



As the annual **Global Outlook on Aquaculture Leadership (GOAL)** conference of the **Global Aquaculture Alliance (GAA)** was taking place this year in **Vancouver**, October 26-29, the editor of the **Global Aquaculture Advocate**, **Darryl Jory**, asked **Thierry Chopin** to write a paper on aquaculture in Canada for the issue of the magazine that would be available during the conference.

Thierry wrote the paper entitled "[Aquaculture in Canada: Status, Perspectives](#)". Moreover, the picture of a very appealing dish, created by **Chef Chris Aerni**, owner of the [Rossmount Inn](#), in St. Andrews, New Brunswick, made the cover. Featured are crispy skin IMTA Atlantic salmon fillet, organic IMTA kelp (*Saccharina latissima*) wrap, nori (*Porphyra purpurea*) dust, ginger-carrot purée, sweet soy drizzle, potato blini, Atlantic salmon caviar and goose tongue greens (photo credit: Thierry Chopin).

A new [video](#) highlighting the **research** conducted at the **University of New Brunswick** includes a few sequences with shots of the work by **Thierry Chopin and his team**.



Amélie Gosselin of the **Radio Canada** show "**Bien dans son assiette**" (French expression meaning feeling good and playing with the words of "in your dish", very appropriate for a food show!) interviewed **Thierry Chopin** on his work with seaweeds and their applications.

The segment of the show is entitled "Thierry Chopin, l'ambassadeur des algues" ("Thierry Chopin, the seaweeds' ambassador").

Listen to the radio interview [here](#).

Thierry Chopin and **Jon Grant** participated in the **European Aquaculture Society (EAS)** annual conference in Rotterdam, the Netherlands, October 20-23. Thierry established a new record for himself: 4 presentations in one day! He gave his two presentations, plus two for **Shawn Robinson**, who was not able to attend the conference.

Two presentations were in the "**Ecosystem services**" session:

- Robinson *et al.* - Habitat creation and nutrient conversion potential of Integrated Multi-Trophic Aquaculture (IMTA) practices from the Canadian perspective
- Chopin *et al.* - Recognizing and valuing the ecosystem services provided by seaweeds and the extractive components of Integrated Multi-Trophic Aquaculture (IMTA) systems

Two presentations were in the "**Multi-species systems and IMTA**" session:

- Robinson *et al.* - Gazing into the crystal ball for aquaculture development: what is in the global future for Integrated Multi-Trophic Aquaculture (IMTA)?
- Chopin *et al.* - FIMTA + MIMTA = going ETP all the way with IMTA!



Jon Grant also gave his presentation, entitled "Assimilative capacity and ecosystem services in marine fish farming", in the "Ecosystem services" session.



Gregor Reid delivering his presentation during the ACFFA annual meeting (photo credit: Thierry Chopin).

Three CIMTAN members gave presentations at the **Atlantic Canada Fish Farmers Association (ACFFA)** annual meeting, in St. Andrews, New Brunswick, November 4-5:

- **Gregor Reid *et al.*** - Climate Change and Aquaculture workshop update.
- **Jon Grant *et al.*** - Integration of aquaculture into marine spatial planning.
- **Ben Forward *et al.*** - Profiling bacterial communities: prospects for complimentary monitoring tools?



Thierry Chopin participated in the **Aquaculture & Fisheries Opportunities Summit** in Shediac, New Brunswick, on November 5. The **Premier of the Province of New Brunswick, Brian Gallant**, and the **Minister of Agriculture, Aquaculture and Fisheries, Rick Doucet**, were present.

Participants were asked how they envision the aquaculture and fisheries sectors in 2040, their growth opportunities, the conditions for success and what should be done within the next 3 years to get ready.

It was an opportunity to underline the need for species diversification for economic stability and as a business risk management option when facing the uncertainties of climate changes. In Canada, finfish aquaculture represents 76% of the aquaculture sector and salmon aquaculture represents 77% of the finfish aquaculture (95% in New Brunswick). Diversification is a well-known strategy in agriculture and when investing in a financial portfolio.

Aquaculture should not be approached differently. Diversification in the cultivation of invertebrates and seaweeds will be key.

The need for flexible and enabling regulations was also underlined to allow the development of this diversification and of innovative practices, such as IMTA.



The Premier of the Province of New Brunswick, Brian Gallant (photo credit: Thierry Chopin).

A **French delegation** representing clusters (**Valorial** and **NHL**), companies (**Agrial**, **Amadéite/Olmix**, **Leroux** and **MiXscience**) and research institutes (**INSERM Bordeaux**) in the **food, natural ingredient and nutritional health sector** visited Fredericton (November 5) and Moncton (November 6), after having visited Boston, in the USA. This mission was supported by **Business France** with the objective of facilitating technology partnerships. The New Brunswick host was **BioNB (Meaghan Seagrave)**.

New Brunswick participants in Moncton included **Leonard Larocque** and **Rodrigue Yossa** (Coastal Zones Research Institute), **Paul Roy** (G.E. Barbour Inc.), **Patrick McGinn** (National Research Council of Canada), **Thierry Chopin** (University of New Brunswick, CIMTAN and also, for the



Paul Roy, from G.E. Barbour Inc., from Sussex, New Brunswick, giving a short presentation to the French delegation (photo credit: Thierry Chopin).



The French delegation with a few Canadian colleagues.

occasion, Honorary Consul of France), **Martin Fillion**, **Pier Morin**, **Marc Surette**, **Pascal Audet** and **Abdelaziz Nait Ajjou** (Université de Moncton).

The meeting took place at the VENN Centre. Each member of the French delegation, and each New Brunswick participant, gave a 3-5 minute PowerPoint presentation, as a way to introduce their organization along with their main purpose for joining the meeting. Lunch was catered on site and networking initiated. One-on-one meetings followed during the afternoon. Based on comments from all participants, this was a fruitful exchange and collaborations/partnerships are anticipated.



Spreading the IMTA message to school children

CIMTAN members have always made an effort to disseminate the IMTA concept with children by giving lectures at schools. Reaching children often elicits discussion with parents, who, then, also become educated and decide if seafood will be on the menu at home.



From left to right, Michael Smith, Shawn Robinson and grade 7 science class students at Nashwaaksis Middle School (photo credit: Taryn Minch).

On November 2, **Shawn Robinson** and **Taryn Minch** (CIMTAN MSc student) visited grade 7 and 8 students at **Nashwaaksis Middle School** near Fredericton, New Brunswick, to talk about the role of science in aquaculture development and their research within CIMTAN. The visit was initiated by a chance meeting between their teacher, **Michael Smith**, and Shawn during beachcombing on the shore in St. Andrews, on the Bay of Fundy. After a short conversation, a plan was developed to bring some practical examples to middle school students on how science is being used to help develop our coastal towns and economies while making the farming systems more environmentally sustainable. Taryn and Shawn both gave presentations to three separate classes and the kids were full of interest

and questions on the research and the types of equipment used (some of which they brought with them). Taryn gave them a good idea on what it is like to be a graduate student and what one has to do to get there, as well as a summary of her research. Who knows, perhaps there were some future marine biologists and coastal decision makers created that day...!

CIMTAN Summer Students' Corner

Five summer students were involved with different CIMTAN projects last summer. Below are short profiles on each of them.

Adena Peters is from the small town of Sussex, New Brunswick. She is currently finishing her final year of her BSc in Marine Biology at the University of New Brunswick in Saint John. She became involved with CIMTAN this past summer, when she was hired as a summer student to work at the St. Andrews Biological Station with CIMTAN MSc student, **Taryn Minch**. Taryn's project involves looking at water current and nutrient dispersion through aquaculture sites of our industry partner, **Cooke Aquaculture Inc.** With the use of a sophisticated current meter known as an Acoustic Doppler Current Profiler (ADCP), they were able to map the currents within a salmon farm site and display them using contour plots.



Adena Peters (right) and Taryn Minch (left) in the field, collecting data (photo credit: Shawn Robinson).



Adena Peters (right) and Shawn Robinson (left) setting up video equipment for deployment (photo credit: Taryn Minch).

As a result of the interest generated through her work with Taryn, Adena is now in the process of completing her Honours thesis, under the supervision of **Shawn Robinson** and **Heather Hunt**. She is investigating the biodiversity of the benthic and pelagic macrofauna at salmon aquaculture sites. Adena is using time lapse video and benthic grab samples along with an Acoustic Fish-Zooplankton Profiler to achieve a better understanding of the wild communities that use aquaculture sites.

Adena has gained valuable experience working with CIMTAN that will benefit her greatly in her future endeavours. She plans to continue her studying in either graduate studies or a technology diploma.

CIMTAN member quote of the month: "Working with CIMTAN has taught me a lot about the way research works and that things do not always happen the way you expect. The unexpected and messiest days can sometimes deliver some of the best results" (*CIMTAN summer student Adena Peters*).

Colleen Haddad grew up in Terrace, which is a beautiful, small town in northern British Columbia (BC). After high school graduation, she moved to the "big" city, Nanaimo, BC, where she first became involved with CIMTAN in the summer of 2014. Colleen first worked as a summer student with CIMTAN MSc student, **Allie Byrne**, under the supervision of **Chris Pearce**, at the Pacific Biological Station, identifying sea lice larvae in the laboratory and measuring oyster growth at a commercial fish farm. She then went on to complete a practicum semester in Chris Pearce's Sustainable Invertebrate Aquaculture Program, assisting both Allie Byrne and another CIMTAN MSc student **Angela Fortune** on their CIMTAN projects. This past summer Colleen was fortunate enough to get an NSERC Undergraduate Student Research Award, which allowed her to continue to work alongside Angela and a new CIMTAN summer student, **Hailey Davies**.



Colleen Haddad enjoying field work in the Broughton Archipelago (photo credit: Allie Byrne).



Colleen is currently in her third year at Vancouver Island University; she is still intrigued by IMTA research and is working on an undergraduate student research project. Her project involves sea cucumbers and a lot of sand. Her research question is: Is there a sediment type that is a biological barrier for juvenile California sea cucumbers, *Parastichopus californicus*, which could naturally restrict their movement in a sea ranching environment?

When Colleen is not playing around with sea cucumbers, she spends her free time beachcombing, hiking, camping and playing volleyball.

CIMTAN member quote of the month: "A sea cucumber researcher is a plumber by trade, seamstress by default and biology nerd at heart" (CIMTAN summer student Colleen Haddad).



Laboratory trials are being completed at the Pacific Biological Station to see if certain sediment types can act as biological barriers to the movement of juveniles of the California sea cucumber, *Parastichopus californicus* (photo credit: Angela Fortune).



Hailey Davies holding a California sea cucumber to be measured, weighed, and photographed at Angela Fortune's field site in Effingham Inlet, Barkley Sound, on the west coast of Vancouver Island, British Columbia. Colleen Haddad, another CIMTAN summer student, is in the background (photo credit: Angela Fortune).

Hailey Davies grew up in Nanaimo, British Columbia (BC) and is currently in her third year, working towards a BSc in Biology at the University of Victoria. She first heard about CIMTAN when her laboratory teaching assistant **Angela Fortune** described her CIMTAN MSc project to her class. Hailey was very interested in the idea of IMTA and, therefore, was excited to learn that Angela was looking for a summer student assistant. Hailey ended up working alongside Angela and **Colleen Haddad** (another CIMTAN summer student), at the Pacific Biological Station in Nanaimo, as part of **Chris Pearce's** Sustainable Invertebrate Aquaculture Program. Angela's project involves optimizing the containment of juvenile California sea cucumbers (*Parastichopus californicus*) and their nutrition in IMTA systems.

Hailey spent part of her summer helping set up field trials for Angela's project at an oyster farm in

Effingham Inlet, Barkley Sound. Hailey also helped Colleen start her laboratory experiment, investigating whether certain sediment types can act as a biological barrier for juvenile California sea cucumbers in a sea ranching environment. She had an opportunity to visit Steve Cross' IMTA farm in Kyuquot Sound at the end of the summer and see a commercial IMTA site in action.



After she graduates, Hailey hopes to explore jobs in ecology and marine science, and possibly complete her own MSc project. When she is not busy with school, Hailey enjoys exploring new places, ski boarding, reading, taking pictures and playing violin.

CIMTAN member quote of the month: "Being part of CIMTAN was an amazing experience – I learned so much and met many great people. One of the most important lessons I learned is that in science, things usually take much longer than you originally think; you have to be adaptable and motivated to succeed" (*CIMTAN summer student Hailey Davies*).

Sam Backman is originally from St. Stephen, New Brunswick. He began working with CIMTAN in April 2015, as a summer student conducting research for his Honours thesis. Under the supervision of **Thierry Chopin** and postdoctoral fellow **Caroline Longtin**, Sam has been studying the cultivation of the red alga, *Palmaria palmata*, commonly known as dulse. His Honours project deals with determining the optimal conditions (substrate type and light irradiance) for successful laboratory cultivation from settled tetraspores. After approximately 10 weeks, the juveniles, which settled on two different types of twines wound around frames, were taken to the aquaculture site of **Magellan Aqua Farms Inc.** to continue growth in the field. In late October 2015, the twines were removed from the site to be analyzed in the laboratory. The analyses are currently taking place. Magellan Aqua Farms Inc. is owned by **Steven Backman**, Sam's father. The farm, raising scallops, was amended recently to grow dulse and kelps.



Sam Backman collecting the red alga, *Palmaria palmata*, commonly known as dulse (photo credit: Thierry Chopin).



Sam Backman examining juveniles of the red alga *Palmaria palmata*, settled on frames wound with twines, before placing them into the water at the site of Magellan Aqua Farms Inc., New Brunswick (photo credit: Thierry Chopin).

When not working on his thesis, Sam is a busy fourth year biology student working towards graduating, in the spring of 2016, with a BSc. He is also the Vice-President of Health at UNB's Aids/HIV Initiative and he volunteers weekly at the Saint John Regional Hospital, playing piano for elderly patients with dementia. Sam is also a peer-mentor with elementary school students in the Saint John area. Currently, his plans for the future are to enter medical school and eventually work in pediatric medicine.

CIMTAN member quote of the month: "Working with CIMTAN has provided me with valuable experiences in the field of research. It has also allowed me to meet many amazing people, who share my thirst for knowledge, and have taught me the value of collaborative study" (*CIMTAN summer student Sam Backman*).



Stephen Finnis obtained his BSc in Geography from the University of Victoria (UVic), British Columbia (BC), in June 2015. Through his university studies, Stephen developed an interest in ocean sciences, particularly in using GIS and remote sensing technology to examine ecological processes in the field of biological oceanography. In his last year at UVic, he worked as a summer research assistant under the supervision of **Maycira Costa** in the Remote Sensing and Spectral Research Laboratory. This work developed into an undergraduate Honours thesis, and involved using optical sensors to identify harmful algal blooms (HABs) in coastal aquaculture environments, with particular focus on developing near real-time detection methods for the harmful species, *Heterosigma akashiwo*. Stephen's thesis research was carried out in Quatsino Sound, on Vancouver Island, through a collaborative effort with **Marine Harvest Canada Ltd.** Every year, aquaculture farms along the BC coast suffer substantial economic losses from salmon mortalities caused by HAB species, and industry officials are seeking new methods to detect and monitor these events. While traditional means of plankton identification (*e.g.* microscopic examination) are very time-consuming and costly, remote sensing instruments offer the potential for rapid detection of these species, provided they have unique reflectance or absorption features that can be identified by the sensors. These results showed the potential for the optical identification of *H. akashiwo* from high fluorescence in the near-infrared wavelengths of the electromagnetic spectrum.

When not studying the ocean, Stephen can be found hiking or biking the trails around his new home in the Lower Mainland, or binge-watching the Office. He hopes to eventually pursue oceanography at the graduate level, and find a career in research in either Canada or the USA.

CIMTAN member quote of the month: "My involvement with CIMTAN allowed me to meet other like-minded students and see the exciting interdisciplinary research projects occurring in the study of IMTA systems. I am grateful for the opportunities to gain experience in numerous aspects of research including fieldwork, laboratory analysis, scientific writing and presentation of these results" (*CIMTAN BSc Honours student Stephen Finnis*).



Stephen Finnis collecting plankton samples in Quatsino Sound, British Columbia (photo credit: Austin Ward).

And now, after the Dutch Weed Burger, an apparently not-so-tasty version of the [IMTA smoothie](#)...!