs. I learned how to weld, to grind metal, I helped extract the chassis from an old Grumman truck, and modified an old washing machine into a salad spinner.

Samuel Dalton
Email: Samuel.dalton@mail.mcgill.ca
Environmental Intern
Premier Tech, Rivière du Loup
Summer 2017

Premier Tech Contact Information
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Company background
Premier Tech is divided into three major spheres: Horticulture & Agriculture, Packaging and Industrial Equipment & Water Treatment. The headquarters are located in Rivière du Loup, Québec. However, PT has offices in 24 countries worldwide.
Premier Tech puts a strong emphasis on innovation in all three divisions, while promoting a great work environment and growing worldwide.
During my internship, I was able to participate in many activities organized by the company such as a kayak trip, PT-Shirt day, Pizza Lunch and more.

Short description of your job
I joined the Research and Development team of Premier Tech Aqua as an environmental intern. My main task was to find information on different filtering media used for decentralized wastewater treatment.

What you learned and how it contributed to your studies
Doing an internship made me learn a lot of things on different levels. I definitely learned more about decentralized wastewater treatment since it was the main focus of my team. As it was my first internship, I also learned about how things work within a company and about the industry as a whole. This is the kind of knowledge I could never have studied in class, so I’m grateful I had to opportunity to learn it over the internship.
This learning experience will have an impact on my studies as it gave me new techniques for different types of projects such as writing a scientific report, which I will be able to incorporate into my upcoming classes.
Summary

- I was in charge of running esterification reactions, with ultrasound, to produce 1,3-propanediol from oleic acid.
- Together with a heavy experimental component, my director required me to write a paper and co-author a book chapter.
- I wrote text, corrected grammar, and translated papers from French to English.

Tasks

I am running a method on the GCMS to analyze the content of my samples.

Credits:
Federico Galli

Results

Ultrasound completes the esterification reaction 2 hours faster.

![Graph showing ultrasound effect on reaction time](image)

Ultrasound has no effect on reaction time if temperatures are below 70 °C.

Learnings

I learned how to operate and maintain an ultrasound machine. I was also taught to write in the active voice when drafting scientific papers and avoid sign-posting, boosting, hedging, and narcissism.

The most important thing I learnt is how to write a scientific paper and the process of submitting for publication to a journal. This is invaluable experience for me because I want to pursue graduate studies.

Acknowledgements:
I gratefully recognize the financial support of NSERC through the USRA.
Internship as an awareness agent for Réseau Environnement

What does an awareness agent do at Réseau Environnement?

As an intern, I had to visit different towns to do awareness activities, including information kiosks at different town events and educational games in schools and day camps. I had to talk to people with different backgrounds and find the best way to make these people relate to the problems of water waste and residual waste sorting. I visited over 15 towns over the course of the 14 weeks I spent interning at Réseau Environnement and talked to over 1,200 people. The vast majority of the activities were done in French.

What is the summer awareness program?

This summer project I took part in aims to raise awareness in different regions of the province of Québec on environmental subjects like wasting drinking water and the inappropriate sorting of residual waste.

What did I learn?

During this internship, I learned how to communicate scientific knowledge to people without a scientific background in a way that made them relate to the subject. I learned more about the seriousness of the drinking water situation in Québec and how everyone can change their habits to reduce their water consumption and the missorting of residual waste to a minimum.

Photo credit: Saint-Calixte
Awareness kiosk in Saint-Calixte during the Saint-Jean Baptiste.

Photo credit: Lachute
Awareness kiosk at Lachute.

Photo credit: Joliette
Day camp awareness activity in Joliette.

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Kathrine Kroft Pelletier, Anais Poitras (me), Romain Rué, Kevin Galipeault and Marie-Hélène Perron, the awareness agents for the summer 2017.
# Psyllium and Fenugreek Gums: Analyzation and Optimization of Extraction

**Job Description**

My internship work included working alongside a PhD student in the department of bioresource engineering. The work focused specifically on food engineering regarding plant based food additives. The plant based food additives explored were from psyllium and fenugreek seeds.

## Objectives and Work Tasks

Psyllium and fenugreek seeds produce a natural mucilage that is a polysaccharide hydrocolloid. This hydrocolloid is the source of the plant based gums that are applied in the food industry. However, prior to food application, analysis and optimization of gum extraction must be explored. Therefore, my job tasks included:

- Facilitating the method procedure for extraction
- Comparing and contrasting microwave and conventional method extractions
- Chemical analysis of food materials (fat, protein, carbohydrates, moisture and ash)
- Maximizing gum yield
- Measuring rheology
- FTIR analysis
- Data analysis and observational analysis

## Hydrocolloid Extraction

![Optimized extraction method for fenugreek gum, taken by Tiffany Sodano](image1.png)

**Figure 1:** Optimized extraction method for fenugreek gum, taken by Tiffany Sodano

## Results and Highlights

- **Emulsification Use**
  - Psyllium gum as an emulsifier proved to be more efficient than other commercially used emulsifiers
  - Stability was seen over long periods of time for both psyllium and fenugreek gums

- **Microwave Extraction**
  - Microwave extraction better than conventional method
  - Less degradation of gum when extracted by microwave
  - More uniformity of gum
  - High gum yields

- **Viscosity**
  - Higher viscosity for runs done by microwave extraction
  - Highest viscosity measured at higher temperature extractions

## Contributions to my Future Career

My class education and practical knowledge was certainly exercised throughout my work this summer. The ability to understand chemistry and engineering was essential to effectively preform my tasks and procedures. My future internships and long term employment opportunities will be positively impacted by my work this summer.

This internship also enhanced my team work and professionalism skills. Working alongside a successful and motivated PhD student encouraged me to work harder.

![A photo of Shima (left) and Tiffany (right), working in the laboratory, taken by Tiffany Sodano](image2.png)

**Figure 2:** A photo of Shima (left) and Tiffany (right), working in the laboratory, taken by Tiffany Sodano

## Conclusion and Acknowledgments

Psyllium and fenugreek gums prove to be an efficient and applicable food additive. They prove to be better than certain commercially used gums. Overall, using these hydrocolloids as food additives have multiple benefits and application. Additionally, I would like to thank Dr. Orsat for this opportunity and Shima Keisandokht for the great support and supervision.
ASSISTANT-TECHNICIAN

Responsibilities
- Help the technician deliver treatments to hospitalized animals
- Take care of hospitalized animals
- Assist in the pre-operative and post-operative part of the surgeries
- Assist the technicians and veterinarians when they need help
- Sterilize the surgery instruments and the surgery room
- Execute daily chores
- Unpack the daily shipment of supplies

Figure 1: Cleaning surgery instruments
Figure 2: Preparing a large animal client’s order

RECEPTIONIST

Responsibilities
- Fill the store in front of the reception area
- Take phone calls
- Schedule appointments
- Answer clients’ questions
- Dispatch large animals veterinarians that are on the road
- Prepare orders for large animals clients
- Check-up calls

KNOWLEDGE ACQUIRED

I had already been working at the Ormstown Veterinary Hospital for a year prior to my internship. Working there again this summer allowed me to further my knowledge in a few fields:

- Transmission mechanism of common diseases in cats and dogs
- Basic knowledge about exotic animals
- Radiology field in small animals and horses
- Common clinical cases seen in the small and large animal practice

The learning process was not the conventional one, as I first acquired knowledge in the field and later I will learn it again at university. The links I was able to make between the veterinary hospital and what I learned in the classroom was mainly around basic molecular level knowledge. As I have only finished my first year of university, I did not get the chance to go in depth and learn a lot about animal disease.

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As an intern on this Jersey dairy farm, I had a wide range of tasks including feeding, bedding and moving calves, preparing their milk bottles, giving vaccinations and oral medications to calves, milking cows, scraping and bedding stalls, feeding hay to cows, unloading and stacking hay bales during haying season, mowing the lawn, building new stalls and feeding minerals and grain to heifers. I was also given the opportunity to shadow a large animal veterinarian!

During this internship, I learned a great deal about the operation of a dairy farm, the crops grown, the machinery used, the lactation and reproductive cycles of a cow, how to handle cattle, the care and feeding of dairy cattle and how to drive a tractor. The internship contributed to my understanding of cattle, farming and the dairy business. The knowledge and experience I gained can be applied to my future studies and will be beneficial and important for my future career as a large animal veterinarian.
Nutrition Internship at Share the Warmth

Share the Warmth is a community group in Point St-Charles, Montreal, that works to fight hunger and poverty. Our goal is to awaken hopes and dreams in the community so that we can all eat, so that we can all learn and grow, and so that we can all work.

I learned...

- About methods of food preservation (canning, pickling, etc.)
- Standardization and determining the cost of larger scale recipes
- How to manage my time when cooking for a large group of people
- Gardening! I learned how to grow various types of fruits, vegetables and herbs. I also learned about composting and how to maintain the garden
- More about the non-profit field and how it functions within the community to effectively help others
- How to speak more fluently in French
- How to communicate better with people of different cultures and backgrounds

Community Kitchen and Cafe
Breakfast and lunches were served at the Share the Warmth cafe each day. These meals were healthy, delicious and affordable for the community, served at only 2 dollars per meal. Working in the community kitchen meant working with many volunteers and community service workers who would all work together to cook and clean. I loved working in the kitchen because I was given lots of room to be creative in my cooking!

Food Preservation
One major project that I had was to preserve or transform the produce that was donated to Share the Warmth by local farms and markets. Through this project, we were able to decrease food wastage by using produce that was about to spoil.

Top picture: jars of pickled carrots
Bottom picture: interns and volunteers sorting through 40 boxes of fresh strawberries to make jam

Growing Produce/Gardening
In our garden, we grew a variety of fruits, vegetables and herbs! Some of what was growing is:

- Zucchini
- Tomatoes
- Swiss chard
- Lettuce
- Basil
- Thyme
- Bok choy
- Kale
- Cucumber
- Turnips and more!

“Pay-what-you-can” Market
This market included mainly organic and locally grown fresh fruits and vegetables. The concept behind “pay-what-you-can” is to allow customers to purchase the produce at whatever price they are able to afford that day, based on an honour system. The idea is that if they pay less than that week, they should be paying more the next week. This market was a great way for the community to be able to choose fresh and healthy produce for an extremely low price. This made nutritious food more accessible for the community!

Nutrition “FoodFit” Workshops
Every week, we would run a workshop focused on teaching basic principles about food and health. This involved leading a discussion based on a nutrition topic, followed by an exercise portion and ended with cooking and eating a meal together. This program was able to equip the participants to be able to make healthier diet and exercise choices, as well as showing them the importance of having an overall healthy lifestyle.

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