

Pathology and Microbiology Welcomes New Chair



I, **Dr. Mark Fast**, would like to take the time to thank everyone within the Department of Pathology and Microbiology for their support over the past 3 years, especially Karen and Ingrid for all their help in my duties as Chair. During my 3 years, AVC has seen 3 different Deans, and I am hopeful that the next 3 years will be more stable, we will experience better balance in our work and that you will all support Dr. Chelsea Martin as much as I felt supported. I will continue to work hard for PM and AVC and am excited for our future opportunities.

Mark



I, **Dr. Chelsea Martin**, am looking forward to serving as Chair of the Department of Pathology and Microbiology and the opportunity to help support new and continued successes of all our members. I am grateful to Dr. Mark Fast for his leadership of the Department over the past 3 years, and for his assistance as I take on this new role. I hope to continue his record of strong support for the academic, research and service goals of our faculty, staff and students. I am excited to represent our Department as we prepare for the 2024-2025 academic year under the leadership of our new AVC Dean, Dr. Dominique Griffon, and UPEI President, Dr. Wendy Rodgers.

Although the next few months will be busy, I hope everyone finds time to enjoy the summer and recharge after a successful winter semester.

Chelsea

UPEI 25-Year Service Award



Congratulations to **Nicole Murphy** on receiving an award for her 25 years of Service to UPEI. Nicole has served the university as a laboratory technician and is currently working between the Departments of Pathology and Microbiology and Diagnostic Services. The University Awards of Excellence and 25-year Service Awards ceremony was held on May 23, 2024 at the UPEI Performing Arts Centre.

Congratulations Nicole!

Photo: Dr. Greg Keefe, Interim President and Vice-Chancellor presents Nicole Murphy, Faculty of Veterinary Medicine with a 25-year service award.

Pathology and Microbiology Newsletter

The Department of Pathology and Microbiology is most appreciative of **Dr. Shelley Burton** and **Dr. Russell Fraser** for their contributions in reviewing and editing the Path/Micro Newsletter. Shelley has served as Reviewer since 2009 when the newsletter was started, and Russ has been Editor since 2020. Throughout their work, the newsletter has been able to transmit widely and at a high level the on-going contributions of Path/Micro faculty, staff and students.

The Department of Pathology and Microbiology extends a warm welcome to **Dr. Shivani Ojha** and **Dr. Fred Kibenge** who will be taking on the task of reviewing and editing our bi-monthly department newsletter.

2024 Research Award of Excellence Recipient



Congratulations to **Dr. Mark Fast** who is the 2024 Research Award of Excellence Recipient by the Aquaculture Association of Canada. The Outreach and Recognition Committee of the Aquaculture Association of Canada has chosen him to be this year's recipient of the Research Award of Excellence. Dr. Fast was recognized for his contributions to academic and industry aquaculture research both within Canada and internationally. This award will be presented at the Aquaculture Canada 2024 Conference and Tradeshow during the Dr. Joe Brown Social Event on Tuesday, June 18, 2024.

Congratulations Mark!

2024 Recipient of the Dr. Regis Duffy Graduate Scholarship



Congratulations to **Shelby Reimer**, on being the recipient of the 2024 Dr. Regis Duffy Graduate Student Scholarship in Science. This award is valued at \$12,500 and recognizes graduate students in science who have demonstrated academic excellence and research potential and are pursuing a MSc, MVSc or PhD degree at UPEI. Shelby, is a PhD student in Pathology and Microbiology supervised by **Dr. Mark Fast**.

Congratulations Shelby!

2024 Recipient of the NSERC Canada Graduate Scholarship Award



Congratulations to **Emily Grace Wainwright**, MSc student in Pathology and Microbiology on receiving the NSERC Canada Graduate Scholarship-Masters (CGS M) award. Emily will receive \$17,500 CDN for her research project titled "Molecular analysis of the genetic footprint of fresh retail poultry meat and the poultry fecal microbial resistome". Emily is supervised by **Drs. Lisanework Ayalew** and **Mark Fast**.

Congratulations Emily!

PhD Defense



Congratulations to **Dr. Walaa Nasry** who successfully defended her PhD thesis "Prostaglandin E2 mediated inflammation and hypoxia in feline oral squamous cell Carcinoma" on April 23, 2024. Walaa was supervised by **Dr. Chelsea Martin**; **Dr. Fred Kibenge** chaired the Supervisory Committee; **Dr. Shelley Burton** chaired the Examination Committee.

Congratulations Dr. Nasry!

New Funding



Congratulations to **Dr. Lisanework Ayalew** on receiving funding from NSERC Alliance MITACS in the amount of \$600,500. His project is titled “Delivery of probiotics in chicken embryos and modulation of the immune system with oligodeoxynucleotides containing CpG motifs to control bacterial infections”. Dr. Ayalew is Co-investigator on the project; the Principal Investigator is Dr. Susantha Gomis, Western College of Veterinary Medicine, University of Saskatchewan.



Congratulations to **Dr. Nina Germitsch** on receiving funding from the New Brunswick Wildlife Trust Fund. Her project is titled “Invasive worms - Are New Brunswick’s wild canids infected with emerging parasites?” Dr. Germitsch will receive \$12,000 for her research project.

Recognition and Appointments



Dr. Lisanework E. Ayalew was recognized as a Top Five Reviewer for The American Journal of Veterinary Research for the period August 2022 – August 2023.

Dr. Lisanework E. Ayalew has been appointed as an Associate Editor for the World Journal of Microbiology and Biotechnology in February 2024. The journal is hosted by Springer Nature.

Pathology and Microbiology Welcomes New PhD Student



The Department of Pathology and Microbiology welcomes **Eleanor Glahn**, who began her Doctor of Philosophy program in January 2024. She is thrilled to be jointly supervised by **Dr. Laura Bourque** and **Dr. Mark Fast**, studying oomycosis of brook and rainbow trout in PEI rivers. Prior to beginning her program here, Eleanor worked as a Biological Science Technician for the USDA Agricultural Research Service at the National Cold Water Marine Aquaculture Center located in Franklin, Maine, primarily working with the salmon louse *Lepeophtheirus salmonis*. In May of 2023, Eleanor received her Master of Science in Aquaculture and Aquatic Resources from the University of Maine, after receiving her Bachelor of Science in Aquatic and Fisheries Science from SUNY College of Environmental Science and Forestry, Syracuse, New York, in May of 2020. Eleanor’s goal is to further her career in research, where her primary interests are the effects of the environment on pathogen host interactions. When not in the field or the lab, Eleanor enjoys running, lifting weights, and exploring all that PEI has to offer with her dog, Clover.

Pathology and Microbiology Welcomes New Laboratory Technologist



The Department of Pathology and Microbiology welcomes, **Amanda Keefe (Hashem)**, laboratory technologist in Parasitology. Amanda was born and raised on PEI with most of her childhood being brought up in her parents' grocery store. Graduating in 2017 with a Bachelor of Science with a Major in Biology, Amanda went on to complete the Bioscience Technology program at Holland College. For the past five years, Amanda had been working as a food microbiology laboratory technologist; but eager for a new challenge, she decided to pursue a career change. Amanda is excited to bring her skills and experience into a fresh and dynamic environment and she is looking forward to working alongside **Dr. Nina Germitsch** and **Nicole Murphy**. In her free time, she likes playing video games, crafting, and lounging with her dogs.

Pathology and Microbiology Welcomes New Summer Students



Brady Sweeney (they/he), AVC Class of 2027, is a VetSRA student under the supervision of **Dr. Nina Germitsch**. Their project is looking at the prevalence of *Echinococcus multilocularis* in foxes and coyotes in the Maritimes. Brady is from Connecticut, USA, and following vet school they would like to go into rural practice or pathology. When not at AVC, Brady can normally be found at the barn or curled up at home with their new kitten and a book.



Hannah Johnston is a 3rd year UPEI Biology student working as a summer student assistant with **Dr. Nina Germitsch**. She will be collecting canid fecal samples to look for *Crenosoma vulpis* larvae for freezing studies. Additionally, Hannah will be working at the Dr. Tim Ogilvie AVC Vet Camp this summer. In her free time, she enjoys playing music and going to the beach.



Clare Henderson, AVC Class of 2026, is a VetSRA student under the supervision of **Drs. Nina Germitsch** and **Megan Jones**. This is Clare's second summer with the VetSRA program and her project involves dissecting lungs and hearts from Newfoundland coyotes and determining the prevalence of French heartworm (*Angiostrongylus vasorum*) and other lungworms. Clare is from New Glasgow, NS, and has always had an interest in pathology, as well as reading, biking, and listening to music. Clare has developed a passion for parasitology and is looking forward to further developing her skills regarding post-mortem techniques and parasite identification.



Leah Campbell has recently finished her first year in Biology at UPEI, majoring in Pre-Vet. Leah says she is fortunate to have been granted the opportunity to attend a Pre-Vet program in Costa Rica this upcoming July; where she'll be able to assist in surgeries, learn about zoonotic diseases, and perform veterinary labs, like suturing, blood smear analysis, and more. This past year, Leah has enjoyed her student position in the Department of Pathology and Microbiology under the supervision of **Dr. Mark Fast**. Leah is looking forward to expanding her knowledge and experience at AVC.



Lindsay Stewart, is a second year student at the University of Guelph, majoring in Marine and Freshwater Biology. Lindsay will be working with **Eleanor Glahn** on her research on the *Saprolegnia* project in PEI rivers. In the future, Lindsay hopes to further her education in Marine Biology with a focus on marine mammals, and one day be involved in research related to the recovery of whale populations. Lindsay welcomes the opportunity to get hands-on experience working in this field and in the laboratory, which will provide her with valuable knowledge moving forward in her studies. Lindsay is a PEI native who enjoys exercising, going to the beach, and playing the piano in her spare time. She also plays on the women's varsity rugby team. Lindsay is supervised by **Drs. Laura Bourque** and **Mark Fast**.



Savannah Christmas, will enter her third year of the veterinary medicine program in the fall. Savannah will be working on a research project under the supervision of **Dr. Melanie Buote**, which aims to determine the prevalence and infectivity of nematode parasites in frozen wildlife tissue samples. She will also be part of an annual national tick surveillance program with the Canadian Lyme Sentinel Network (CaLSeN). Savannah's career interests, other than Pathology, include Wildlife and Zoo Medicine. She also enjoys reading, cooking and spending time at the beach.



Hannah Kennedy, is a third year veterinary student and SJDAWC-VetSRA recipient. This summer she will be doing a project with **Dr. Shivani Ojha** titled "Isolation and characterization of bacteriophages against pathogens implicated in skin infections of canine species." They will be isolating bacteriophages (viruses that infect bacteria) from Charlottetown wastewater samples and test their killing efficacy against *Pseudomonas aeruginosa*. In her free time Hannah loves to draw and paint and she's looking forward to enjoying a beautiful summer on PEI!



Minhye Lee, AVC Class of 2027, will be participating in the VetSRA program this summer. Minhye will look at the occurrence of *Salmonella* in the wildlife of Atlantic Canada under the supervision of **Drs. Shivani Ojha** and **Megan Jones**. Minhye will process rectal swabs of dead wildlife species using microbiological methods to detect *Salmonella*. The serotyping and antimicrobial susceptibility profiling of the identified isolates will be performed. While Minhye aims to explore many different fields of veterinary medicine, her primary interest lies in wildlife medicine. In her free time, Minhye enjoys painting and hiking.



Carissa Grove will work with **Drs. Megan Jones** and **Laura Bourque**, in wildlife pathology and the Canadian Wildlife Health Cooperative (CWHC). She will be entering her third year in the DVM program this fall (Class of 2026) and is also completing her Masters of Science degree in Environmental sciences. She is hoping to pursue a career in wildlife pathology or to become involved in conservation programs in the future. Her duties this summer will include helping with the day-to-day tasks such as wildlife disease surveillance and necropsies, as well as assisting in other research projects. In her free time she can be found mainly outdoors, hiking and camping, but also enjoys playing board games with friends and reading.

Conference Presentations

Dr. Lisanne Ayalew was a co-author in the following conference presentation:



Ranaraja A, Rathnayake M, Gautam H, Subhasinghe I, Shaik N, Popowich S, Lockerbie B, Ahmad K, **Ayalew L**, Tikoo S, Ojkic D, Gomis S. Rapid Poultry Disease Diagnosis Using Metabolomics. 2024. Western Poultry Disease Conference, Salt Lake City, Utah, USA, April 15-17th, 2024.

Gautam H, Shaik NA, Banaganapalli B, Popowich S, Subhasinghe I, **Ayalew LE**, Mandal R, Wishart DS, Tikoo S, and Gomis S. Butyric acid as a biomarker and early diagnostic tool for the detection of necrotic enteritis in broiler chickens using metabolomics. 2024. WCVU Graduate Student Research Poster Day, April 3, 2024.



Dr. Reza Ghanei-Motlagh presented at the following conference:

The 63rd Annual Meeting of the Canadian Society of Zoologists was held in Moncton, NB, from May 6-10. **Dr. Reza Ghanei-Motlagh** (Postdoc fellow), supervised by **Dr. Mark Fast**, provided presentations on the progress of two research projects entitled “Mitigating the impact of climate-related challenges on salmon aquaculture” and “Sea lice resistance over time in an Atlantic salmon breeding program” (referenced below):

Transcriptome responses of Atlantic salmon of different families to sea lice infection under different temperature conditions. **Ghanei-Motlagh, R, Cai, W, Whyte, SK**, Garber, AF, **Fast, MD**. The 63rd Annual Meeting of the Canadian Society of Zoologists, May 6-10, 2024. Moncton, NB (Oral presentation); Modulation of immune-inflammatory responses in the intestine of Atlantic salmon upon sea lice infestation. **Ghanei-Motlagh, R.**, Feng, Y, **Purcell, SL, Whyte, SK**, Garber, AF, **Fast, MD**. The 63rd Annual Meeting of the Canadian Society of Zoologists, May 6-10, 2024. Moncton, NB (Poster presentation).



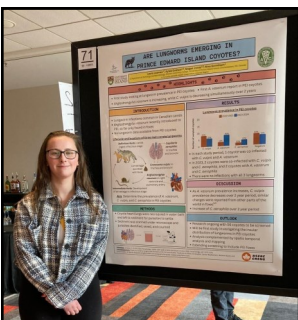
Dr. Eyesun Fajei presented her research findings at the following conference:

The 63rd Annual Meeting of the Canadian Society of Zoologists, which was held in Moncton, NB, from May 6 to 10. **Dr. Eyesun Fajei**, a PhD candidate supervised by **Dr. Mark Fast**, presented recent findings related to her thesis. Her abstract was titled “Investigation of two different PACAP-38 (Pituitary Adenylate Cyclase-Activating Polypeptide) formulated feeds on Atlantic salmon (*Salmo salar*) with Enteric red mouth disease (*Yersinia ruckeri*).”

Poster Presentations



Dr. Shivani Ojha (investigator, Charlotte Pye co-investigator) presented a research poster at the Conference of Research Workers in Animal Diseases (CRWAD) which was held in Chicago, Illinois, USA, from January 20-23, 2024. The research poster was included in the Session of One Health/ Public Health. The poster was titled “Isolation and characterization of *Pseudomonas aeruginosa* bacteriophage to treat canine skin infections”.



Laura Leaman, a Master of Science in Veterinary Medicine student under the supervision of **Dr. Nina Germitsch**, presented a research poster at the Canadian Society of Zoologists Conference, parasitism section, held May 6 – 10, 2024, in Moncton, New Brunswick. Her poster was titled: “Are lungworms emerging in Prince Edward Island coyotes”. Laura finished first place in the PEI poster section, and received the Mick Burt Award for her poster presentation.

International Training Course Delivered in Lima, Peru



Participants in training course: Dr. Fred Kibenge (centre); Dr. Molly Kibenge (last right side); Dr. Zelalem Mekuria (second from left side).

This workshop had three main objectives: i) to prepare participants to conduct molecular diagnostics of Infectious Pancreatic Necrosis virus (IPNV), ii) to train the participants in using the Nanopore NGS platform for whole genome sequencing, and iii) to help participants to conduct molecular diagnostics and characterization under quality standards. The 5-day training agenda consisted of morning lectures in fish virology, diagnostics and molecular methods with focus on IPNV and related viral diseases, and afternoon hands-on labs on molecular diagnostics and Nanopore sequencing of IPNV.

Drs. Fred Kibenge and Molly Kibenge participated as international experts in a workshop in Lima, Peru, titled “Regional training course on Molecular Diagnostics and Nanopore Sequencing of the Infectious Pancreatic Necrosis, from March 18-22, 2024”.

The workshop, which was funded by the International Atomic Energy Agency (IAEA) and hosted by SANIPES (National Fisheries Health Agency, Peru), was delivered by three international experts including Dr. Zelalem Mekuria from The Ohio State University. There were 14 participants from different Latin American countries (Argentina, Brazil, Chile, Ecuador, Mexico, Panama, Peru, and Uruguay).



Workshop participants after donning their laboratory coats and head covers before entering the lab for the hands-on labs.



At the conclusion of the workshop, Dr. Fred Kibenge presented to Professor Nieves Sandoval Chaupe (Faculty of Veterinary Medicine, National University of San Marcos) and Dr. Muriel Gómez Sánchez (Director of Health and Food Safety, SANIPES), each, with a two-volume set of his books: **AQUACULTURE PATHOPHYSIOLOGY, VOLUME I. FINFISH DISEASES** and **VOLUME II. CRUSTACEAN AND MOLLUSCAN DISEASES**, published August 26, 2022, by Academic Press.

Dr. Fred Kibenge presenting the two-volume set of his books each to Professor Nieves Sandoval Chaupe (Faculty of Veterinary Medicine, National University of San Marcos) (on the right) and Dr. Muriel Gómez Sánchez (Director of Health and Food Safety, SANIPES) (on the left).

Invited to Speak at the FAO Headquarters in Rome, Italy



Dr. Mark Fast has been invited to speak at the Food and Agriculture Organization Headquarters of the United Nations (FAO) in Rome, Italy. Dr. Fast will present at the Aquatic Organism Health: To vaccinate or not to vaccinate International Conference (hybrid event) on June 20, 2024. This conference will bring together leading experts to delve into the topic of fish vaccination and new developments regarding shrimp vaccination as a vital biosecurity strategy.

Dr. Fast's presentation will be on his findings of "Recent developments using mRNA vaccine strategies for fish."

Pathology and Microbiology Purchases New Equipment



"The Department of Pathology and Microbiology recently purchased a new Olympus BX53 microscope capable of allowing 5 people to view a slide simultaneously. A high-end digital camera was also obtained, which will allow users to display images on a nearby monitor or virtually. The addition of this piece of equipment will help with hands-on teaching in anatomic and clinical pathology, both to DVM students and residents. Funds were primarily obtained from the Department, with a contribution from the Dean's Office. Thanks to all who were part of the effort to obtain this much-needed microscope."

Canadian Wildlife Health Cooperative Student Rotation



The Wildlife Health Rotation - VPM 4130, took place from April 2-12, 2024.

This year, field trips were organized to visit Hope for Wildlife Rehabilitation Centre and Shubenacadie Wildlife Park in Nova Scotia, and Magnetic Hill Zoo in Moncton, NB from April 9th-11th.

In the eagle's nest at Hope for Wildlife are "eaglets": Carolina Vicente, Meredith Bilter, Sam Benham (on the top from left to right). Below: Gabrielle Mau, Dr. Giuliana Obeid (ZEW Master's student) and Kristy Faulkner. Out of the nest are Eagle "parents": Wildlife tech **Fiep de Bie**, **Dr. Megan Jones** and Dr. Lara Cusack.

Publications

Godoy M, Montes de Oca M, Suarez R, Martinez A, Ponigo JP, Caro D, Kusch K, Coca Y, Bohle H, Bayliss S, **Kibenge M, Kibenge F**. Genomics of Re-Emergent *Aeromonas salmonicida* in Atlantic Salmon Outbreaks. *Microorganisms* 2024;12;64. <https://doi.org/10.3390/microorganisms12010064>.

<https://www.mdpi.com/journal/microorganisms>

Ghanei-Motlagh R, Hernández-Orts JS, **Fast MD**, **Whyte SK**, El-Matbouli M, Saleh M. Morphological and molecular characterization of *Stomachicola muraenesocis* Yamaguti, 1934 (Digenea: Hemiuridae) from the daggertooth pike conger *Muraenesox cinereus* (Forsskål) *Parasitology* 1-21 <https://doi.org/10.1017/S0031182023001063>

Gautam H, **Ayalew LE**, Ahmad Shaik N, Subhasinghe I, Popowich S, Chow-Lockerbie B, Dixon A, Ashfaque Ahmed K, Tikoo SK, Gomis S. Exploring the predictive power of jejunal microbiome composition in clinical and subclinical necrotic enteritis caused by *Clostridium perfringens*: insights from a broiler chicken model. Gautam et al. *Journal of Translational Medicine* 2024;22;80

<https://doi.org/10.1186/s12967-023-04728-w>

Brocca G, Truant A, Peckova H, Lisnerova M, Perolo A, Fioravanti M, Fiala I, Gabai G, Quaglio F, Gustinelli A. Identification of new amoebae strains in rainbow trout (*Oncorhynchus mykiss*, Walbaum) farms affected by nodular gill disease (NGD) in Northeastern Italy. *Journal of Fish Diseases*, 00,e13933.

<https://doi.org/10.1111/jfd.13933>

Shaker Nasry WH, Jones K, **Rodriguez-Lecompte JC**, Tesch M, **Martin CK**. Expression of mPGES1 and p16 in feline and human oral squamous cell carcinoma: A comparative oncology approach. *Veterinary and Comparative Oncology* 2024;1-13. <https://doi.10.1111/vco.12967>

Rojas A, **Germitsch N**, Oren S, Sazmand A, Deak G. Wildlife parasitology: sample collection and processing, diagnostic constraints, and methodological challenges in terrestrial carnivores. Rojas et al *Parasites & Vectors* 2024;17;127. <https://doi.org/10.1186/s13071-024-06226-4>

Groves L, **Whyte SK**, **Purcell SL**, **Michaud D**, **Cai WC**, Garber AF, **Fast MD**. Temperature impacts Atlantic salmon's (*Salmo salar*) immunological response to infectious salmon anemia virus (ISAv). *Fish and Shellfish Immunology Reports* 2023;4:100099. <https://doi.org/10.1016/j.fsirep.2023.100099>

Ksepka SP, **Groman DB**, **Bourque L**, Bullard SA. First report of *Myxobolus neurofontinalis* (Bivalvulida: Myxobolidae) infecting anadromous Brook Trout from Prince Edward Island, Canada. *Journal of Aquatic Animal Health* 2024;00:1-6 <https://doi.org/10.1002/aah.10209>

Cook KA, Hawke JP, **Groman DB**, Pretto T, Toffan A, Hanson LA, Nguyen D, Ford L, Baumgartner A. Betanodavirus meningoencephalitis in an Atlantic blue marlin. *Journal of Veterinary Diagnostic Investigation*. 2024;1-4 [DOI:10.1177/10406387231218223](https://doi.org/10.1177/10406387231218223)

Hamed Shaker Nasry W, Jones K, **Rodriguez-Lecompte JC**, Tesch M, **Martin CK**. Expression of mPGES1 and p16 in feline and human oral squamous cell carcinoma: A comparative oncology approach. *Vet Comp Oncol*. 2024 February 20. [DOI:10.1111/vco.12967](https://doi.org/10.1111/vco.12967)

Sajid Z, Gamperl AK, Parrish CC, Colombo SM, Santander J, Mather C, Neis B, Holmen IM, Filgueira R, McKenzie CH, Cavalli LS, Jeebhay M, Gao W, López Gómez MA, Ochs C, Lehnert S, Cauturier C, Knott C, Romero JF, Caballero-Solares A, Cembella A, Murray HM, Fleming IA, Finnis J, **Fast MD**, Wells M, Singh GG. An aquaculture risk model to understand the causes and consequences of Atlantic Salmon mass mortality events: A review. *Reviews in Aquaculture* 2024; 1-22. [DOI:10.1111/raq.12917](https://doi.org/10.1111/raq.12917).

Valberg SJ, **Clancey NP**, Salinger A, Waldrige B, Tan JY, Barton MH. Pseudohyperkalemia in horse with rhabdomyolysis reported by an enzymatic chemistry analyzer. *AVMA Javma* 2023; 06:0348
<https://doi.org/10.2460/javma.23.06.0348>

Rojas A., **Germitsch N.**, Oren S., Sazmand A., Deak G. 2024. Wildlife parasitology: sample collection and processing, diagnostic constraints, and methodological challenges in terrestrial carnivores. *Parasites & Vectors* 17 (1), 1-23. <https://doi.org/10.1186/s13071-024-06226-4>

Gao S, Tan S, **Purcell SL, Whyte S, Parrish K**, Zhong L, Zheng S, Zhang Y, Zhu R, Jahangiri L, Li R, **Fast MD, Cai W**. A comparative analysis of alternative splicing patterns in Atlantic salmon (*Salmo salar*) in response to *Moritella viscosa* and sea lice (*Lepeophtheirus salmonis*) infection. *Fish and Shellfish Immunology* 2024: 149:109606. <https://doi.org/10.1016/j.fsi.2024.109606>

Carvalho LA, Whyte SK, Purcell SL, Hay T, Taylor RG, Balder R, Gagne N, Salvin S, **Fast MD**. The impact of functional feed on Atlantic salmon (*Salmo salar*) systemic immune response to high and low levels of sea lice infection (*Lepeophtheirus salmonis*) and co-infection with infectious salmon anemia virus. *Comparative Immunology Reports* 2024:6;200147. <https://doi.org/10.1016/j.cirep.2024.200147>

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Ayalew LE, Mekuria ZH, Despres B, Saab ME, Ojha S. Geonome Sequence Comparisons between Small and Large Colony Phenotypes of Equine Clinical Isolates of *Arcanobacterium hippocoleae* Animals 2024:14;1609. <https://doi.org/10.3390/ani14111609>

For comments or suggestions for our newsletter,
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Editor/ Reviewer Dr. Fred Kibenge and Dr. Shivani Ohja

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