

ADMIN/SABBATICAL PROJECT REPORT, Lucy Lee, Dean, Faculty of Science, 2017-2018

Title of project: **Expanding UFV capacity for teaching and research in the sciences: explorations into internationalization and indigenization.**

As part of my administrative leave for 2017/18, I embarked into expanding our capacity for teaching and research in the sciences. Towards this goal, two specific areas were proposed: administrative matters and personal research. For the first area, my aim was to expand our international and aboriginal connections for the sciences and agriculture, while for the second area, my personal scientific research relating to in vitro work with fish cells and applications in aquaculture were addressed. Below are details of the results of my leave for the two areas pursued:

1) EXPANDING SCIENCE CAPACITY THROUGH INDIGENIZATION AND INTERNATIONALIZATION:

The Indigenization aspect of my admin leave was to bring awareness of Indigenous issues to the faculty of Science and to make science more accessible to Indigenous students.

This started with my invitation for Dr. Gwen Point, former Chancellor of UFV, to give a campus wide seminar as part of the Dean of Science seminar series. This was done on Sept 28, 2017 in B101 and albeit I begun my international travels and missed her talk, Dr. Point gave a heartwarming presentation on her personal experiences and perspectives as a science teacher connecting science with Indigenous ways of life. A recording of her presentation is available in https://www.ufv.ca/faculty_of_science/science-speaker-series/. I believe her talk opened up some minds to the issues affecting our First Nations people and what we need to work on, to move forward for reconciliation and advancement.

In mid October, I went to Salt Lake City, Utah to attend SACNAS 2017, organized by the Society for Advancement of Chicanos/Hispanics and Native Americans in Science, that has been held annually in the USA since 1973. This conference currently attracts over 4000 participants interested in the STEM fields bringing together Indigenous peoples and minorities, with scientists of all walks of life to emphasize that diversity in science is important. I also connected with an anthropology professor from Utah State University, Dr. Bonnie Glass-Coffin, who researches cultural ethnography of Indigenous peoples and have begun a collaborative partnership for possible student immersion program on Native American peoples' cultures. In any event, SACNAS was an inspirational meeting and I believe Canada could begin a similar event. I presented this idea to the Council of Canadian Deans of Science (CCDS) in May of this year. I believe we can begin in small steps, and follow the USA SACNAS model for "reaching out to underrepresented minority science students to involve them in events where they can meet minority scientists, network, make connections, meet mentors, get feedback on their research projects and presentations, find internships and fellowships, make connections for graduate school and jobs, and advance in the sciences." At the CCDS meeting which I chaired as I was the President of this group for 2017 and 2018, I also interacted with invited scientists with Aboriginal backgrounds and listened to talks from these scientists giving us the perspectives of western science and Indigenous knowledge. One of these speakers was Kori Czuy, a PhD candidate in Mathematics at the University of Calgary, and I invited her to come to UFV to give an inspirational seminar, which she agreed and will come this November. I believe Aboriginal role models in the sciences are needed and Kori will be a great addition to the Dean of Science Seminar series.

The internationalization aspect of my administrative leave was to make connections with scientific institutions abroad and seek collaborative programs for students as well as faculty exchange opportunities. I achieved this by connecting with various officials at several universities and research institutes.

- Beginning in Iceland, in August 2017, I visited the University of Akureyri, at the northern end, and the University of Iceland, in Reykjavik.
- Moving on to Skretting research group in Stavanger, Norway; I visited the University of Oslo; the Norwegian School of Veterinary Medicine; and the Norwegian University of Life Sciences, NMBU in As, Norway. In all the institutions in Norway, I met various department heads and discussed student exchange opportunities.
- In September of 2017, I travelled to Denmark, where I met the chair of the Department of Chemistry, Dr. Mikael Bols, at the University of Copenhagen, as well as Dr. Kasper Villumsen of the Faculty of Health and Medical Sciences for research collaboration; and Drs. Niels Lorenzen and Jacob Gunther-Smith of the Danish Technical University in Lyngby, Denmark, and began discussions for research opportunities and possible short-term exchange of students.
- I also visited the Karolinska Institutet, in Stockholm, Sweden, where I met Dr. Stig Linder and his wife Margheritte to discuss opportunities for student travel and short-term placement at the Karolinska Institutet.
- In October of 2017, I hosted two scientists from Bandung Institute of Technology, Indonesia and was invited to visit them in Indonesia to arrange a collaborative program, but I was unable to visit them during my leave period.
- In January of 2018, I travelled to Berkeley, California, and connected with scientists from Finess Foods and begun a collaboration for work-study placement for our students.
- In March of 2018, I visited the Austral University of Chile in Valdivia and gave a graduate course, connecting with students as well as with professors and administrative personnel there to initiate a visiting program for their students through the Emerging Leaders in the Americas program.
- In April of 2018, I visited the University of Auckland (UA) and Auckland University of Technology (AUT) as well as visiting the Plant and Food Research Institute in Nelson, New Zealand for research collaboration opportunities.
- In July of 2018, I hosted Dr. Kristin Schirmer, Head of the Department of Environmental Toxicology, and Dr. Mario Schirmer of the Department of Water Resources and Drinking Water, from Eawag, Switzerland, for collaborative and exchange projects.

Currently, UFV has international exchange agreements for students but not much has been done for faculty or staff. I believe that there will be excellent opportunities for advancing the professional development of our faculty and staff through exchange appointments that I have explored, where faculty would participate in regular work but as visiting personnel, and the visiting members could fill in the vacated roles of the exchange members.

Thus the above aspect of my administrative leave was very fruitful in terms of initiating the international connections.

2) SABBATICAL LEAVE- FISH IN VITRO RESEARCH:

This component of my leave for the year 2017-2018 was highly successful which resulted in the following output:

A. Research publications (peer reviewed manuscripts, underlined names are those of my trainees, and bolded ones are from UFV):

1. Pham PH, Lee LEJ, Misk E, Hamilton M, Jones G, Sokeechand B, Lumsden JS, Bols NC (2018) VER-155008 induced Hsp70 proteins expression in fish cell cultures while impeding replication of two RNA viruses. Antiviral Research (submitted Aug 6, currently under revision)
2. MacLeod MJ, Vo NTK, Mikhaeil MS, Monaghan SR, **Alexander JAN**, **Saran, MK**, Lee LEJ (2018). Development of a Continuous Cell Line from Larval Atlantic Cod (*Gadus morhua*) and its Use in the Study of the Microsporidian, *Loma morhua*. J Fish Diseases 41(9): 1359-1372.
3. Pumputis PG, Dayeh VR, Lee LEJ, Pham PH, Viththiyapaskaran S, Bols NC (2018) Responses of rainbow trout intestinal epithelial cells to different kinds of nutritional deprivation. Fish Physiol Biochem 44: 1197-1214.
4. Kim JJ, Hamilton ME, Pham PH, Lee LEJ, Bols NC (2018) Effect of selenomethionine on cell viability and heat shock protein 70 levels in rainbow trout intestinal epithelial cells at hypo-, normo-, and hyper-thermic temperatures. J Thermal Biol 76: 107-114.
5. **Trento MVC**, Cesar PHS, Marcussi S, Lee LEJ (2018). Genotoxic action of naphthenic acids on the fish macrophage cell line, RTS11. Int J Environ Poll 63: 117- 130.

B. Published Abstracts: (Conference presentations, underlined names are those of my trainees, and bolded ones are from UFV)

1. Dayeh VR, Linton L, Hamilton M, Pham PH, Lee LEJ, Bols NC (2018) Evaluating the toxicity of beauvericin to rainbow trout intestinal epithelial cells at different temperatures. Annual Meeting of the Society for In Vitro Biology. St. Louis, MO. June 2-6, 2018, poster A2002
2. **Boyd TM**, **Gomez JM**, **Navarro SA**, Lee LEJ (2018) Initiation, characterization and culture of olfactory cells from adult rainbow trout (*Oncorhynchus mykiss*). 57th Annual Meeting of the Canadian Society of Zoologists, Saint John's, NL, May 7-11, 2018
3. **Webb TH**, **Boyd TM**, **Kobes VG**, **Navarro SA**, Lee LEJ (2018) Establishment and characterization of mesothelial cell lines from rainbow trout (*Oncorhynchus mykiss*). 57th Annual Meeting of the Canadian Society of Zoologists, Saint John's, NL, May 7-11, 2018

Non-Peer reviewed conference participation:

1. **Boyd TM**, Lee LEJ (2018) Long-Term In Vitro Culture of Olfactory Cells from Rainbow Trout (*Oncorhynchus mykiss*). Presented as a poster at UFV Undergraduate Research Day. Apr 5, 2018. ***Winner of UFV's Student Research Day - President's Award***

C. Invited seminars:

1. **Lee LEJ** (2018) Ecotoxicology & Fish Invitromatics. Toxicology Centre, University of Saskatchewan, Saskatoon, SK. Aug 29, 2018
2. **Lee LEJ** (2018) Marine Fish Invitromatics. Plant & Food Research, Nelson, New Zealand. Apr 24, 2018

3. **Lee LEJ** (2018) Development and Use of Various Marine Fish Cell Lines. Universidad Austral de Chile, Valdivia, Chile. Mar 23, 2018
4. **Lee LEJ** (2018) Fish Invitromatics. Dean of Science Seminar Series, University of the Fraser Valley, Abbotsford, BC. Feb 20, 2018
5. **Lee LEJ** (2018) Invitromatics: The Art & Science of Cell Culture. Comparative Physiology Group, Department of Zoology, UBC. Jan 22, 2018
6. **Lee LEJ** (2018) KFE-5, a myogenic cell line derived from embryonic mesodermal tissue of killifish, *Fundulus heteroclitus*. Finless Fish, Berkeley, CA. Jan 15, 2018
7. **Lee LEJ**, Bols NC (2017) Role of fish cell lines in fisheries and aquaculture. Norwegian Veterinary Institute, Oslo, Norway. Sept 25, 2017
8. Bols NC, Pumputis P, **Lee LEJ** (2017) The use of fish intestinal cells for aquaculture feed research. Norwegian Veterinary Institute, Oslo, Norway. Sept 25, 2017
9. **Lee LEJ**, Bols NC (2017) Use of fish cell lines in fisheries and aquaculture. International Seafood Congress, Reykjavik, Iceland. Sept 11, 2017 (Cancelled due to host from Matis moving)

D. Courses & Workshops:

(Month/Year, (Institution), description, (enrollment), contact hours)

1. Sept 2017, Norwegian Veterinary Institute, Oslo, Norway: Fish cell culture: Atlantic salmon & Zebrafish (6), 40h
2. January 2018, Finless Foods, Berkeley, CA, USA: Culture of fish muscle cells: Tuna, Tilapia, Trout (6), 48h
3. March 2018, Graduate course Universidad Austral de Chile, Valdivia, Chile: Fish invitromatics: Atlantic salmon, Rock fish, Congrio, Chilean Seabass (6), 72h
4. April 2018, Plant and Food Research, Nelson, New Zealand: Marine fish invitromatics: Snapper fish (3), 40h

E. Research Grants

<u>Principal Investigator, Grant type and Agency</u>	<u>Total Amount</u> (my share if not PI)	<u>Years</u>
S. DeWitte-Orr, AR Rullo and LEJ Lee NSERC (Strategic)	Submitted Jun 2018	2018-2021
G. Dowd and LEJ Lee Catalyst Seeding Fund, Royal Society NZ	\$79,000 NZD (14K)	2018-2021
J.G. Schmidt, LEJ Lee & 5 others. Independent Research Fund, Danish Research Council	Submitted Oct 2017 Unsuccessful	2018-2020
LEJ Lee - Equipment grant Natural Sciences and Engineering Research Council of Canada	Submitted Nov 2017 Unsuccessful	2018
Simon Weli & 6 others. Large-scale Programme for Aquaculture Research, HAVBRUK2, Norway	\$730,000 USD (travel costs)	2017-2019

F. Student training:

- Anthony Miyagi, UBC (summer 2018) initiation and culture of invertebrate cells: bees and shrimp
- **Veronica Kobes** (NSERC USRA, summer 2018) Histology of rainbow trout olfactory tissues, fish cell culture maintenance
- **Taylor Boyd** (NSERC USRA, winter 2018) Fish olfactory cell culture, initiation and characterization.
- **Tessa Webb** (Fall 2017) Fish cell culture maintenance and quality control

G. Thesis committees:

- Brianna Eisler, MSc University of Saskatchewan (August 2018) External Examiner.
- Chao Li, PhD University of Alberta (November 2017) External Examiner.
- Elizabeth Johnston, PhD University of Guelph (ongoing) Committee member.

H. Professional Service:

- Symposium Organizer, Cellular Agriculture, Society for In Vitro Biology (2018-2019)
- President, Canadian Council of Deans of Science (2017-2018)
- Past-President, Canadian Society of Zoologists (2017-2018)
- Reviewed promotion materials for faculty at:
 - University of Maryland, Center for Environmental Science (2018)
- Refereed papers for the following journals
 - Comparative Biochemistry and Physiology (1)
 - Cytotechnology (3)
 - J. Fish Diseases (1)
 - Ecotoxicology and Environmental Safety (1)
 - Fish Physiology and Biochemistry (1)
 - In Vitro Cell & Developmental Biology (4)
 - Toxicology in Vitro (1)
- Reviewed grants:
 - Israel Research Council (2018)
 - NSERC Discovery (2017)
- Scientific Advisor, Finless Foods, Berkeley, CA (2018 -)
- Presented at Abbotsford learning Plus (Abbotsford) Feb 1, 2018 on Shifting Paradigms: Good is not always perfect.

In addition to above aspects, but relating to professional and administrative aspects, I was interviewed by University Affairs on article about predatory conferences, which was published on Mar 5, 2018 <https://www.universityaffairs.ca/news/news-article/poor-quality-predatory-conferences-prey-academics/>

UFV student newspaper Cascades- Feb 28. <http://ufvcascade.ca/the-fine-art-of-fish/>

UFV student newspaper Cascades- Feb 21. <http://ufvcascade.ca/more-to-fish-than-just-the-slime/>

Featured in ExPASy- Oct 2017 https://web.expasy.org/cellosaurus/invitromaticists/Lee_LEJ.pdf