



**Imminent deadline! Submit your abstract for *Aquaculture Europe 14* no later than June 1.**

The theme of this year's **European Aquaculture Society (EAS)** conference is ***Adding Value*** and the meeting will be held in Donostia-San Sebastian, Spain, October 14-17, 2014.



The **IMTA session** will be called **"Beyond Monoculture"**, which was the theme of the EAS conference in Trondheim, Norway, in 2003, the year before the acronym IMTA was created. The session will be made up of two parts: in the morning, members of the EU project IDREEM will report on their progress; in the afternoon, the session will be open to IMTA projects from all over the world. The session will be co-chaired by **Kenny Black** and **Thierry Chopin**.

Donostia-San Sebastian, the 2011-2013 Spanish city of Science and Innovation and the future European Capital of Culture in 2016, will be an exciting and beautiful venue for AE2014. The Kursaal is right on the beach and should be a

spectacular venue.

More information about the conference, venue, registration and abstract submission can be found on the EAS AE2014 webpage:

<http://www.easonline.org/component/content/article/39-uncategorised/259-aquaculture-europe-2014>

### The Premier of New Brunswick is very familiar with CIMTAN Snippets!

On March 20, **Thierry Chopin** attended the **R3 Gala** of the **New Brunswick Innovation Foundation (NBIF)** in Fredericton. "R3" is for Research, Results and Recognition. As he was entering the room for the gala dinner, so was the Honourable David Alward, the Premier of New Brunswick. Thierry Chopin introduced himself and the Premier responded "Oh, yes, you are the one who sends me your newsletter, *CIMTAN Snippets*; I like that newsletter and its style! Very nice to keep me updated on what you are doing".



The NBIF R3 Gala dinner at the Fredericton Convention Centre (photo credit: NBIF).

What a pleasant surprise! Yes, Premier Alward is part of the 1,241 person distribution list of our newsletter, and he is also reading it... both great and impressive! It is interesting to note that David Alward was the New Brunswick Minister of Agriculture, Aquaculture and Fisheries from June 2003 to October 2006, before becoming Premier of the Province in October 2010. Thierry Chopin was invited to the R3 Gala as a former 2010 recipient of the R3 Award. The NBIF presented a very nice recapitulative video of all previous recipients that evening.



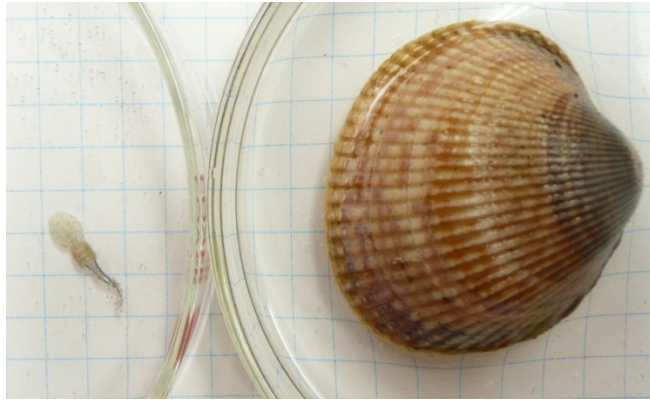
Thierry Chopin, Premier David Alward and Terry Drost in conversation before entering the NBIF R3 Gala dinner room (photo credit: NBIF).

*Watch the video:*

<http://www.youtube.com/watch?v=bocYo7jYVLg&feature=youtu.be>



CIMTAN also involved in **tackling the sea lice issue** by bringing a **complementary biological approach** to the chemical approach to find **solutions**.



Gravide sea louse and adult basket cockle (photo credit: Janis Webb).

In the article *“These tiny fish may cure salmon farming’s environmental problem”*, published in *takepart*, on March 27, 2014, **Clare Leschin-Hoar** wrote about the efforts to use “cleaner fish” in Norway, Scotland and Canada. She also interviewed **Thierry Chopin** and **Chris Pearce**, who explained his work and the potential role of bivalves in controlling sea lice development. Thierry Chopin summarized that all approaches have their merits and none of them will be the silver bullet. Therefore, a combination of them is the multi-pronged approach the industry needs to take, just as nature does.

Read the article:

<http://www.takepart.com/article/2014/03/27/can-cute-fish-solve-sea-lice-problem-vexing-salmon-farms>

**Clare Leschin-Hoar** wrote another article in *takepart* on April 19, 2014. In *“Is it time to reconsider farmed salmon?”* Clare reported on the changes in the aquaculture industry that have convinced celebrity Chef **Rick Moonen** to not only serve farmed salmon at his Las Vegas restaurant, but, as of last month, also to serve as the brand ambassador for **True North Salmon Company**, a subsidiary of our industry partner **Cooke Aquaculture Inc.**

Clare Leschin-Hoar noted that a defining turn has been taking place in the farmed salmon industry over the last few years that Moonen, and others, say merit a closer look. Clare then cited a series of examples of change, with IMTA among them. Rick Moonen is also very aware of IMTA. He was in the audience when **Thierry Chopin** spoke about it, as an invited panelist, in the session “Greening the Blue Revolution” at the Sustainable Foods Institute **“Cooking for Solutions”** at the **Monterey Bay Aquarium** in May 2010, and did his famous IMTA dance to the tune of “YMCA”. This, along with a lively discussion in the back of a limousine going to the Monterey airport, must have left an impression on Rick who, in April 2011, on his arrival at the **Fortune Brainstorm Green conference**, in Laguna Niguel, California, shook the hand of Thierry, with a resounding “Eh! This is my IMTA man!”.

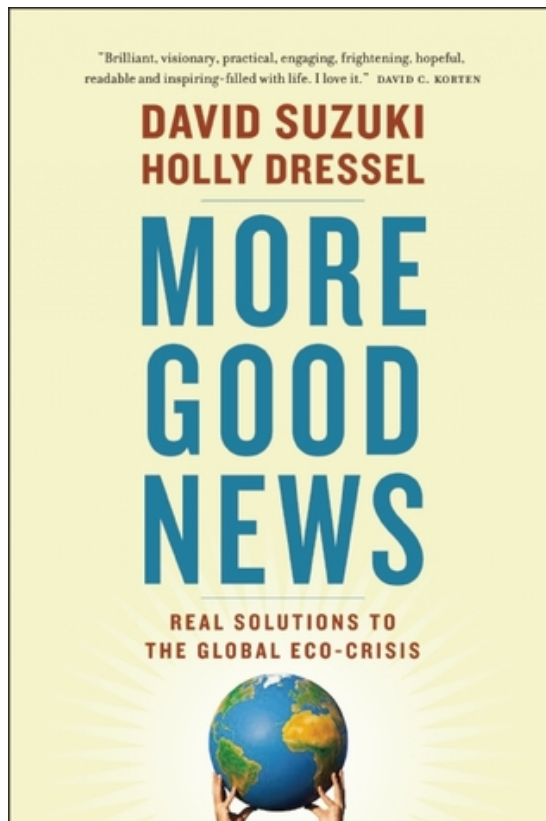


Read the article:

<http://www.takepart.com/article/2014/04/19/it-time-reconsider-farmed-salmon>



A search for “sea lice” and “IMTA” led us to a book we were not aware of. **David Suzuki** and **Holly Dressel** updated in 2010 their bestseller *Good News for a Change*, published in 2003, with the latest inspiring stories about individuals, groups and businesses that are making real change in the world in a new book entitled *More Good News - Real Solutions to the Global Eco-Crisis*. The authors also present information about new, critical subjects not covered in the previous edition, such as energy and the economy. All the stories describe sustainable solutions that already exist and that can be used around the world.



Below is the excerpt of the book dedicated to IMTA and sea lice.

Interesting!

“Putting fish farms in tanks on land is helpful but expensive, especially as currently, large fish-farm companies can dump their environmental costs on the local ecosystem. There is some possible good news in the work of Thierry Chopin, a seaweed expert from the University of New Brunswick, and Shawn Robinson, a biologist with the DFO, who have been trying to revive an ancient Chinese practice that eliminates some of the problems biologically. They approached Glenn Cooke of Cooke Aquaculture, a big fish-farming company in the Maritimes, and began their program of Integrated Multi-Trophic Aquaculture (IMTA). The waste that flows out of the open-net pens of fish farms is a huge problem, so Chopin and Robinson tried growing mussels, which love to eat waste, around the outside. They also encouraged seaweed growth beneath the nets. When the mussels were tested for health afterward, they passed so well that both they and the seaweed were found to be marketable. Another problem with fish farming is caused by overfeeding. It’s hard to tell from above how much the fish eat, and many pellets end up falling to the bottom

of the nets and creating mounds of rotting waste. Cooke had cameras installed below every net pen so that as soon as pellets start to drift down, the technicians know the fish are full and stop feeding. That saves money and reduces pollution. As for what’s left, sea worms, cucumbers and urchins are being grown to mop it up.

Using natural species this way means, as Chopin says, “we have the biofilters, nutrient scrubbers, but at the same time, they have a market value”. By using more plant material, Cooke has been able to reduce the amount of wild fish in their feed to less than one pound for each pound of salmon produced, so this experiment is encouraging on almost every front. They are attempting to address the biggest problem of all, sea lice, by growing far fewer salmon per net. So far it’s only an improvement, not a solution, but at least Cooke is trying. The company doesn’t grow species that are alien to the area, and it uses genetic material from wild salmon for their “crop”, so that if any escape the impact will be lower. These are all steps that could lead toward a more sustainable form of ocean farming, if one is possible. The still-faraway goal would be finding a way to get rid of the lice – and then passing legislation that would make sure that IMTA is practiced throughout the industry.”





It is interesting to note that IMTA has been featured in seven books, from bestsellers to textbooks for undergraduate and graduate students and instructors:

- *Four Fish: The Future of the Last Wild Food* by Paul Greenberg (2010)
- *Les Secrets des Algues* by Véronique Leclerc and Jean-Yves Floc'h (2010)
- *More Good News - Real Solutions to the Global Eco-Crisis* by David Suzuki and Holly Dressel (2010)
- *The Whole Fish: How Adventurous Eating Can Improve your Sex Life and Help Save the Ocean* by Maria Finn (2012)
- *Integrated Multi-Trophic Aquaculture - A Sustainable, Pioneering Alternative for Marine Cultures in Galicia* by Salvador Guerrero and Javier Cremades (2012)
- *Elements of Ecology* by Thomas Smith, Robert Smith and Isobel Waters (2014)
- *Seaweed Ecology and Physiology - 2nd Edition* by Catriona Hurd, Paul Harrison, Kai Bischof and Christopher Lobban (2014).

This is the result of a determined effort by CIMTAN to carry out its mission of knowledge dissemination and technology transfer to diversified targeted audiences. We are also working with the publisher Springer on a book dedicated to IMTA, which we hope to finalize within the next few months.



Cover of the Proceedings of the 21<sup>st</sup> International Seaweed Symposium, Bali, Indonesia, April 2013: cultivation of the carrageenan producing seaweed, *Kappaphycus striatus*, at Pandawa Beach, Bali, Indonesia (photo credit: Thierry Chopin).

The Proceedings of the 21<sup>st</sup> International Seaweed Symposium, held in Bali, Indonesia, in April 2013, are out.

They are published as a special issue of the *Journal of Applied Phycology* (Vol. 26, Issue 2). It contains a preface, authored by **Thierry Chopin** [who, after having been President from 2007 to 2010, is now the Secretary General of the International Seaweed Association (ISA)] and **Iain Neish** (President from 2010 to 2013), and entitled "*The 21<sup>st</sup> International Seaweed Symposium: seaweed science for sustainable prosperity*".

After covering some ISA business matters, the paper starts (on p. 696, right column) to deal with a key question: how can we put seaweed aquaculture, and the ecosystem services it renders, on the radar beyond the converted phycological community?

Paradoxically, seaweeds represent the majority of the total world mariculture production (50.9%). However, when attending a World Aquaculture Society (WAS) conference, or other aquaculture conferences, this is not the impression one could get. By regrouping abstracts on microalgae (0.8%), freshwater plants (0.6%) and seaweeds (0.6%), a combined 2% of abstracts at the 2007 WAS conference dealt with algae and aquatic plants. In 2010, this increased to 4.6%,

mostly due to abstracts on IMTA and biofuels. In 2013, it reached 5.5%, this time the bulk of the papers being related to IMTA and aquaponics, which is a freshwater variation on the IMTA theme.



Why are seaweed presentations so underrepresented at international aquaculture conferences? Is it because seaweed aquaculture does not have as many environmental, economic and societal issues as animal aquaculture? Seaweed aquaculture also has its share of issues, but, more fundamentally, it is an attitudinal problem: it is time for the phycological community to get out of its ivory tower and “preach” at other meetings to educate people who, because of our deeply-rooted zoologically-biased education system, do not know much about seaweeds, particularly in the western world. The problem is that 98.9% of seaweed aquaculture is concentrated in 7 Asian countries (China, Indonesia, The Philippines, South Korea, North Korea, Japan and Malaysia) and that is why the western world is mostly ignorant of what can be done with seaweeds and the ecosystem services they render, which could be of great benefit to the rest of the aquaculture industry. If aquaculture is to make a major contribution to the efficient and responsible food production systems of the future, far more production and applications of inorganic extractive seaweeds and aquatic plants, and organic extractive animals, must be developed in a more integrated and evenly distributed manner throughout the world.

We need to go beyond what **Maxwell Doty** called “**marine agronomy**” in the 1970’s and clearly delineated in the Proceedings of the 9<sup>th</sup> ISS in 1979. The aquaculture “**Blue Revolution**” of the 1980s needs to become greener; it is now time for the “**Turquoise Revolution**”. This greener approach not only targets practices in the marine environment, but also in the freshwater environment, and in open-water as well as in closed containment operations. Instead of talking about agronomy (in Greek, “the laws of the [land] fields”) in marine or freshwater environments, it may now also be time to talk about “**aquanomy**” (“the laws of the aquatic fields”).

Humans will soon not be able to continue thinking of mostly land-based agricultural solutions for securing their food, nor for providing many other derived products, but will have to turn increasingly to responsible aquanomic principles to manage their “aquatic fields”.

This is where IMTA will be able to play its full role, as we enter a new ERA of aquaculture practices for the development of Ecosystem Responsible Aquaculture systems.



Dr. Maxwell Doty, who coined the term “marine agronomy” in the 1970s.

*Read the paper:*

<http://www2.unb.ca/chopinlab/articles/files/Chopin%20and%20Neish%202014.pdf>



Terms like IMTA and seaweeds are increasing in popularity, even with authorities and funding agencies!

IMTA has been mentioned in recent discussions with regional public institutions in Spain.

Article 46 (Productive investments in aquaculture) of the recently approved **European Maritime and Fisheries Funds (EMFF)** states that the EMFF may support:

(i) investments allowing a substantial reduction of the impact of aquaculture enterprises on water usage and quality, in particular through reducing the amount of water or chemicals, antibiotics and other medicines used, or improving the output water quality, including through the deployment of integrated multi-trophic aquaculture systems.

The NOAA's Office of Aquaculture of the USA is talking **marine agronomy** and establishing a **macroalgae inventory**. Marine algal aquaculture in the USA could be a part of NOAA's strategy to maintain healthy, productive marine ecosystems and coastal communities. As NOAA's Office of Aquaculture explores its role in marine agronomy, it is looking to establish a baseline of current USA seaweed projects, both planned and existing. The survey is voluntary and the data will provide a 2014 snap shot of marine macro-algal cultivation in the USA. Data will be summarized and used to establish a "Seaweed" web page on the NOAA Aquaculture site.

Note: the survey is anonymous [because NOAA is not collecting information about you (*sic*)] and it could have evolved beyond marine agronomy (see above).

Even birthday cards can have an IMTA theme...!





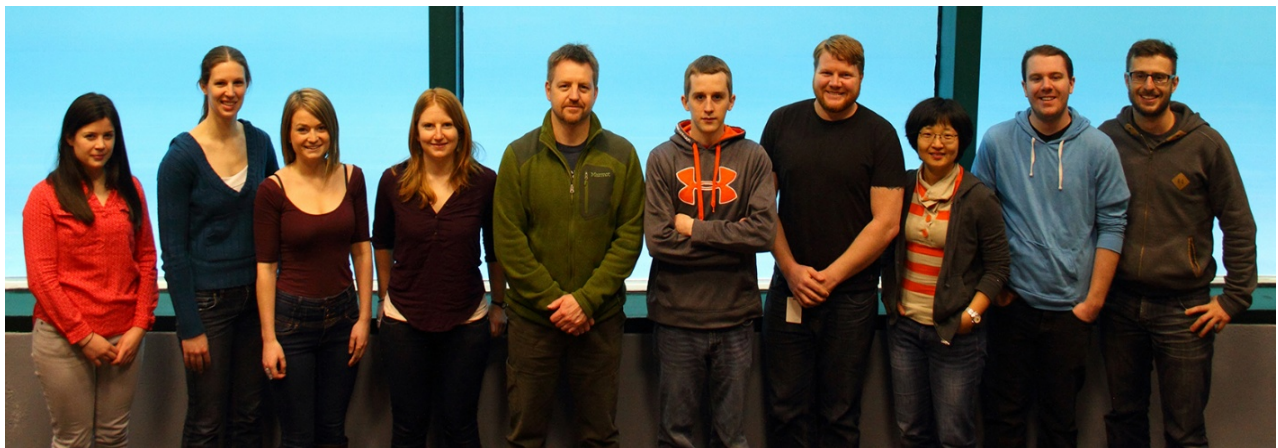


## Flume tank workshop for CIMTAN highly qualified personnel (HQP): a colourful success!

The first initiative, supported by the NSERC Strategic Network Enhancement Initiative Program, recently took place at the Memorial University's Flume Tank facility of the Marine Institute in St. John's, Newfoundland (March 23-27). The training objective of this intensive four day CIMTAN HQP workshop was to apply a team-based research approach to a complex problem, under conditions of time and resource limitations, with the goal of producing a publishable research document. The scientific objective was to document nutrient mixing behaviour and wake morphology of current flow passing through a model fish cage array to guide in the optimal placement of co-cultured species at an IMTA farm.



Multi-colour dye release at 5 second intervals.



Workshop participants: Allie Byrne, Jordana Van Geest (co-leader), Hannah Bradford, Sarah Sprague, Gregor Reid (co-leader), Adam Turner, Adam Gray, Di Wan, Kurt Simmons and Justin Del Bel Belluz.

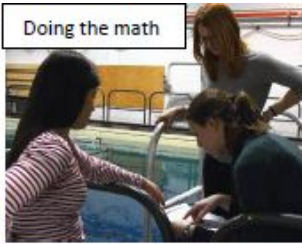
Eight CIMTAN HQP and two co-leaders (Gregor Reid, CIMTAN modeller, and Jordana Van Geest, CIMTAN postdoctoral fellow) lived and worked together for four days. HQP came from very diverse backgrounds and locations (five from the west coast and 3 from the east coast, taking advantage of the mobility provided by CIMTAN). Each brought their own unique skill sets to the project and had an opportunity to develop new ones. Data were collected through a variety of approaches such as dye dispersal, visual analysis, neutrally buoyant drogue-balls, flagging tape and current meters. Each HQP was assigned a primary and secondary task, with assignments as Data Overload, Data Wrangler, Gear Heads, Filmmee, Video Chief, Writers, Image Adjuster and the Analysts. Data were collected during the day with evenings spent debriefing and analyzing them.

Everyone did an amazing job and the workshop produced some excellent results, which are presently being written up (see CIMTAN wikibase). Returning home was quite an experience, courtesy of a nasty snow storm, but everybody managed to reach their final destination after becoming intimately familiar with various airports!





Drogue-ball assembly bee



Doing the math



Successful retrofit



Hanging in the kitchen



All hands on deck  
for meal prep



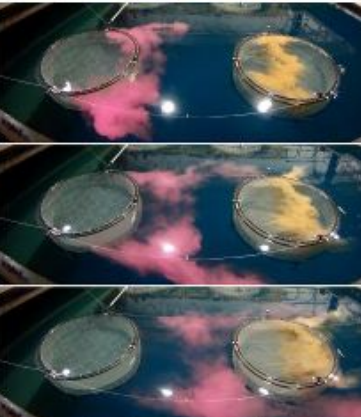
Hometel cooked meal



Maritime winter travel = time in airports = fashion reflection



Di is cold



Two cage  
simultaneous  
dye release



Adam, Allie and Kurt debrief



Releasing drogue-balls



Sarah debriefs



Jordana waves to  
GoPro in tank



←Serious business, less serious business→





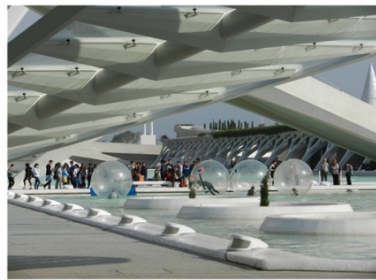
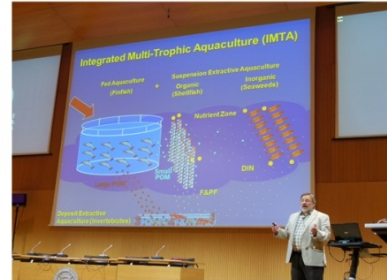
**Thierry Chopin** was in **Spain** and **South Korea** in April giving seminars on IMTA and being a **keynote speaker** at one conference.

In Spain, **Thierry Chopin** gave a presentation entitled "*La revolución turquesa para un cultivo sostenible del mar*" at the **Universitat Politècnica de València** with the support of the **Museum of Sciences of the City of Arts and Sciences of Valencia** and the **Institut Français**. This was an interesting trilingual (Spanish, French and English) presentation that took place during the Fifth Gastronomic Week of Aquaculture Products of the Community of Valencia. Thierry Chopin also had an opportunity to tour and discuss with people at the **Oceanogràfic**, one of the most impressive oceanographic museums and aquaria of Europe. He also visited the **Museo de las Ciencias**, the **Hemisfèric** 3D movie theatre, the **Agora** for concerts and sporting events and the **Palau de les Arts Reina Sofia**, an impressive opera house and music and dance cultural centre. The City of Arts and Sciences of Valencia is a most creative entertainment-based cultural and architectural complex designed by the famous Spanish architects **Santiago Calatrava** and **Félix Candela** and constructed between 1996 and 2005. The old city of Valencia has also a **Mercado Central** worth visiting for its attractive displays of peces and mariscos, jamón of all kinds, vegetables and fruits of all sorts and even some algae marinas! The Old Exchange (**La Lonja**) is also a superb building where many contracts and court decisions were signed and taken, which affected many events on the high seas.

**Thierry Chopin**, then, went to **Granada** to participate in the seminar series "Acuicultura: investigación, desarrollo e innovación" at **cei.mar**, the campus de excel·lencia internacional del mar of the Universidad de Granada. He gave a presentation entitled "*Integrated Multi-Trophic Aquaculture (IMTA): an environmentally, economically and societally responsible aquanomic practice*". He was very warmly welcomed by **Isabel Reche Cañabate** and **Luis Cruz Pizarro**. Isabel is interested in microbial activities, particulate organic matter and IMTA; so, possibilities of collaboration with CIMTAN need to be explored. Luis is interested in trophic interactions, energy and nutrient fluxes and eutrophication and restoration; he is also the Director of the School of Graduate Studies.

Luis has another quality, which is becoming rare: he is a rare remaining humanist and discovering the wonderful city of Granada, with its narrow streets and rich Moorish past, or appreciating the best tapas bars (*Bodegas Castañeda* and *Los Diamantes*) with him is a real treat! The Universidad de Granada owns the **Carmen de la Victoria**, an unbelievable haven of peace/residence for visiting scholars and **Thierry Chopin** decided to stay there: the relaxing atmosphere, the myriad of fragrances from the Moorish gardens, and the nice meal service by very attentive staff beat any hotel in town! Moreover, the view every night on the **Alhambra** should definitely be on your bucket list! Being there the weekend before Easter, intersecting with a procession of penitents, with their long blue masks/hats reminiscent of the Inquisition (or the KKK!), a strong smell of burning incense everywhere, huge floats carried by very strong men hidden under them, and very large music bands, which can be heard all over the town, added to creating an unforgettable experience.

In Granada, **Thierry Chopin** also met the founders of a very interesting spin-off company of the Universidad de Granada, **Pedro Álvarez** and **Carolina Alonso**, who created **iMare Natural S.L.** (<http://www.imarenatural.com/>): a very original variation on the IMTA theme with the cultivation of sea anemones (*Anemonia sulcata*; yes, you can eat them), glassworts (*Salicornia europaeae*; yes, they make wonderful pickled condiments) and sea cucumbers (*Stichopus regalis*; well, maybe a delicacy and an aphrodisiac in Asia...).











After Spain, Thierry Chopin flew to **Seoul, South Korea**. He met the students of **Jeong Ha Kim**, of the **Sungkyunkwan University**, before leaving for Daejeon, where he was invited by **Sung Min Boo** to give a seminar at the **Chungnam National University**. This one was entitled **"Integrated Multi-Trophic Aquaculture (IMTA): an aquanomic approach to farming the sea"**. After that, they drove to Wando (South Korea is not a very large country, especially when compared to Canada).

Wando was the location of both the **2014 Wando International Marine Algal Symposium**, from April 16<sup>th</sup> to April 19<sup>th</sup>, with the theme **"Seaweeds for Future Industry"**, and the very interesting **Wando Seaweeds Expo 2014**, with the theme **"Discovery of the Future Life, Seaweeds"**, for a full month between April 11<sup>th</sup> and May 11<sup>th</sup>.

Thierry Chopin was one of the keynote speakers of the conference, which was very well organized by a committee chaired by Jeong Ha Kim. The conference covered many aspects of phycology: taxonomy, genetics, evolution, ecology, physiology, seaweed and microalgal industrialization, aquaculture techniques, diseases and much more.

This conference was also highly cultural and enjoyable. The first day, there was a beautiful performance of wonderful South Korean music and dances for the audience to appreciate, and for some to discover. For the second day, Jeong Ha Kim had organized a "Seaweed Concert", only the second time music was brought into a seaweed conference. The first was in 1992 when Jean-Yves Floc'h, and the choir he was a member of, performed at the opening ceremony of the 14<sup>th</sup> International Seaweed Symposium in Brest, France, and interpreted a wonderful song to which the whole choir swayed like a wonderful underwater kelp forest.



Haecho and Micho, the two mascots of the Wando Seaweeds Expo 2014 (photo credit: Thierry Chopin).

This second occasion presented a rare and special opportunity as **Soojin Han**, the daughter of **Taejun Han**, a well-respected phycologist and successful developer of seaweed cosmeceuticals, was visiting her family in South Korea. Soojin is a remarkable young violinist with already an impressive list of accomplishments (<http://www.casalmaggiorefestival.com/soojin-han/>). She came to Wando with her friends ChanWook Kang (cello) and JooYoun Shin (piano) to delight the audience with music of Handel, Faure, Massenet and Squire. Having the father and daughter on stage was a special moment, especially when she recalled excursions on the shores of the Isle of Man, where her father was a postdoctoral fellow with the well-known British phycologist Joanna Kain (Jones). At a time, Soojin knew quite a lot of species names, but her violin soon became her calling. After some nice conversation, Thierry Chopin also had the rare privilege of touching a 1666 Stradivarius violin... quite a special feeling for those musically inclined!





The morning after the conference, a number of attendees were able to visit some large local cultivation sites where kelps and abalone are co-cultivated. Some of the kelp biomass is used for diversified applications and some is used directly to feed abalone every 4 days. Paradoxically, South Koreans do not call that aquaculture practice IMTA, but this is really yet another variation of it. Interestingly, while this is large scale aquaculture, it does not reach the high density which can be observed in some places in China, like Sanggou Bay; this could be related to the structure of the operations, which remain family managed. South Koreans also apply the concept of Integrated Sequential BioRefinery (ISBR), in which the same species is processed in many different ways to develop a full array of diverse products, instead of the too common one species-one process-one product approach still observed in many fisheries and aquaculture.

In the afternoon, the group explored the Wando Seaweed Expo 2014 and what a surprise it was...! Covering several hectares along the waterfront, 5 pavilions explained what seaweeds are and what can be done with them

(<http://www.koreapost.com/news/view.html?section=161&category=181&no=267>).

The opening ceremony was a spectacular show, including the band **Nine Muses**

(<http://www.youtube.com/watch?v=drlebCKjfYw>)

and a welcoming message from Thierry Chopin

(<http://www2.unb.ca/chopinlab/imta/news/Impressions%20of%20South%20Korea/index.html>).

You can decide which one must have been the most popular!

This expo averaged 23,000-25,000 visitors per day.

The 5 pavilions (ecology, industry, food, culture and business) remarkably delighted people of all ages, whether they knew nothing about seaweeds or were experts, which is quite a laudable achievement (<http://english.jeonnam.go.kr/?pid=EP020602>). A variety of “experience” facilities (from making seaweed ice cream to extracting red, brown and green pigments) kept children interested in seaweeds with much laughter and amazed eyes. A unique floating platform, the “Seaweeds Experience Zone”, recreated small scale models of the cultivation techniques for the main seaweed species farmed in South Korea and offered people the chance to touch/feel them as well (<http://www.youtube.com/watch?v=CLFk0JwPqtW>).

At the end of the afternoon, the Mayor of Wando wanted to meet the group to get its impression.

**Mr. Jong-Sik Kim** was omni-present during the week: at the opening ceremonies of the Expo and the Conference, listening to the keynote presentation of Thierry Chopin, distributing seaweed soup to visitors, with the mascots Haecho and Micho, at the cultural events and the banquet. A dream-come-true politician for any organizer of a seaweed event and an enthusiastic seaweed supporter every western phycologist can only dream of! The group told him that it was most impressed by the quality of the information and the way the Expo was able to reach a very diverse population without boring any sector of it or oversimplifying and irritating some purist scientists! A very difficult balance to find, but a very successful formula when reached through a playful

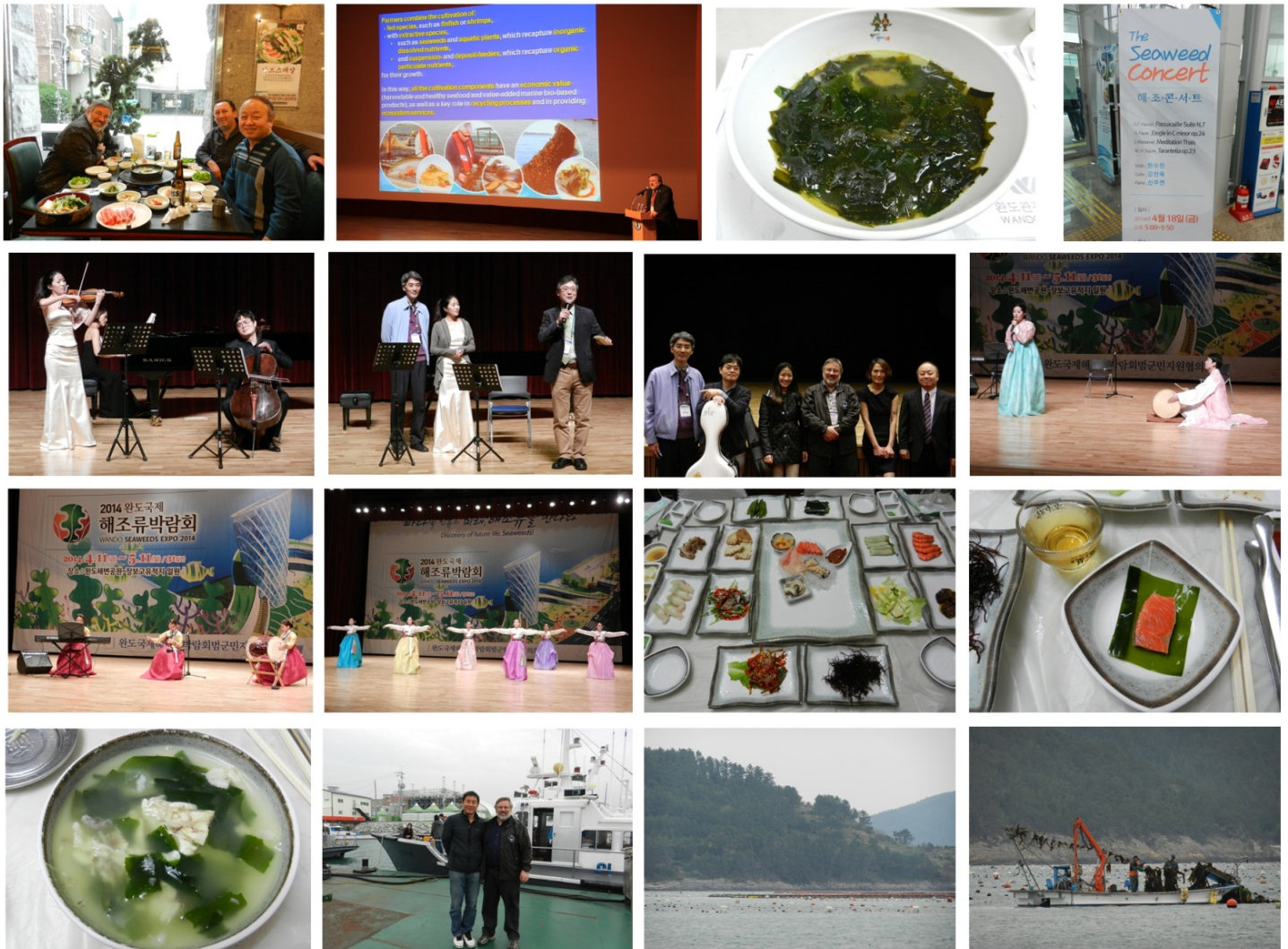




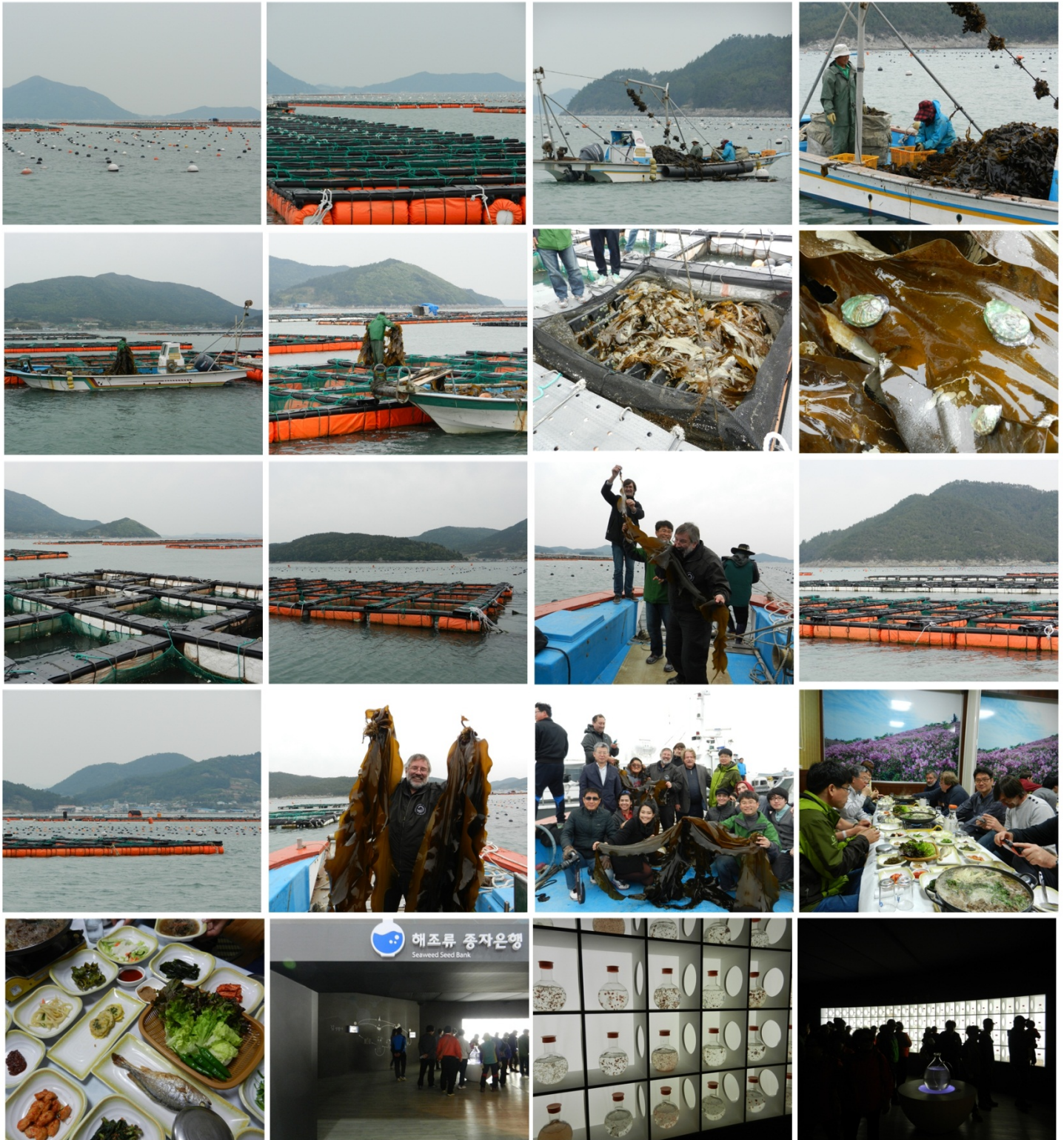


approach. It is certainly a very concrete example of successfully developed edutainment. With a few more translations into English and a few adaptations to better target a western audience, this would be a wonderful touring exhibit, which could play a huge educational role. Maybe we should just say that it was a surprising wonder of Wando!

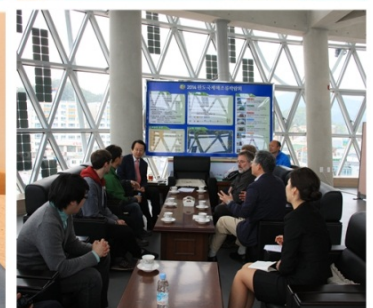
On his return to Seoul-Incheon airport, Thierry Chopin had enough time to visit Taejun Han at his spin-off company of the Regional Innovation Incubator of the Incheon National University. The tour, livened up by the very kind hospitality of Taejun, was most interesting. Taejun has developed two brands of functional cosmetics launched in 2012 and 2013, *M.Rose* and *Fikia*, which are most impressive by their design and are presently being enjoyed by Kathy Chopin!



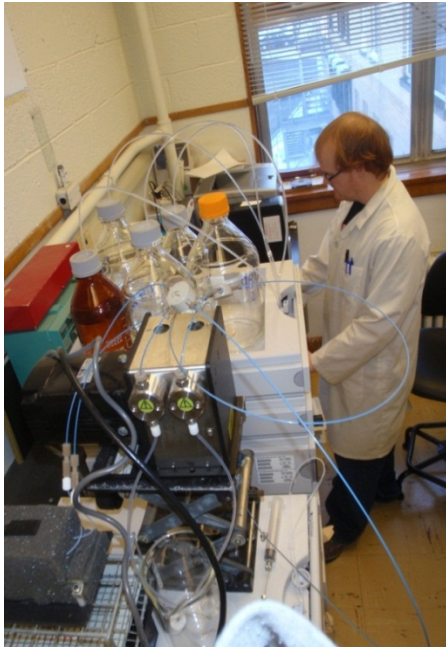












Geoffrey McBriarty performing HPLC analysis of experimental exposure media to determine the concentrations worms were exposed to during bioassays (photo credit: Paul Robertson).

**Geoffrey McBriarty** is a recent MSc graduate co-supervised by Dr. Les Burrige from Fisheries and Oceans Canada in Saint Andrews, New Brunswick, and Dr. Karen Kidd from the University of New Brunswick in Saint John. His research examined the effects of the anti-sea lice therapeutic emamectin benzoate (EB) on the polychaete worm *Nereis virens*. *Nereis* is being considered as a co-extractive species due to its commercial value as a bait species as well as its emerging potential as a replacement for wild-caught fish in commercial feed preparation. To determine the sensitivity of *Nereis* to EB, water and sediment bioassays were performed over a period of 7 or 30 days. Only the 7-day water-borne EB exposures resulted in significant mortalities, whereas decreases in worm mass and marked behavioural changes were observed after 30 days of exposure to environmentally relevant levels of EB in sediments. While  $LC_{50}$  was only established for water-based exposures, the effect of 30-day exposure demonstrates the risk posed to worms at an IMTA site where EB coated feed would be used.

**CIMTAN member quote of the month:** "My work with CIMTAN has given me a better appreciation for the various components of multi-disciplinary research and has allowed me to meet and develop working relationships with colleagues across Canada and beyond which I hope to continue as I move forward with my career in aquaculture research" (*Geoffrey McBriarty, CIMTAN MSc graduate*).



Sea worms (*Nereis virens*) being placed in freshly prepared emamectin benzoate-spiked beakers for exposure during a 30-day serial replacement bioassay (photo credit: Geoffrey McBriarty).

Geoffrey McBriarty graduated with a MSc in Biology from the University of New Brunswick in Saint John on April 17, 2014. As he found a job with our industry partner Cooke Aquaculture Inc. before graduating, we asked him a few questions.

*How did you transition from being a CIMTAN student to working in the aquaculture industry?*

GMcB: In March 2013, my Master's funding ran out and I started to intensively look for work. One day on a job bank site I saw that a technician position was open at the Oak Bay Hatchery of Cooke



Aquaculture Inc. I applied and even though another applicant filled the position, I was still brought in for an interview. While nothing was currently available then, I was told that if anything came up in the future I would be contacted. A few months went by and came November I was called and asked if I was still looking for work and if I would be interested in working on the Cunner project (see the above article "*These tiny fish may cure salmon farming's environmental problem*" by Clare Leschin-Hoar). I said yes, and came December 2013 I was hired on as the project's Senior Technician.

*What are you doing now?*

GMcB: Currently, we are in the spawning season, so typical days consist of preparing and distributing live feed to larvae, egg collection, larval transfer in addition to caring for the broodstock and daily management of our various hatchery systems (water, O<sub>2</sub>, etc.). I am also responsible for the Human Resources side of the project, along with being the primary point of contact for Kelly Cove Salmon Ltd. (a subsidiary of Cooke Aquaculture Inc.) and Huntsman Marine Science Centre, as well as being our Joint Health Safety Committee representative.

*Was the training you got through CIMTAN helpful for getting the job and through the job now?*

GMcB: I believe that my work while being part of CIMTAN was a major factor in me eventually ending up in this position. My time with CIMTAN made me a better-rounded person and certainly helped me form healthy working relationships with people critical to the success of this project.

*Any other related comments you would like to add?*

GMcB: I like to think that my time in CIMTAN was a major turning point in my life. I had a vague understanding of aquaculture going into the program and have now been exposed to so many sides and aspects of the aquaculture sector that it is hard to think of what else I could be doing. I do enjoy working on the research side of the business and being involved in the kind of work that has continued to move our industry forward. We are always looking for better ways to grow healthy and nutritious food while minimizing our environmental impact. We have come a long way, but there is always room to improve and working on the R&D team with Cooke Aquaculture Inc. gives me an opportunity to be part of something exciting.