INTERNSHIPS
Bieler Family Internship Office
SUMMER 2016
During my 11 internship I volunteered with an organisation that helps monitor loggerhead sea turtle nesting beaches throughout Greece. In Zakynthos we collaborated with the National Marine Park to conserve the pristine nesting beaches by enforcing beach regulations during the nesting season, collecting data for beach nest counts and tagging individual females during night survey beach monitors. We conducted public awareness information sessions at hotels and had kiosks set up around the island of Zakynthos. In the Amvrakikos research project data was collected from feeding juvenile male and female Caretta Caretta by capturing them from the water, collecting data on the boat and placing metal tags before releasing them back into the water.

Fun Facts Learned:
1) Only 1/1000 hatchlings survive to maturity
2) Each female lays ≈100 eggs per nest and can lay 2-3 clutches per nesting season
3) Adult loggerheads eat jellyfish
4) Females come back to the same beach they were born to lay their eggs

Excavation of a hatched nest 2 weeks following the first hatching during morning survey on Dafni beach, Zakynthos

Also in photo: Lena-Marie Holterf & Jo Farrow

Photo Credit: Alayna Dorobek

Please contact me for any additional information on my experience at ARCHELON:
amanda.smith-stasinopoulos@mail.mcgill.ca
My Internship in Pressfield Holdings Limited

Pressfield Holdings Limited
敏興集團有限公司

Name: Andes Ng
Email: andes.ng@mail.mcgill.ca
Company's Contact Information: http://www.pressfield.com/

Company Background
Pressfield is one of the world's leading sweater manufacturing companies. The company provides sweaters to major international brands around the world.

Job Description
- Understanding the industry
- Understanding the customers
- Understanding the needs of the company
- Field Trips to stores
- Making a video in factories in China to provide 'Standard of Procedures' of sweater manufacture for other factories of the company in the likes of Thailand, Myanmar and Vietnam.

Gap P.A.C.E Program is a sustainability project held by the company and the clothing giant Gap Inc. We as interns, try to find similar ideas to strengthen the company's sustainability, with the help of science.

A photo showing the large size of the company’s factory in Mainland China.
Introduction

- Renewable freshwater resources in Quebec make up one-third of the water resources available in Canada as a whole, and roughly 5% of the resources of the planet.
- Groundwater contamination by nitrates is a problem related to the spreading of organic and chemical fertilizers by farmers.
- Health effects of groundwater contamination by nitrates and may lead to eutrophication and important consequences for marine life and infants.
- Just downstream from Montreal, phosphorus and nitrogen levels exceed the water quality guideline because of the release of municipal wastewater into the river.

Objectives

- We hypothesize that addition of SAP and biochar into soil will increase nutrient holding capacity of soil substantially and will mitigate the loss of nutrients, phosphorus and nitrates, through leaching.
- Increased C storage, improved soil fertility, and reduced nutrient leaching are among the most pronounced effects of biochar soil amendment.
- Biochar application in soils may be an efficient practice for improving soil nutrient content, availability, and crop productivity.
- It is proposed that incorporating Super Absorbent Polymers (SAP) help soil retain large quantities of water and nutrients, which are released as required by the plant.

Materials and Methodology

- 15 lysimeters each having 2 holes (34" diameter) drilled at 10 cm and 30 cm heights filled with sandy soil were used.
- Biochar was produced with dried prairie peat charred in a pyrolysis unit.
- 5 treatments were setup each having triplets: Biochar, SAP, SAP+Biochar, Control, Freshwater.
- Each treatment was incorporated in the top soil.
- Spinach plants were transplanted into all lysimeters.
- First round of fertilizer was applied on same day as planting i.e. 10th of June 2016.
- Soil samples were taken before planting and 10 days after planting.
- Wastewater created by Nadegogva and Dhiman for their research project was also used in this research project.
- First wastewater irrigation was done on 1st of July 2016. Second round of fertilizers applied on same day.
- Four irrigations were carried out with 10 days interval. Soil samples were collected on 3rd day of every irrigation.
- Soil samples were analyzed in lab for available phosphorus by performing Molybdenum test and for extractable Ammonium and nitrate ions by performing test with KCL.

Conclusions

- Ammonium concentration decreases over the time indicating mineralization of ammonium ions to plant available nitrate ions.
- Background samples have very small quantities of ammonium and nitrate ions in all depths.
- Control is holding more nitrate ions in surface soil as compared to other treatments.
- SAP+BC is holding more nitrate ions than other treatments in depth 1 and depth 2.
- SAP has a property of holding nutrients and releasing it slowly.
- Therefore, it can be concluded that the lysimeters with SAP are holding nutrients as shown by last two depths.
- However, in the top soil nutrients are being released slowly which can be beneficial to avoid leaching.

Results

<table>
<thead>
<tr>
<th>Ammonium Concentration</th>
<th>Nitrate Concentration</th>
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<tbody>
<tr>
<td>Surface</td>
<td>Depth 10 cm</td>
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Bibliography

(Novak et al. 2009b; Laird et al. 2010a; Van Zwielen et al. 2010; Lu et al. 2013; El-Naggar et al. 2015).
(Lohmann et al. 2003; Liang et al. 2006; Van Zwielen et al. 2010; Ventura et al. 2013)
(Lohmann and Rondon 2006; Novak et al. 2009b; Graber et al. 2010; Majer et al. 2010a)
Feeding orphaned wildlife
Wildlife rehabilitation techniques learnt:
- Rescues & Releases
- Exams & Restraint
- Treatments & Care
- Feeding & Nutrition
- Monitoring health
- Evaluating behaviour
- Cleaning & disinfection
- Time management
- Solo & Team work

Virginia Opossum, photo by Kerstin Jede
Eastern Gray Squirrel, photo by Cory Waheed

Rescued Orphaned Raccoons;
Rambo, Amy and Drake, photo by Lena Gill

Cory Waheed
corinne.waheed@mail.mcgill.ca

McGill

Painting the beaver enclosure, photo by Cory Waheed

Finishing the deer enclosure, photo by Kerstin Jede

Project: Monitoring the growth rates of three raccoon kits in my care.

Records of raccoon growth over two months (weight in grams over time in days)

Baby Northern raccoon, photo by Kody Knighten
Juvenile Northern raccoon, photo by Brookland Martin
Field trip with raccoon kits, photo by Stijn Verhoveen
I was part of a food product development team that participated in an international competition in Chicago, with our winning product, *Fitamin Multimeal*. This product is specifically designed for pregnant women and children in Yemen to combat the many nutritional deficiencies present in that region. I was responsible for all the food safety aspects of our product from legislation, to raw materials and processing.

This internship helped me to improve and strengthen my problem solving abilities, as there are many challenges and obstacles that must be overcome when developing and creating a new food product.
Research on Popular Uses of Medicinal Plants in Mestizo and Indigenous communities on the Oroza River, Peruvian Amazon

What I learnt:
- Improving my Spanish by conducting daily interviews with Peruvian locals in Spanish
- Insight on indigenous cultures, lifestyles, health and environment through day to day interactions with the Yagua communities
- The uses and preparations of more than 140 different plants
- Able to identify most of the 58 plants included in the book
- The process of collecting plant vouchers in humid environments

Contribution to my career goals:
- Valuable insight into NGO work
- Exposure to field work and to research methods

Description of my research:
- Research in the Mestizo and Indigenous communities of the Peruvian Amazon Oroza River on their use of medicinal plants.
- Goal of the project: to increase awareness and promote the use of medicinal plants across communities on the River Oroza
- Mestizo communities: Santo Tomas, Nuevo Israel
- Yagua communities: Commandancia, Puerto Yamori, Santa Rosa, Santa Urzula
- Interviewing herbalists, community leaders, health promoters, and households to collect information about the most common medicinal plant used, their preparation and for which illnesses.
- We created a book including plants that were mentioned three times or more by the populations
Internship at Normandin Research Farm

This internship allowed me to understand how a governmental research farm works which helped me decide whether or not it's a field which could interest me. I worked with dynamic people and spent most of my summer outside which allowed me to enjoy the great weather!

Tasting the seaberries

Work with a team of researchers and students to grow various plants, collect data for agricultural research and prepare samples for lab analysis.

Collecting alfalfa samples

Preparing the fields

Grinding the samples before sending for lab analysis

Agriculture and Agri-Food Canada

AAFC Research Farm
1468 St Cyrille St.
Normandin QC
G8M 4K3
418-274-3378

Office of Student Academic Services
Macdonald Campus

McGill Faculty of Agricultural and Environmental Science

Judith Largy-Nadeau
judith.largy-nadeau@mail.mcgill.ca
Internship at the Lyman

If you never ventured in the Centennial Center basement, you might not know that a museum is hidden down there.

Yet, the Lyman entomological museum is home to millions of insect specimen, many of which are waiting to be discovered.

My internship was designed to have 2 parts: doing research, and doing curatorial work in the museum.

Describing new species

The first part of my internship consisted of continuing research on a genus of flies that seemed to have more species than those already described, Neodiptotoxa. This genus has 2 North American species, yet it seems more diverse. I had to sort the specimen, describe new species and create a key to the whole genus.

My internship showed me how complex species are, and how hard it is to determine what is a new species.

Databasing butterflies

For the curatorial part of my internship, I worked with Entomofaune du Québec, an organization aiming to learn more about Quebec Arthropods.

My job was to database the collection of North American butterflies and skippers that inhabits the Lyman Museum, so that the information can benefit future research through the online database eButterfly (You can also contribute! www.e-butterfly.org).
Washing and preparing the day’s harvest.

Making sure to turn on the heat lamps at night for the new broiler chicks.

An internship will challenge yourself and make you better understand the many aspects of agriculture.

Planting onions in groups allows you to harvest them already in bunches.

Bottle feeding calves.

100 acre farm in southern Ontario with an organic vegetable production and livestock.

Pruning tomatoes to increase the plants’ fruit yield.

Mulching pathways to better control the weeds and create a microclimate.
Food Security in Northern Canada (FoodSINC) Greenhouse HVAC System Internship with the Macdonald Campus Biomass Production Lab

Intern:
- Mark R. Cool – mark.cool@mail.mcgill.ca

Supervisor:
- Mark Lefsrud Ph. D.

Location:
- Macdonald Campus Technical Services Building

Tasks:
- Assisted in the construction of a hydroponic growth chamber
- Worked on the design/fabrication of a greenhouse HVAC

Challenges
- Designing a working prototype from scratch
- Working on a timeline

Working Career Skills Acquired/Developed:
- Drawing software skills
- Lathe machining
- Rudimentary welding
As an intern with the Bureau of Forestry’s planning section, I helped edit, revise, and update the policies governing management of PA State Forests. I wrote reports on gas activity on state lands, and worked with G.I.S. to compile information about different parcels of state land.

In addition to learning much about forest ecology and silviculture, I gained an understanding of how conservation policy is conducted administratively, as opposed to how it is implemented in the field. My travels helped me see first-hand the role of state agencies in natural resource management. I now have a better grasp on what it would be like to have a career in state government. I came to appreciate that in a job like this, communication skills—especially writing—are almost as important as one’s educational background.

To learn more, contact: mercy.harris@mail.mcgill.ca
Introduction

Undergraduate Pilot Project

Our employer, McGill University (21111 Lakeshore, Ste-Anne-de-Bellevue, Québec, H9X 3V9), partnered with the Canadian Light Source to develop a program for undergraduate students. The Canadian Light Source already welcomes high school students as part of their Students on the Beamline program. They would like to extend this opportunity to undergraduate students.

Project Summary

In addition to being undergraduate students of McGill University, we both work at the University’s dairy barn. Recently, the Macdonald Campus dairy barn has established a new method for testing bovine colostrum (the first mammary secretion after calving), to assess quality by calculating percent total solids using refractometry.

Since surplus high quality colostrum is frozen and stored for future use, we were wondering if this had any effect on quality and the structure of the Immunoglobulin G protein (which is an important component of colostrum as it is important to calf health and the future of the herd).

Job Summary

At McGill University

- Reviewed literature
- Submitted a proposal to be accepted by the CLS
- Completed several modules of safety training
- Collected colostrum samples
- Tested colostrum quality
- Ran preliminary FTIR spectra
- Developed sample preparation techniques and ran preliminary spectra

At the Canadian Light Source

- Acquired fresh colostrum
- Prepared colostrum samples for analysis
- Scanned our samples on an attenuated total reflectance (ATR) machine and the synchrotron source
- Analyzed our most significant data
- Presented our preliminary findings

Knowledge Acquired

A Scientific Research Experience

We now understand the amount of time and effort involved in gaining access to restricted facilities and equipment.

We learned a great deal about sample collection and the difficulties of research involving live animals. We also developed our more practical skills such as sample preparation which enhanced confidence in a laboratory setting.

We learned how to use the different machinery available as well as the difference between the benchtop IR and the synchrotron source regarding sample preparation and spectra obtained. This allowed us to better interpret our infrared spectra, specifically related to the proteins in colostrum.

We also gained insight into the field of experimental science. We learned we needed to adapt and persevere as we overcame challenges along the way.

Acknowledgments

- McGill University Macdonald Campus
- Dr. Ornat and her laboratory
- Chantal Charette, Paul Meldrum and other Macdonald Campus farm staff
- Beller Family Internship Office Macdonald Campus, McGill University
- Dr. Scott Rosenzweig and Dr. Stuart Reed
- Mr. Tim May
- Tracy Walker and Anna-Marie Boechler
- Dr. Fritz Schumann
- Plum Blossom Farms
- Dr. Alice Charestes

Impacts

Future Studies

- Experience for future research projects
- Professionalism within the scientific community
- Networking within the Faculty of Agricultural and Environmental Sciences at McGill University

Career

- Networking at the Western College of Veterinary Medicine and at the Rayner Dairy and Teaching Unit
- Better knowledge base in calf health and colostrum management
- Experience in developing ideas that produce meaningful results

Figure 6: Olivia presents preliminary findings at the Canadian Light Source

Figure 1-3: Olivia at the Macdonald Campus Farm

Figure 4-5: Olivia at the Har Royal

Figure 6: Olivia at the Har Royal

Figure 7: Olivia at the Macdonald Campus Farm

Photographers: Nelio Morel, Sebastien Groves and Alannah
My job at Nestor Paris was to:
- manage nutrition issues to make sure the meals were well balanced
- develop the project “Vendredi Healthy”, which means that every Friday a meal lower in fat and sugar than the other days is proposed. The aim was to fill a customers’ demand in a healthier meal option
- work with the Chef to design the menu every week and upload it on Nestor’s website
- organize and plan the culinary tests to introduce new recipes on the menu
- look for new packaging that fit the food perfectly to improve the customer’s experience

My greatest successes were to launch the “Vendredi Healthy” project, to solve some HACCP issues in the kitchen, find adequate packaging for cakes/desserts, soups, and smoothies. Moreover, I managed to bring consistency and wholesomeness to the meals. The biggest challenges were to find new recipes that fitted the kitchen capacities and would resist the delivery issues. To work with a team was also part of the challenges, it took me a few weeks to familiarize myself with the startup but I absolutely enjoyed the experience once settled.

My academic background in nutrition, food packaging, and HACCP especially helped me during my internship, among other skills. My work experience was highly instructive and rewarding. I enjoyed working with such a nice team of young and dedicated people who let me learn a lot from them. It was a pleasure to spend these 10 weeks at Nestor and partly contribute to its success!

Contact information:
Intern: Rose Bonnany – rose.bonnany@mail.mcgill.ca
Employer: Nestor Paris – www.nestorparis.com +33 (0)7 88 73 49 80

Background picture: Red berries crumble ready to be delivered in a refrigerated shelf.
Voluntary Assistant at the United Nations World Food Programme

Employer: United Nations World Food Programme  
Location: Panama City, Panama  
Employer Contact: panama.hrsupport@wfp.org

About the host organization
The World Food Programme (WFP) is the voluntarily funded food assistance branch of the United Nations and the world’s largest humanitarian agency fighting hunger worldwide and promoting food security.

Highlights of the internship
Several aspects made this experience unforgettable, such as the country, the working environment, all the people I have encountered and everything work has taught me. In fact, being able to travel and discover a different country while gaining a new work experience was incredible. Also, contrary to expectations that one may hold about large bureaucracies, the work environment was very welcoming; my contributions and opinions were taken into consideration and appreciated at all times.

Job Description:
As a WFP intern, I assisted the Communications and Knowledge Management Unit by:
- editing and posting content such as news releases, web stories, hunger stories on the WFP external sites
- monitoring the media for mention of the WFP’s work in Latin America and Caribbean region
- creating content for “WFP in the News”, which is an internal email newsletter
- producing Facebook and Twitter Analytic Metrics Reports to evaluate WFP’s social media accounts
- editing and translating documents
- helping to format texts into official templates for external distribution.

Overall experience
Although this internship was not related to my field of studies, I am satisfied with the results, as I was able to better understand the inner workings of the UN system, as well as gain first-hand experience of the administration and internal bureaucracy of an organization. Not only did I learn valuable skills and meet wonderful people, but I also grew as a professional and I now have a much better idea and direction of my future career path. Moreover, this internship allowed me to further my experiences in international development.
Summer Internship 2016 with Chemonics International

At my internship this summer, I worked with the Agriculture and Food Security (AFS) Practice to gather information and conduct research on AFS technical areas. Ultimately, I developed ten background guides while supporting recruitment, practice events, and partnership tracking.

I learned a lot about the development consultant industry and am excited to pursue field work in agriculture and food security moving forward!

To learn more, contact me at sybelle.vanantwerp@mail.mcgill.ca.
I was working in a community garden inside a small village named Gapakh in Senegal. I was living with a family of the village and I helped the women responsible of the garden in their everyday activities. I learnt a lot about cultivating crops in arid condition where irrigation or watering is essential. It helped me recognizing various pests common during the dry season and also the rainy season. It showed me how lucky we are to live in a developed country where fields crops are easier to produce with the help of mechanization.

Contact me at william.overbeek@mail.mcgill.ca
Environmental Intern for La Ville de L’Île-Perrot

Job description:
As the environmental intern my primary function was the "Independent Waste Water Management System Plan" which included setting up a plan of action to replace systems in accordance with the provincial norms, executing it and writing the legislation to accompany it.
In addition to this, I was in charge of the new legislation concerning pesticide use and organizing environmentally oriented events for the City.
I also participated in events organized by the urban and environmental department to encourage the public to make ecological decisions.

Organizing and hosting an information session for the owners of homes with septic systems.

Visiting the water treatment plant to better understand the struggles of water shortages during heat waves.

I had the chance to organize and participate in events to inform the public on environmentally friendly practices such as mulching, decreasing water waste, limiting the spread of the emerald ash borer, and proper waste disposal methods. This diversified my schedule and my workload!

I learned about municipal law and how decisions are made based on a political and administrative balance. I also became an expert in independent waste water management systems and pesticide use. However more importantly I learned how a project can be carried out from planning to execution in the field, and all the glitches that can result from poor planning.

The best part of the internship?
A super dynamic team in a fun and friendly environment.

Alexandra Charlton
Bioresource engineering student
alexandra.charlton@mail.mcgill.ca

Office of Student Academic Services
Macdonald Campus

Ville de L’Île-Perrot
Service de l’urbanisme et de l’environnement
136, Boulevard Perrot
Île-Perrot, Québec J7Y 3G1
Comparative Healthcare System Program

Coordinator: Kate Gong
Email: mcgill.chsp@gmail.com

WHAT I LEARNT...

Learnt about:
Social health policy, epidemiology, traditional medicine, patient care, research & funding for public health and preventive care measures

Challenges: Extrapolation of aspects of Taiwanese healthcare system requires more future research and advocacy.

MAIN PROJECT

A knowledge evaluation on breastfeeding promotions and policies in Taiwanese female adolescents and women: A qualitative Review

Future Studies:
This was a great experience to complement my future studies in Masters of Public Health (MPH)

Program Participants with Pr. Chen Catherine, Jia-Jyan, Frank, John, joey, Alex, Arlin, Aarti, Vanessa, Britany, Melanie. Pic: Shu-Chun Lee

View of Taipei city from Elephant Mountain, Taipei 101 pictured. Pic: Arlin Cherian

Learning to intubate on a patient manikin at Kaoshiung Medical University. Pic: Vanessa Wong

Receiving welcome package from President of SZMC, Mr. Ming-Tang Chen. Pic: Vanessa Wong
Maya Mountain Research Farm located in Belize, Central America

MMRF is a permaculture and agroforestry demonstration site. The farm resembles a lush rainforest dominated by coconut trees, mango trees, avocado trees, papaya trees, pineapples, cacao trees, and coffee shrubs.

With hundreds of species of plants, birds, amphibians and insects, this is the perfect place to study both sustainable agriculture and wildlife.

My work:
- Planting and transplanting trees, harvesting produce.
- Identifying and cataloging over 300 plant species.
- Independent project: *A Study of Tropical Plant Biodiversity in a Permaculture Agroecosystem in the Maya Mountains of Belize*

Contact me:
Audrey Constance Wagner
Major in Environment, Food Production and Environment
Email: audrey.wagner@mail.mcgill.ca

Definition of permaculture:

Permaculture is a framework for designing sustainable landscapes, usually agroecosystems. Permaculture is often used to restore degraded land and replace it with perennial-based agricultural systems that mimic nature. Permaculture can be used for agroforestry and edible landscaping to create 'food forests'.

A transformative learning experience in:
- Permaculture, agroforestry, and tropical ecology
- Sustainable off-grid living
- Conducting field research on biodiversity
- Gaining specific hands-on skills, for example, how to roast, peel, and grind cacao beans in order to make cacao powder.
Internship 1:
Lauren Minchen, MPH, RDN, CDN
Golda Bar, PO Box 4584, New York, NY 10163
lauren@goldabar.com
www.goldabar.com

Job description: Nutrition Marketing:
I worked with registered dietitian Lauren Minchen, founder and president of
Golda Bar, on various projects such as writing educational blog posts for
the Golda Bar website, creating nutrition-related YouTube videos to
promote Golda Bar, and performing live demonstrations at a local health food
store to promote the bars.

Me working from my apartment in New York City.
Photograph by Meg Cupp

Me holding up two Golda Bars and the brochure I made.
Photograph by Meg Cupp

Golda Bar Cacao Almond Flavor
Photograph by Robert Hickson

Me filming a YouTube video.
Photograph by Meg Cupp

Lauren Minchen and I hosting a Golda Bar demonstration
at Zen Medica, a local health food store in NYC.
Photograph by Cooper Chimbler

Throughout my internships, I not only deepened my knowledge in nutrition, but also learned about the development of a start-up company. I learned how to raise money using Kickstarter, how to create a new product, and how to market it using various strategies including social media platforms (YouTube, Instagram, Twitter, and Facebook). I also learned how to use iMovie and make YouTube videos. I created a YouTube channel for Golda Bar. I also learned how to create a website and how to use the Search Engine Optimization (SEO) method in order to be ranked higher in Google searches. Moreover, I learned how to build a nutrition consulting private practice from scratch and shadowed a nutrition counselling session with Ms. Brockman and one of her patients. I also shadowed a weight-loss program at Goldman Sachs and learned a lot about corporate wellness, which is the field I would like to work in in my future career.

My greatest challenges were promoting ideas that I do not personally support such as the fact that non-GMO, organic, and gluten-free foods are better for your health. Another challenge was having to learn how to use iMovie and filming videos. It is much harder than it looks! Lastly, writing scientific articles for the general population to understand was challenging. Writing about complex, scientific mechanisms is much easier when you are writing for somebody that knows what you are talking about.

My greatest success was making all my YouTube videos and creating the “Golda Bar Snack” YouTube channel, which still has many more videos to come.

Internship 2:
Jacqui Brockman, RD, CDN, CLT
Jacqui Brockman Nutrition
1133 Broadway, Suite 1010, New York, NY 10010
jacqui@jacquibrockman.com
www.jacquibrockman.com

Ms. Brockman is also the Registered Dietitian
of Goldman Sachs.

Goldman Sachs

JACQUI BROCKMAN
for a healthier life

Job description: Nutrition Blogger:
I worked with Jacqui Brockman, registered dietitian of Goldman Sachs. I shadowed a
weight-loss program at Goldman Sachs and observed Ms. Brockman during a nutrition
counselling session with one of her patients.
I also worked on distinct projects such as creating a nutrition blog for Ms. Brockman’s patients, reaching out to other health professionals for patient referral purposes, and creating recipes along with analyzing their nutrition facts.

Office of Student Academic Services
Macdonald Campus

OSAS

McGill Faculty of Agricultural and
Environmental Sciences

By Chloe Cassecuelle
chloe.cassecuelle@mail.mcgill.ca
Description of Company & Job

Microhabitat is a Montreal start-up that offers residents, restaurants and corporations the installation of urban gardens. Founded in 2014 by Alexandre Ferrari-Roy (who holds a Bachelor’s in Agricultural and Environmental Sciences), Microhabitat is teaching people about urban agriculture and sustainable food production. I was an intern from May to June 2016. I helped Alexandre with any task that needed to be done but mostly focused on creating a catalogue and a handbook, doing fieldwork and developing workshops.

Catalogue & Handbook

The catalogue and handbook were designed to help employees and clients understand the bases of gardening, plant needs, and urban agriculture. The handbook focused on the overarching topics of urban food production, while the catalogue was a list of all the plants Microhabitat offers to its clients. Each plant’s description included its needs in light, water, nutrients, companions and other tips and tricks to assure a healthy and productive growth.

Fieldwork

This aspect consisted in helping in the installation of the gardens on rooftops or in courtyards. I was able to be in direct contact with clients and Microhabitat’s operating team. We would set up the pots, create the soil mixture, and transplant the seedlings. I participated in the following projects—Alexandre’s mother’s garden, Le Thazard, and Le Bleu Raisin (two restaurants in the Montreal Plateau).

What I learned

This experience taught me that an entrepreneur’s work is endless and represents one’s entire life. Alexandre was always thinking about how to improve Microhabitat, obtain customers, reduce expenses, etc. In addition, a strong organized foundation is necessary for an enterprise to grow. Another important concept I learned is that communication is crucial among partners. A team is needed because each member has skills that complement the others, but if they do not communicate between one another, they will never have a common vision for the business. Finally an enterprise’s most important asset is its reputation. If the company’s image is not preserved and nourished, then it will not survive.

Challenges & Successes

The most challenging aspect of this internship was working individually and independently on the catalogue and the handbook. Since it consisted of a lot of research, I would work on my own from home or conduct research at the library. However it ended up being very rewarding because Alexandre was very pleased by the final product. Another challenge I faced was stepping out of my comfort zone of always being told what and how to do a project, and actually dive in it on my own without any structure or guidance.

Overall this internship was very successful because I learned more about an entrepreneurial career and gardening, as well as enhancing my communicating skills and confidence. I met incredible people who are passionate about Microhabitat as well as clients who are greatly interested in the company and its growth.

Workshops

Alexandre and I developed workshops in which we wanted to vulgarize the basics of urban agriculture and educate people about gardening. We organized different events with Cultivons le Plateau, La Tank and Thirsty. We would present the company and its service and then follow through with a hands-on gardening activity.

(From left to right) Pierre-Auguste Comte, Orlane Pennet, myself, Christopher Edward, Felix Frager at the Cultivons le Plateau event in June.

Clara Limongi
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Supervisor: Alexandre Ferrari-Roy
microhabitatmtl@gmail.com
514-942-6573
7154 St-Urbain Street, Montreal

Illustration Credits: Maude Ariès
McGill & OSAS logos: Official website
The City of Montreal is in charge of managing the urban forests in most of the Montreal island. This task includes control of the emerald ash borer (EAB), an invasive pest insect which could potentially destroy close to 20% of all trees in Montreal.

My job this summer was focused on the intervention against EAB on private property, as the City mandates that citizens treat their ashes and offers a 50% subsidy to do so.

I really enjoyed learning more about the management of such a project, and touching on multiple aspects of the application of a by-law. It was an excellent chance to deepen my interest in project management and I would love to include this as part of my future career!
Ferme Avicole Paul Richard and The Soil Ecology Lab of Professor Joann Whalen

Ferme Avicole Paul Richard is an egg farm located in the Abitibi region of Quebec, which houses nearly 70,000 chickens. They are an entirely self-sustaining farm, growing their own feed and using the manure from their chicken houses to fertilize their crops. Their fields, which grow barley, red clover, canola, buckwheat, and spring/winter wheat (and more!) were the subject of study for Professor Joann Whalen and the Soil Ecology Lab at McGill's Macdonald Campus this summer.

The Soil Ecology Laboratory is analyzing the effects of chicken manure on soil and plant chemistry across three different farms in the Abitibi region. My work this summer was mainly taking soil samples, recording data, installing soil membranes, performing weed analysis, and preparing samples in the lab.

During the weeks when my work with the laboratory did not fill my time, I worked for Ferme Avicole Paul Richard, learning about modern farm technology, how to operate and repair farm machinery, and about sustainable farming techniques. Throughout the course of the summer I got to experience a number of different jobs, including driving a tractor, operating the feed mill, and shoveling buckets and buckets of chicken manure!

The Learning Experience

As student in bioresource engineering, it is important for me to understand the impact farming has on local ecosystems, and methods for improving sustainability. Through my experience this summer I was exposed to many new techniques and practices I had not before considered. It will serve as an inspiration to carry with me throughout my engineering career.

My interests in engineering are largely in modern technologies that improve the way we interact with our environment. At Ferme Avicole Paul Richard, I got to learn about and experience many different pieces of farm technology engineers developed within the past few years. These included complex tractor GPS systems, automated chicken house lighting and feeding systems (coded by an employee of the farm) and highly advanced scales and transport services in the feed mill.

My research project, "The effects of chicken manure on soil and surrounding ecosystems," allowed me to connect the research performed this summer with another engineering interest of mine, potential hydrologic solutions to environmental and public health problems that might be caused by fertilization.

Across these three areas, my experience this summer provided inspiration for career paths, important hands-on experience in agriculture and soil science, and education that will supplement the classes I take at McGill.
Bordignon Lab
Research Internship in Porcine in vitro Production
Fernando Altamura
fernando.altamura@mcgill.ca

MY LAB investigates different approaches to improve Somatic Cell Nuclear Transfer (SCNT) and cell reprogramming technologies. The research group uses oocyte derived factors and epigenetic modulation in order to erase epigenetic memory. They also investigate the role of chromatin modifiers and their actions during the reprogramming process.

Due to the physiological and anatomical similarities that pigs have with humans, the lab is interested in using swine models (more specifically minipigs) to study human diseases and to develop therapeutics for chronic and inherited disorders and cancers.

Protocols of porcine in vitro embryo culture are therefore continuously polished and refined to improve the models employed in this field of research.

MY RESEARCH PROJECT focused on the metabolic competence of pre-implantation porcine embryos. More specifically, I studied the ability of these embryos to uptake and metabolize glucose.

I used both an embryological approach, exposing embryos to different glucose concentrations in their culture media, and a genetic approach, investigating the developmental stage in which the first class of glucose transporters (GLUT-4) is expressed.

The ultimate goal of my project was to determine which member of the GLUT family is responsible for the uptake of glucose during pre-implantation development, and to design its consequent up-regulation, to increase the quality of porcine in vitro production (IVP).

MY GOAL is graduate level studies in science. I am very passionate about research and teaching, and I am projecting myself into an academic career involving both. I was looking for a laboratory-based experience that could complement my knowledge, and nurture my research interests.

I gained plenty of experience on cell and embryo culture, and I got the chance to improve my skills in project planning and experimental designing. I also learned a lot by shadowing graduate students, helping them with the daily routines of their research protocols.

I am very humbled and grateful for this wonderful experience, and I am excited to continue to work on this project in the next academic year.
LYW is a French start-up that raises awareness on and collects organic wastes: mainly food waste and frying oil. Its partners range from schools, breweries, hospitals, and companies.

I was working in the Logistics Team to optimize collection routes and methods for schools and breweries. We also launched the Used Cooking Oil activity for LYW.

On our way to collect waste from schools and breweries!

A complete service to respect and anticipate legislation on (bio)waste

A sustainable solution to achieve social and environmental targets

Innovative services responding to the waste producers’ needs

Working for LYW showed me what it is to be entrepreneurial: hard-working, passionate and confident.

The biggest challenges I’ve faced came from issues that come up during the operations and that could not be anticipated.

Jean Delatour: jean.delatour@mail.mcgill.ca

www.loveyourwaste.com
Indicators of Soil Quality Across Different Land Uses in the Panama Canal Watershed

Joan Herrmann
joan.herrmann@mail.mcgill.ca

Smithsonian Tropical Research Institute
Supervisor: Mano Bretfeld
m.bretfeld@si.edu

- This summer I worked as a research assistant for Agua Salud, a project of the Smithsonian Tropical Research Institute in Panama.
- Agua Salud evaluates how land use within the Panama Canal watershed affects the ecosystem services of these environments.
- As a research assistant for Agua Salud, I assisted in data collection from four different land use sites.
- During my time in Panama, I learned an incredible amount of knowledge about tropical ecosystems and the many factors that either enable or prevent its proper functioning.
- This experience proved to be a crucial stepping stone for my future ambitions to achieve a masters in either hydrology or bio-resource engineering.
- I had the immeasurable opportunity to work beside brilliant and passionate professors and scientists within the fields of hydrology and more generally ecosystem dynamics.
- I would like to thank my supervisor at McGill University, Caroline Begg, my supervisor in the field, Mario Bretfeld, in addition to Jan Hendrickx and countless others for their constant academic and professional support during my time in Panama.

In this photo I am collecting bulk density samples in a greater than 100 year old forest.

Pictured to the right I am enjoying a short “descansa” or break while collecting samples on the pasture site.

Collecting soil samples in the field often gets messy, but luckily the birds, monkeys and others “locals” aren’t judgmental!
Man is Like a Tree in the Field: Interning at Cultivate the City

Juliana Isaac
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U2 Bioresource Engineering Student

Cultivate the City is an urban farm operating in Northeast Washington, D.C. Through vertical farm production at several urban farm sites, school gardens, and home gardens, they aim to provide communities with organic, locally-grown produce.

Along with three other interns, I worked mainly at our primary location, a rooftop garden. There, I harvested fresh produce, planted new plants, and performed many garden maintenance tasks. All interns also worked at the two school gardens Cultivate the City runs, assisting with classes and running after-school programs in the gardens.

My individual project involved planting and maintaining a ZipGrow farm wall, designed by Bright Agrotech. Working on the ZipGrow walls involved daily maintenance. This included planting new seedlings and fixing malfunctions in the drip irrigation systems.

Working on these systems allowed me to further my knowledge of vertical farm systems, which I have started to learn about through Bioresource Engineering. I thoroughly enjoyed researching vertical farm systems and hope to continue working in this field in the future!

Throughout the summer, we were also able to participate in new and exciting projects Cultivate the City was starting. Creating a rooftop garden at the Washington Nationals baseball stadium was one of these projects, and was an incredible experience.

We planted over 600 plants of various types at the stadium; the produce harvested from these plants will be used in concession stands at the stadium. Being a part of such a high-profile project was an extraordinary experience, and I feel very lucky to have been part of it!
Dew Water Harvesting Project

Julie Jarjour – U4 Bioresource Engineering
julie.jarjour@mail.mcgill.ca

The dew water harvesting project began in the summer season of 2014 and continued in the summers of 2015 and 2016. Twelve dew water condensers were installed on the Macdonald Campus of McGill University and amounts of dew water collected were measured on a daily basis during the summers. Dew water harvesting can contribute to providing an additional water source and the goal of the project is to further explore dew water systems.

My role for the summer was to employ statistical models that predict dew yield using the experimental data of 2014. Through this, I was exposed to new softwares through which statistical modelling can be performed and I learned to understand developed code that performs statistical modeling. My tasks included performing two different types of data driven models: multiple linear regression and artificial neural network, and employing them for all the condensers. Furthermore, I wrote a report on the findings of the different models. Through modeling dew yield, one can establish the important meteorological parameters that affect dew yield. This research is important so as to further investigate the development of models that estimate dew yield and I was fortunate to be able to contribute to this research.

Employer: Dr. Jan Franklin Adamowski
Location: Macdonald Campus, McGill University
Employer Contact Information: jan.adamowski@mcgill.ca

Dew condensers set up on the Macdonald Campus
Introduction
During the summer of 2016, I got the opportunity to conduct an internship within the team of Project Management at APG-Neuros. APG-Neuros is an engineering firm that manufactures and operates turbo blowers for use in the secondary treatment of a wastewater treatment facility. Mr. Omar Hammoud, President and CEO, founded this company back in 2006 by teaming up with professionals from the gas turbine industry as well as from the aerospace and defense technology.

Benefits of turbo blowers
- Energy efficient + Cost savings
- Low noise and vibration
- Easy to install + reliable product
- Low maintenance; cleaning/ replacing air filters only
- Control, monitoring, diagnostics – user friendly
- Oil-free, non contact air bearing

Internship projects within the company
One of my main projects all throughout the summer was to create a complete database of projects, made up of all the data needed to perform a root cause analysis of all core failures. The prime goal of this task was to understand and determine the cause of failures, to ultimately prevent future failures. This project allowed me to visit a site in Deux Montagnes to better understand the complete process of turbo blowers.

Design approach of turbo blowers in a wastewater treatment plant
These blowers are mainly retrofitted into an aeration system to help dissolve contaminants. They are used in secondary wastewater treatment applications such as activated sludge, sequencing batch reactors and membranes. Turbo blowers are mainly intended to stir up and clean dirty water in an aerate sludge field to help the bacteria growth by adding oxygen to the water and allowing the chemical process to brake down the sludge.

References
Internship Background

This summer, I worked as a lab assistant in Dr. Mark Lefsrud’s Biomass Production Laboratory at McGill University Macdonald Campus. The main objective was to re-engineer and design a new and improved bee smoker. The existing design dates back to the early 1900s and no significant improvements to it have been seen since then (1).

My job was to develop a new design drawing inspiration from other technologies such as portable smoke devices and electronic vaporizers. Figure 1 below shows three samples of smoking devices made from simple lab materials and Figure 3 shows the smoke these samples created during testing.

Internship Responsibilities

Throughout the internship, I worked independently so I was responsible for all the work including research, design, purchase, fabrication, and testing. It ties into my major in Bioresource Engineering because those are vital to engineering design. This project required me to build upon my circuits and heat transfer knowledge, then put it to practical use. One of the most important things I’ve learned from this internship is how to set manageable goals. Also, to budget extra time for incidents that cannot be prevented such as waiting for an item to restock.

Why smoke bees?

Bee smokers have been used during the honey harvesting to stupefy and calm bees down so harvesters do not get stung. It is believed that smoke tricks the bees into thinking the their hive is on fire, so they will gorge on honey in preparation to flee their hive. The smoke also masks the smell of alarm pheromones emitted by guard bees (2).

References

Acknowledgements:
I’m especially thankful to everyone in Dr. Lefsrud’s Biomass Production lab for helping me with the project, sharing their knowledge with me, and making the lab experience incredibly fun.

Thank you to the Office of Academic Services at Macdonald Campus and the Bieler Family Internship Office for providing necessary assistance during this internship.
Forage Seed Production

Soil moisture and compaction readings were taken periodically.

Soil core samples were collected, dried and sifted for lab analysis.

Plant samples were collected, dried and ground for lab analysis.

Plant heights were measured when the crops reached their full height.

Photos by Rachel Lewis and Rahman Azooz.

Employer: Beaverlodge Research Station, Agriculture and Agri-Food Canada

My role: Summer student in the Forage Seed Production Program

What is forage seed production? Cool nights and long days make northern Alberta and BC perfect for grass and legume seed production. AAFC’s Forage Seed Production Program tests crop rotations, new seed varieties, and chemical treatments for forage crops like fescue, wheatgrass, clover and alfalfa.

My duties: My duties in the forage seed lab were related to setting up and analyzing experimental plots for perennial forage seed production. The lab seeds about 5 new experiments per year, and each experiment lasts 3 to 5 years. With seeding, sampling, harvesting and processing all these plots, the summer is very busy!

Pros: My favourite part of this job was learning about a wide variety of agricultural practices and research methods. Other perks were working with lots of other students, getting government certified training (driving, ATV, UTV, WHMIS), industry networking, guidance for my independent project, and the opportunity to travel in Alberta and BC.

Challenges: Physical labour outside in all conditions, repetitive tasks, operating farm equipment, understanding plant science and soil science, and living in a remote location.

Successes: Completing a research paper on no-till agriculture.

How to apply: Apply online through FSWEP (Federal Student Work Experience Program).

Contact: laura.kennedy@mail.mcgill.ca
Les Fermes Reyla Enr.
Email: Reyla@oricom.ca

As an intern, I was given a number of responsibilities that contributed to the success of the operation. In addition to milking cows daily, I oversaw the health and wellbeing of animals as young as a day old. I learned how to recognize livestock illnesses, as well as administer curative medical treatments. Furthermore, I promoted the growth and development of calves through diet management.

Les Fermes Reyla is a family-owned and operated dairy farm in Oromocto, New Brunswick. They farm 260 acres and milk 60 jersey cows.

I was responsible for ensuring the health and overall wellbeing of calves.

My internship was so valuable because I gained hands-on experience in both plant and animal science. As a student in Environmental Biology, I feel that this has allowed me to open doors to multiple career pathways, as well as help me realize my interests and strengths. This internship was definitely an indispensible part of my university education.

I learned how to evaluate the progress of crop growth, and identify factors that could be deterring from plant success. In addition, I worked as part of a team to harvest high quality hay for livestock. During this process, I gained an understanding of the correlation between the nutritional composition of feed, and cattle health.
What is STRI?

STRI is the Smithsonian Tropical Research Institute based in Panama City with the objective of understanding biological diversity. STRI aims to offer research facilities that allow staff scientists, fellows, and visiting scientists to achieve their research objectives.

Dr. Potvin is an associate researcher of STRI and she has been working in a project in Sardinilla, Panama looking at complex links between biodiversity, land use and tropical ecosystem functions in a wood plantation of native trees in Panama.

Job Description:

As a research intern I participate in a study looking the effects of tree plantation diversity on both butterfly and bird diversity and bird behavior in Sardinilla, Panama. I was able to contribute to the development of the methodologies done to study the two diversities and the habitat characterization of the plantation. Additionally, I collected the data by walking and recording species in three transects of 500 meters during the months of June to August and I organize the data base. Since the experiment will be running for the next year, I also helped to determine the minimum sampling effort for future data collection.

The experience in this internship allowed me to better understand the process of scientific research. I was able to actively participate in many different processes of research and I was able to learn from both my mistakes and success. Also, being in a foreign country allowed me to learn how to work autonomously and the importance of both organization and perseverance in science. Biology is a field in which one needs to be humble about both what one knows and what one ignores.
Internship at the Ministry of Agriculture, Fisheries and Food of Quebec (MAPAQ) in Blainville.

Supervised by agronomist Jean-Baptiste Sarr
(jean-baptiste.sarr@mapaq.gouv.qc.ca)

Job Description:

• Participate in land occupation projects using GIS and Info-Sols
• Participate in the application of phytosanitary measures in agricultural productions
• Participate in orchard modernization projects
• Perform field inspections, assessments and sampling according to strict protocols
• Participate in the organization of various informative sessions
• Collect, analyze and present data using Excel

Learning Outcomes:

• Project management skills
• Oral and written communication skills
• Organizational and time management skills
• Understanding customs and practices in agricultural productions
• Understanding and conforming with legal regulations

Picture of colleagues and I during fire blight inspections, taken by agronomist Jean-Baptiste Sarr

FAES 300
Marie-Josée Banville
marie-josee.banville@mail.mcgill.ca
Duties

- Verify HACCP Plans
- Verify Process Flow Diagrams
- Review CCP Records
- Compile HACCP Plans
- Ensure that written forms reflect true practices in the production plant
- Update production documents

What I learned

Working in a real production plant exposed me to food processing machinery and I was able to observe how/when they are used in the supply chain. Validating HACCP plans encouraged me to understand every detail pertinent to keeping a food product safe and have a bigger appreciation for Good Manufacturing Practices (GMPs). Additionally, working in an all-French environment forced me to further develop my bilingualism and interpersonal skills.

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The Kraft Heinz Company
8600 Ch. Devonshire,
Montreal, QC, H4P 2K9
(514) 340-2300

My supervisor Ellen Gravi (on the right) and I
Credits: Philippe Brizard

Cheez Whiz Line
Credits: Marina Nguyen
Mathilde Guglielmi
U2 Environment
(Biodiversity & Conservation)
mathilde.guglielmi@mail.mcgill.ca

I was a research assistant at the Lyman Entomological Museum. I worked on the fly family Empididae identifying specimens at the genus and species level. I used identification keys, diagrams, type specimens and a high power microscope. Throughout the process of identification and classification, I became more familiar with fly morphology and taxonomy. It was an opportunity for me to apply my previous knowledge of systematics that I learned at McGill. It was highly detailed and lengthy work, but it allowed me to get a glimpse of what it is like to curate a museum and work in a lab.
Job Description:
The main responsibility of this internship was to carry out an independent project supervised by Dr. Zhiming Qi. The project included elements of data processing, modeling and statistical analysis. Other major duties were to help Dr. Qi’s graduate students in the lab with their projects. These duties included breaking down soil samples, transportation and other required tasks. Research was a large aspect of the internship. A good portion of time was spent researching papers related to topics of climate variability trends and the effects of land use. Research was also done on the different methods of detecting trends and other possible methods to analyze raw data. The research from these papers were used to interpret data and information from the project towards a final research paper. All other jobs included helping Dr. Qi with requested miscellaneous tasks.

Overall Experience: This internship exceeded my expectation as a learning experience. This experience was technical and very hands-on. I learned about the research process and what it takes to write a paper for a journal. I learned about how the academic field produces research for companies. Working with Dr. Qi’s Graduate students allowed me to see what kind of research is being done in the field of water and soil. Since the project that I was tasked with was independent, managing myself was the most difficult part of the internship. This allowed me to improve on my organization and management skills. Overall, this internship was a worth while experience.
CLEANLINESS MEASUREMENT PROJECT

Ultraviolet sensor detects the presence of contaminants on surfaces

Validating surface contamination

My Role
Research and Development intern

• Evaluate prototype and explore functionality
• Make suggestions for prototype improvements
• Final design
• App Design
• Launch of the commercial product

Academic Success
Increased Knowledge in:
• Applied optics
• Design
• Data management
• Wireless data communication
• Marketing and Sales

[Images of sensor prototypes and project presentation]

Project Presentation

[Photo Credit: Mehak Munjal]

My Role
Research and Development intern

• Evaluate prototype and explore functionality
• Make suggestions for prototype improvements
• Final design
• App Design
• Launch of the commercial product

[Images of sensor prototypes and project presentation]

Project Presentation

[Photo Credit: Mehak Munjal]
**Marine Mammal Education and Research Internship**

**Olivia Bradberry**

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**Employer Contact Information**

Volunteer Programs and Internship Office
intern@neaq.org
Read about the application process here:
http://www.neaq.org/get-involved/internship-programs

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**Intern Contact Information**

Olivia Bradberry
Environmental Biology, U2
olivia Bradberry@mail.mcgill.ca

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**What did you do this summer?**

I spent the summer with whales! As a Marine Mammal Education and Research Intern on the New England Aquarium whale watch, I played a role in both public education and data collection. Over the course of the summer I developed data collection skills and got personally acquainted with many humpback whales. I also developed public speaking skills by interacting with the public, and teaching them all about whales and the threats that they face. My most common tasks included educational outreach, data collection and entry, and daily operations aboard the cruises. Read more about my daily activities in my Activity Report.

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**Why whales?**

At McGill I've had very little formal education regarding marine life. However, the ocean is not as isolated from us as we think. Every day, whales and other marine life face human-caused threats such as overfishing, pollution, and ship strike. Conservation and understanding of wildlife is an issue that spans all environments, and an issue that all my courses have stressed. This internship has not only built upon my environmental background, but also has given me practical experience in a research field, hopefully helping me to land conservation and research jobs in the future.

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**Breaching**

An uncommon sight in the feeding grounds we frequented, breaching is still somewhat of a mystery to scientists. After breaches, I scrambled to record the weather conditions and sighting information—happily this data will help us fully understand the myriad of reasons why whales breach.

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**Taking data**

Every day I collected data for all our whale sightings. I recorded the date, time, weather, sea conditions, longitude and latitude of the whale, behaviors, presence of scat, feed, calves, or birds, whale names, species, and photo frames. I also collected information regarding marine debris.

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**Feeding and Other Fun**

My job included recording behaviors like “surface lunge” (below), and “bubblenet” (bottom right). My supervisor forwarded this data to the Center for Coastal Studies—a center that utilizes the info in both the conservation of these animals and their habitat.

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**Finning dive**

Humpback whales lift their tails out of the water before most dives. We can distinguish between whales by the patterns on the underside of their tail—see Pelle above. This photo (left) allows us to better understand the whales’ lifespans, relationships, and encounters with fishing gear and propellers.

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**Photo taken by Tasia Blough**
http://www.bostonharborcruises.com/naturalists-notes/august-2016/august-21-2016/

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**Photo taken by Frida Clark**

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**Photo taken by Rich Dolan**
http://www.bostonharborcruises.com/naturalists-notes/august-2016/august-5-2016/

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**Photo taken by Rich Dolan**
Maya Mountain Research Farm; Agroforestry in the Rainforests of Belize

The Maya Mountain Research Farm is an NGO which aims to promote sustainable agriculture and food security using an agroforestry model. I experienced firsthand the challenges of tropical agriculture and learned a lot pertaining to the post-harvest processing of different fruits. I also learned how to carry out certain agricultural practices such as contour cropping.

As an intern at MMRF, my responsibilities included many farm chores including feeding the poultry, caring for the domestic rabbits, harvesting and processing of fruits, etc.

Moringa seedlings before and during transplanting, courtesy of MB Browne

Rose & fellow interns with the daily harvest, courtesy of C.Nesbitt

Secondary Project: Creating a Guide to the Care of Domestic Rabbits

I was also given the task of completing a guide to the proper care of domestic rabbits. Most important within this was identifying forages that could be collected on the farm and fed to the rabbits.

Main Project: Moringa as a Sustainable Source of Livelihood Among Belizeans

*Moringa* is known as miracle tree due to its multiple uses and impressive nutritional profile yet it is underused in Belize. My project involved me seeding 200 *Moringa* trees, 100 of which are destined for trade with local villagers to garner interest. I made observations about the seedlings’ growth and ways to optimize them, then validated these with a few local *Moringa* farmers. Noted was the germination rate, growth rate in relation to season, response to irrigation, soil type, etc.

Rose with finished guide & rabbit, courtesy of MB Browne

Contact MMRF
Directors: Chris Nesbitt, Calini Logan
Phone: +501 630-4386
Email:info@mmrfbz.org

By: Rose Seguin, rose.seguin@mail.mcgill.ca
Hi, I’m Roxanne Tremblay, and this summer I had the chance to experience the job of a green patroller for the municipality of Saint-Jean-sur-Richelieu.

Throughout the summer, my mission was to patrol the town and inform the citizens with ash trees that their trees were likely infested by the invasive Emerald ash borer. I was there to tell them that their trees were going to die and that the municipality had a program to help pay for a treatment if they were interested. On the side, I also participated in multiple environmental activities organized by the municipality, such as planting trees with children, developing environmental activities for summer camps, and inspecting whether citizens were respecting specific conservation zones or not.

This opportunity allowed me to learn how a municipality works and what can be changed or improved in order to be sustainable and ecologic. It also taught me how to be well organized and how to approach people, which gave me a lot of confidence, a foundation which I hope to build upon in future job opportunities.
What is it?
Hope for Wildlife is a charitable wildlife rehabilitation site

- Founded in 1997 by Hope Swinimer
- Located on the coast of the Atlantic Ocean in Seaford, Nova Scotia
- Composed of:
  - The hospital
  - The nurseries (marine, bird, raccoon)
  - The Education Centre + trail
  - Several enclosures for rehab animals
    - Flight cages
    - Marine unit
    - Outdoor raccoon units

Working as a rehab intern
What did I do?
My job entailed:
- Cleaning units
- Feeding the animals
- Administering medication
- Vet runs
- Miscellaneous tasks

What I’ve learned...
This internship allowed me to develop both as a person and as a professional animal caretaker

What I took away from this experience:
- Taking care of animals is an uphill battle
- Death is never easy to accept
- Being an intern involves immense responsibility
- No job is more rewarding than saving lives
Food Waste in l’Horeca

Internship in Namur, Belgium:
Company: Biowallonie
Research grant subsidized by Government of Wallonia, Belgium
Focus: survey food waste
Industry: restaurant/hotel

- 1/3 of the food produced is thrown out annually.
- 1/7 people in the world are hungry

Increased knowledge of the commercial food sector:
- Food preparation
- Food distribution
- Food waste
Influence my studies/future career to specialize in the food sector of engineering

Dividing waste into different categories directly impacts the amount of GHG emissions

Photos of food waste:

Biowallonie- Phillipe Grogna
philippe.grogna@biowallonie.be

sara.mikhail@mail.mcgill.ca
I was a stagier in field crops for which I had many tasks from screening soybean fields for producers to following fields for the Reseau d’avertissement Phytosanitaire (RAP) for harmful insects and emerging diseases. I conducted soil health evaluations for producers who had poor yields and helped my supervising agrologist make recommendations to improve the issue. Even if I was hired for field crops I was lucky enough to spend some time on organic vegetable farms and strawberry farms where I was able to develop my knowledge about harmful diseases and insects.

I conducted an experiment which examined the populations of wireworms and seedcorn maggots in various soil types within Quebec’s laurentian region (Mirabel, Saint-Anne-des-Plaines and St-Eustache). Little to no soil pests were found in heavy clay soils. With further research the use of neonicotinoids could be reduced to fields with light soils.

Throughout my Internship I was able to develop some important interpersonal skills. At the beginning I was unable to properly communicate what I had seen or what would be a viable solution to specific issue to my supervisor or even the producer. However I have learned so much throughout my internship that I am able to better explain myself as well as comfortably communicate with producers.
Wildlife Preservation Canada

Turtle Conservation
Raccoons and other omnivorous nest predators are drawn to campsites and cottages because it allows for easy access to food. Their presence, even in protected provincial parks, results in nearly 100% of all nests being devoured within 48 hours of being laid. This project aims to restore the populations of six at risk species of freshwater turtles through egg collection and incubation.

3 Fieldwork Seasons

Mark-recapture
- Trapping turtles
- Marking and data collection: notching, measuring, blood samples, claws samples, etc.

Nesting
- Tracking
- Egg extraction and incubation

Hatching
- Determining nest viability
- Marking using decimal coded wire tags (DCWT) and visible implant elastomers (VIE)
- Data collection: measuring, blood samples, claw samples
- Release

Our project
Aplalone Spinifera study confirms that the fitness of a female does not indicate the fitness of her clutch.

Is fieldwork right for you?
If you are passionate about conservation and don’t mind getting your hands dirty, then contact WPC today!

Contact us:
rebecca.novac@mail.mcgill.ca
stephanie.chan3@mail.mcgill.ca
admin@wildlifepreservation.ca
VACUUM PACKAGING APPLICATION IN THE MEAT INDUSTRY

Sysco Fine Meats – Trimpac
620 Malkin Avenue
Vancouver, BC V6A2K2

During the 14 weeks of internship at Trimpac, division of Sysco Fine Meats, I worked closely with different vacuum packaging machines as a production packaging associate for fresh and frozen meats.

My job duties as a production packaging associate include the following: meat product preparations according to order types, operating different vacuum packaging equipment, applying appropriate labels and dates, filling out proper HACCP documentation and using metal detectors for quality assurance purposes.

Meat product preparations that are specific to each order include: bone dust scrapping, skewer making, bacon wrapping, bone-guard applying and cutlets making using a tenderizer.

I worked on three different types of vacuum packaging machines in total: double vacuum chamber machine, automatic belt vacuum chamber machine and thermoforming vacuum packaging machine. Hence I decided to do a research paper on the application of vacuum packaging in the meat industry and the comparisons of the three types of vacuum packaging machines that I worked with this summer.

Besides the work and research, I had an opportunity to observe how a raw meat processing plant typically runs with all the production team, storage and receiving team, and the quality assurance personnel. From the food science aspect, I learnt how to adjust different settings of the vacuum packaging machines in order to achieve desirable quality of the packaged end product, and thus affecting the quality of the packaged meat. Also, I had the opportunity to observe how the QA personnel and the government food inspector perform their jobs daily at a meat processing facility.

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McGill
FACULTY OF
Agricultural and Environmental Sciences

Office of Student Academic Services
Macdonald Campus

Photo Credit:
Figure 1: Angela Lee
Figure 2: Mandy Zhang

Figure 1. Manufacturing site of Trimpac, Sysco Fine Meats
Figure 2. Proper workwear for food plant
Figure 3. Thermoforming vacuum packaging machine in operation
Source: http://www.ultracoreusa.com/
BURGEAP (Bureau de Géologie Appliquée) is a French firm, created in 1947, of engineering consultants specializing in the depollution of air, soil or water.

**My activities**

- Compile data to create a data base of the geochemical background for the region of Lyon to establish chemical threshold representative of the region.
- Produce geological sections with the program called STRATER based on information from fields observations.
- Do field work with technicians or engineers to learn about methodology.

**Examples of field experiments**

- Sampling of soil and its VOCs using a corer
- VOCs and O2/CO2 measurements in underground gases using a PID (photoionized detector)

**Lessons learnt**

This internship allowed me to grasp the processes of the world of work we lack when studying in classrooms. I was able to appreciate how much I have learnt since my first year at McGill and how it can be applied to different fields. However I also realized this knowledge has limits and the best way to learn is to actually do.
I had received an NSERC Undergraduate Student Research Award (USRA) which allowed me to work for Professor Orsat in her laboratory on a personal project for the summer. My project topic: pulse-based ice cream! The goal was to determine the feasibility of combining pulses and dairy to create healthier ice cream and to determine the added value that pulses brought to the ice cream. The ice creams were made from beans; navy, pinto, cranberry, and white kidney beans, with various concentrations of beans.

Tests Performed

In order to achieve the project goals, tests were performed on the ice cream, such as:

- Fourier Transform InfraRed spectroscopy (FTIR) which analyzed the absorption spectrum of the ice cream
- CIE L*a*b* (CIELAB) by chromameter to determine the colour of the ice cream
- First drip time
- Estimated the overrun (air pushed into the ice cream mix)
- Sensory evaluation

I’ve learned to use different equipment that I otherwise would not have the opportunity to. I also got to learn about the health benefits of pulses and dairy, the different properties of ice cream and was able to develop a palate to taste the differences between the different kinds of ice cream. Working with colleagues, I was able to improve my communication skills, gained confidence in bringing up possible issues and ideas, and learned how to organize and plan experiments in the lab.
Macdonald Student- Run Ecological Gardens
Contact: macdonaldstudentgardens@gmail.com
Independent Project: Marigolds and Pest Control

Harvest Time!
Successes: I learned everything from planting vegetables to prepping them for the market.

Challenge: It was difficult to wake up so early at first!

Planting Away Winter Squash
I learned how to farm! It helped me develop great team-work skills and field work experience to use at my future jobs.

Seeding the Spring Onions
Alex Daigle, Anna Lyon and Mateo Pacifico

Contact info:
mahnoor.malik@mail.mcgill.ca!
The Solomon Lab: Research Assistant for Projects in Limnology

Nathalie Chehab
U3 Environmental Biology Student
nathalie.chehab@mail.mcgill.ca

What is the Solomon Lab?

Dr. Solomon is a great researcher who studies the ecology of lakes and the organisms that live in them, with a focus on understanding the functioning of these systems to better manage and conserve them. He supervises various projects and working as research assistant in his lab allowed me to practice different sampling techcins. I therefore spend my summer working on boats collecting and processing data on fish, invertebrates and lake water and gas. Most of Dr. Solomon’s sampling is done at the University of Notre-Dame Environmental Research Center (UNDERC) in Wisconsin, USA. The property of UNDERC is covered by a pristine temperate forest and holds about twenty lakes and many different wetlands, making it a perfect place for research in limnology.

Chironomids sampling in 6 easy steps!

Job description

The main focus of my work was assisting the research of a Graduate student at McGill on the impact of dissolved organic carbon on Chironomids or Non-biting Midgets. Together, we sampled aquatic invertebrates, picked out the Chironomids larvae and processed part of the data. I also worked on a long term monitoring projects where we used sensors, syringes and other equipment to collected data on biotic and abiotic constituents of the lake ecosystem. I also briefly assisted a project on fish biodiversity which used Fyke Nets to catch Bluegill fish! Working for the Solomon Lab was an amazing experience! I’m am so grateful for the skill and knowledge I have gained. Plus, through this internship, I will be able to use data on lake metabolism taken on the property to complete an independent research project this fall and put to use all the knowledge I have acquired. You can join Dr. Solomon by email at solomonc@caryinstitute.org.

Photo by Nathalie Chehab

Photo by Nadia Facciola
After collecting water from the lake, we would extract the bacteria and chlorophyll from it using these filters.

Photo by Carly Olson
We collected gas samples from the lake with syringes, making sure to push out air bubbles first!

Photo of Shuntaro Koizumi by Nadia Facciola;
These are the Fyke Nets we used to catch fish and graduate students!

Photo taken from the EST database - http://findfish.com/img/7891323
An example of a Chironomid larva; Polypedilum vanderplanki.
Who knew that they were this cute!
Community Nutrition Internship at Partageons L’espoir/ Share the Warmth

<table>
<thead>
<tr>
<th>Personal Statement</th>
<th>Job Description</th>
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<tr>
<td>My summer spent at Share the Warmth was definitely one of the most eye opening experiences I have had in my career so far. Being able to be a part of the community for 3 months helped me gain an understanding of the needs of low-income populations in the city. I learned how to better communicate with individuals from different social backgrounds in order to improve the way information was delivered to them. I was also able to improve my French communication as a result of the large French-speaking population in the area. By working on the various tasks I was responsible for, I was able to see the difficulties faced by non-profits that run community food initiatives in their pursuit to improve the situation of the populations they serve. It was as a result of this that I chose to do my research paper on the “Efficacy of Community Food Programs in Canada” in order to examine their benefits and shortcomings.</td>
<td>As the nutrition intern, I was responsible for three main initiatives that were based in community education and engagement. I was put in charge of planning and animating the collective kitchens as well as the community barbeque. An additional task I was given was looking at the feasibility of preserving fruits from gleaning or surplus produce and whether there were any applications that would be interesting for the organization.</td>
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</table>

Community BBQs
Another initiative I was responsible for were the community BBQs that were held every week. We worked with a team of volunteers to ensure that we created a welcoming atmosphere for members of the community to come out and enjoy a lunchtime meal with their neighbors.

Food Preservation
One of the assignments I was given during my time at the organization. Pictured above is the result of sorting through 2 lbs of Saskatoon Berries in order to make jam.

Contact Information
Name: Nihal Mandanna C.P.
Email: nihal.mandannacp@mail.mcgill.ca

Collective Kitchens
The collective kitchens I animated at Share the Warmth were my first real venture into the world of nutrition education. From planning the recipes to giving nutrition advice throughout the course of the workshops, I learned a great deal about my capabilities as an animator. It was also perhaps one of the most rewarding experiences to see the excitement of the participants when they made a new recipe and realized how manageable the process of making these healthy meals can be.
RESEARCH INTERNSHIP IN INDIA
Ryan Lalonde

INTERNSHIP
My internship was to conduct a research experiment at the Indian Institute of Technology, in Kharagpur, India. The title of the research project is “Nitrogen Budget of Organic and Inorganic Fertilizers Applied for Irrigated Rice Production in West Bengal, India.”

RESEARCH PROJECT
A nitrogen budget is a mass balance between the amount of nitrogen entering a field (inputs) and the amount of nitrogen exiting a field (outputs). Rice production is especially susceptible to nitrogen losses when irrigation is practiced. By comparing the nitrogen budgets of inorganic and organic fertilizers, singly and together, my research objective is to answer the question “Which fertilizer source is the most efficient for rice production, with the lowest nitrogen loss to the environment?”

WHAT I LEARNED
- A developed understanding in nitrogen budgets and nitrogen management in rice crops
- Communication, organizational and problem-solving skills
- Enormous amount of technical skills, for both lab and field work
- Budgeting, planning and managing a large research project

MAIN TASKS
- Data/sample collection
  - Soil samples
  - Gas samples
  - Ammonia volatilization
  - Leachate water
  - Plant tissues
- Analysis
  - Gas chromatography
  - Spectrophotometry
  - Kjeldahl lab method

I wish to thank...

CONTACT:
Ryan Lalonde
ryan.lalonde@mail.mcgill.ca
(242) 378-5622

All photos taken by Ryan Lalonde
In this picture is myself, Laura Huaranca and the small cattle farmers of the Salta Forestal region. It was taken in Joaquin V. Gonzalez in the Chaco desert of the Salta province in Argentina. Here we are listening to a local farmer explain how the cattle auction was going to run. We were there to interview the small cattle ranchers for our Index of the Diagnosis and Evaluation of Sustainability.

My tasks included participation in the research, discussion and debates on the data collecting methods and information on the project. I joined the research teams in the field where we visited small scale cattle ranchers to discuss and evaluate their situation with local agricultural experts. Got hands-on experience and face-to-face interactions with the producers to evaluate the sustainability of their agricultural activities. We travelled to cattle auctions in Joaquin V. Gonzalez, local producer meetings at La Escuela St Victoria and a large 10 000 hectare farm estate called La Buena Agua. Also aided in writing an article, “Diagnosis and evaluation the Sustainability of the Cattle Ranchers in the Semi-arid Chaco Case: Salta Forestal in the Department of Anta, Salta Province”, that was sent to a national conference in La Plata, Buenos Aires. Translating scientific articles, rubrics and papers for the staff and students of CONNECT and INENCO was also a large part of my duties as an intern.

The photo above was taken June 29th, 2016 in the local school in La Poblacion where the farmers meet for reunions and workshops. Here, myself and Laura sit listening to the ranchers talk and work together to try and solve the problems they’ve been having recently.

This opportunity gave me the chance to improve my Spanish and was a once in a lifetime experience to learn a new culture. Being fully immersed in Argentina helped me see life a little differently. Being a part of such a huge research project that was aimed to help producers in need was an incredible feeling. I learned about the difficult living conditions and the challenges cattle people face on a day to day basis to survive. It was interesting to see the types of solutions that came up and the actions they were taking to try and solve their problems. I was surprised at how simple the solutions were but how difficult it was to “implement” them but realized that the obstacles were more socially and politically related and harder to approach. My new world views and knowledge are definitely things that are essential for my future career in Global Food Security and these concepts are something I can use for the rest of my life.

In this photo above, myself and the graduate student I was working with, Gaby Jeckell, visited the children and teachers of the elementary school Saint Victoria in La Poblacion. Because the children’s families can live up to 70 km away from the school and there are no roads, the children stay at school during the week and only return home on the weekends. The teachers are some of the most passionate and hardworking people I’ve ever met.
Poster Presentation – FAES 200

Reda Hansali - 260559291
McGill University – Bioresource Engineering Department

Internship Information and Contact
Internship at Pilarquim Corp. Shanghai.
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Reda Hansali
U4 Bioresource Engineering
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Tasks and objectives
• Multiple tasks given throughout the 10 weeks.
• Goal is to gain as much knowledge as possible on pesticides and the agrochemical industry in general rather than focusing on a specific task to repeat over and over again.
• Rotated between all major departments, spending 1-2 weeks in each department
  ➢ Registration:
  ➢ GLP (in the labs)
  ➢ Microbial contamination
  ➢ Biofertilizers
  ➢ QA, QC + R&D (in the labs)

• I also conducted soil sampling and analyzed the soil (screened for fungus, bacteria, yeast) using different methods and different agars depending on the microbe.

• QA’s work is somewhat similar to the work done in the GLP labs. I learned how to verify the quality of the products (whether it is the finished product i.e. the pesticide, OR its container or bottle). I was able to conduct many tests for that purpose.

Acknowledgements
• My sincere gratitude to Mr. Parkson Chen (my supervisor), Mr. Tsai (CEO at Pilarquim), Mrs. Mehek Mehta and everyone else that made this internship possible.

Line of business
• Pilarquim Corporation: Imports, distributes, manufactures and exports pesticides and biofertilizers.
• Wide range of products to promote plants’ growth and to fight pests.
• Site in Shanghai: Area of 9 hectares, comprising many warehouses, laboratories, R&D center, offices, dormitory, etc.

• Small scale model of the facility, showing all the buildings and infrastructure on site.

• This picture was taken in the GLP lab, at Pilarquim. This lab is located in the main building, and here is where both liquid and gas chromatography take place (3 HPLC and 1 GC×MS in this lab)

• During my time in the labs some of my tasks included carry out tests for the finished product (i.e. viscosity, pH, flash point, etc.). I am also much more comfortable with constituent analysis (through HPLC and GC), although I cannot perform any all by myself obviously.

• Reda, here in front of the main building (labelled “R&D center” on the model). Most of the time was spent in this exact building.
High-Rate Anaerobic Digestion of Ozonated Biosolids

Sarah Mitchell, Zeinab Bakhshi and Dominic Frigon
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Introduction

Background
- 700,000 tons of biosolids produced per year in Quebec (13% of all organic waste, the equivalent of 280 Olympic sized swimming pools) 1
- Represents up to 60% of operating costs of Water Resource Recovery Facilities 2
- Biosolids produces methane, a valuable renewable energy source
- In landfills, the methane escapes into the atmosphere where it acts as a greenhouse gas (GHG) 21 times more potent than CO₂ 3
- 2020 landfills biosolids banned in Quebec 1

Anaerobic Digestion
Treats biosolids, generates less sludge, reduces GHG emissions and produces valuable biogas

Limitation
- To facilitate hydrolysis of biopolymers (rate –

Hypothesis: Anaerobic digestion can be enhanced and biogas recovery can be maximized using ozone pretreatment

Methodology

Anaerobic Sequencing Batch Reactors
Step 1: Design and construct reactors
- Water seal
  Maintain anaerobic conditions while allowing for frictionless rotation
- Water bath
  Surround reactor and maintains constant temperature
- Tin foil cover
  Prevent light from entering which causes mould growth

Step 2: Operate reactors and collect data

Table 1. Operational conditions for anaerobic sequencing batch reactors (ASBRs)

<table>
<thead>
<tr>
<th>Reactor configuration</th>
<th>With O₃</th>
<th>No O₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>SRT (days)</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Feed</td>
<td>Ozonated WAS</td>
<td>WAS</td>
</tr>
</tbody>
</table>

Results

A. Soluble chemical oxygen demand

- The reactor fed ozonated saw a 44.58% reduction in S.COD whereas conventional saw an 88.77% reduction over 33 days

Fig 5: Soluble Chemical Oxygen Demand over time

B. Reduction of Volatile Suspended Solids

- Anaerobic digestion is effectively reducing biosolids content of waste activated sludge

C. Ozone induced Biogas production

- 85% higher average biogas production for reactor fed ozonated WAS as compared to conventional

Fig 7: Biogas produced after 50 days

- Anaerobic digestion of ozonated WAS resulted in enhanced biogas production

Conclusions

Better performance is achieved by 35 °C ozonated digester system compared to conventional digester at 35 °C without ozone:
- Enhanced biogas production

References

J’ai passé mon été à travailler comme stagiaire au Regroupement QuébecOiseaux (RQO), un organisme sans but lucratif qui a pour mission de favoriser la conservation des oiseaux, le partage des connaissances et le loisir ornithologique. J’étais sous la direction de plusieurs biologistes, chacun chargé de projets de conservation ou de sensibilisation d’oiseaux menacés au Québec. J’ai donc eu la chance de participer à cinq différents projets autant dans leur préparation que dans leur mise en œuvre sur le terrain.

1- Grand Héron
J’ai d’abord commencé sur le projet du Grand Héron, une espèce sentinelle. Mandaté par Environnement Canada, nous devions visiter quatre colonies en bordure du fleuve Saint-Laurent, de Montréal jusqu’à Sept-Îles (Figure 1). Un grimpeur professionnel s’occupait d’allier chercher les œufs dans la cime des arbres puis nous les pesions et en conservions un (Figure 2). Tous les œufs récoltés ont été envoyés dans les laboratoires d’Environnement Canada et servent au suivi de l’état de l’écosystème du Saint-Laurent.

2- Petit Blongios
Le projet suivant consistait à inventerier le Petit Blongios, une espèce appartenant à la famille des hérons qui se retrouve exclusivement dans les marais (Figure 3). Le terrain s’effectuait en canot, en appelant le Petit Blongios à l’aide d’une trame audio. De plus, il fallait répertorier plusieurs autres espèces communes des marais, telles les Râles, la Grèbe à bec bigarré et le Butor d’Amérique.

3- Hirondelle de rivage
Ensuite, j’ai participé aux inventaires des Hirondelle de rivage qui, du au fait qu’elles nichent dans des terriers creusés dans des parois verticales (Figure 4), sont très communes dans les sites d’excavements tels les sâbières. Nous avons donc situé leurs colonies dans les sâbières/gravières du Québec dans le but de sensibiliser les propriétaires à leur présence et leur donner quelques conseils pour éviter leur dérangement.

4- Martinet ramoneur
J’ai aussi effectué des inventaires de Martinet ramoneur, un projet similaire au précédent. Il s’agit d’un petit oiseau ressemblant à une Hirondelle qui construit son nid dans des cheminées (Figure 5). En ville, nous confirmions la présence de nidification de Martinet en observant une cheminée potentielle pendant un certain laps de temps.

5- Oiseaux champêtres
Finalement, j’ai terminé mon stage avec le projet des oiseaux champêtres, c’est-à-dire les oiseaux qu’on retrouve sur les terres agricoles, notamment le Gogliu des prés, le Bruant des champs et la Crècerelle d’Amérique. Le RQO travaille en collaboration avec plusieurs agriculteurs en Montérégie chez qui nous avons installé des structures (piquets de bois, nichoirs, barbelé, etc.) servant à la nidification, à l’alimentation et même à la parade nuptiale afin de favoriser la présence et le succès de ces espèces.

Pour finir, en plus de me créer des contacts essentiels dans le monde de l’ornithologie au Québec (Figure 9), j’ai appris à vulgariser le jargon scientifique pour communiquer efficacement avec le public général. De plus, j’ai acquis de l’expérience quant à la préparation de terrain et au terrain lui-même, ce qui m’a amené à comprendre l’importance de la rigueur, de la patience et de la persévérance qui sont indispensables lors de la réalisation de tels projets scientifiques. Ces nouvelles qualités seront à mon avantage tout au long de ma future carrière.
Research Description
- Changes in gene expression are early warning indicators of toxicity. Faster and more reliable way to determine environmental toxicity, provides information at the molecular level.
- Changes in genetic and epigenetic modification over generations → adaptation to toxicity, increased prevalence of genetic mutations, increasingly extreme phenotypes.
- Analysis of transcriptional expression patterns in *Daphnia* under chronic exposure to Cu using RNASeq, 2-ended sequence overlay and validation of gene expression levels with qPCR.
- Use of organisms from 3 lines of historic sensitivity/insensitivity to toxins—ecological difference?
  - (1) verify + investigate candidate genes using q-PCR, (2) compare expression of candidate genes at generation 3 with previous generations and recovery generations.
- Use the Guilliman pipeline to look at data and determine significant differences in alternative splicing and gene expression.
- Use CummeRbund as well as the Cufflinks package to look at differences in AS patterns.

Take Aways and Academic Growth
- Gained experience in biotechnology and bioinformatics (RNASeq, qPCR, pipeline codes, bioinformatics software).
- Able to synthesize a variety of interests: ecology, toxicology, genetics, biotechnology and bioinformatics all in one project.
- Experience comparing transcriptomes → moving beyond DNA into something more complex and specialized that accounts for epigenetics and differential expression.
- Transcriptional differences of chronic and acute toxicity.
- Understanding of the applicability and importance of biotechnology and genomics in modern toxicology.