**Lauren Zink**

Curriculum Vitae

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# Education

Post-Doctoral Fellow, University of British Columbia, January 2024-present

 Wood Lab, PI: Chris M. Wood

PhDBiosystems and Biodiversity, University of Lethbridge, 2023

Pyle Laboratory for Aquatic Health, PI: Gregory G. Pyle

Dissertation: Effects of polyethylene microplastics and cadmium on freshwater animals: A modelling framework

BScAnimal Biology (*honours*), Thompson Rivers University, 2017

 Gosselin Laboratory, PI: Louis Gosselin

Thesis: Effects of light wavelengths experienced during juvenile life on eye development and morphometrics in the crayfish *Procambarus patzcuranesis*

# Scholarships and Fellowships

2024 NSERC Post Doctoral Fellowship, $131667

2021 NSERC Post-Graduate Doctoral Scholarship, $63000

2020 Nexen Fellowship in Water Research (Doctoral), $30000

2020 University of Lethbridge School of Graduate Studies PhD Tuition Scholarship, $20000

2020 NSERC Canada Graduate Scholarship – Masters, $17500

2019 Nexen Fellowship in Water Research (Masters), $5000

2019 Alberta Society of Professional Biologists Graduate Scholarship $1750

2019 University of Lethbridge School of Graduate Studies MSc Tuition Scholarship, $8000

# Publications

## Underlined authors represent trainees

## Refereed Journal Articles, published

2024 **Zink, L**., Mertens, E., Zhou, X., Johnston, S.E., Bogard, M., Wiseman, S., and G.G. Pyle. Reframing microplastics as a ligand for metals reveals that water quality characteristics govern the association of cadmium to polyethylene. Science of the Total Environment. DOI: 10.1016/j.scitotenv.2024.174659

2024 Zhou, X., Logozzo, L., Johnston, S.E., **Zink, L.**, Bogard, M.J. Composition and bioreactivity of dissolved organic matter leachates from end members in a mountain to prairie transitional river valley. JGR-Biogeosciences. DOI: 10.1029/2023JG007831.

## 2024 Zink, L, and Wood, C.M. The effects of microplastics on ion transport processes in the gills of freshwater fish and invertebrates: a prospective review. Invited Review to the Special Issue: Novel Mechanisms of Epithelial Ion Transport and Its Regulation. Comparative Biochemistry and Physiology, Part A. DOI: 10.1016/j.cbpa.2024.111669.

2024 Simonis, C., **Zink, L.**, Johnston, S.E., Bogard, M.J., and G.G. Pyle. Effects of water quality on palladium-induced olfactory toxicity and bioaccumulation in rainbow trout (*Onchorynchus mykiss*). Integrated Environmental Assessment and Management. DOI: 10.1002/ieam.4900

2023 Eriksson, A.N.M., Dubiel, J., **Zink, L.,** Zhe, L., Doering, J.A., Wiseman, S. Embryonic exposure to Benzotriazole UV Stabilizer 327 (UV-327) Alters Behaviour of Rainbow Trout Alevin. Environmental Toxicology & Chemistry. DOI: 10.1002/etc.5807

2023 **Zink, L**., Meslo, M., Wiseman, S., and G.G. Pyle. *Daphnia magna* alter their digestive physiology differently when exposed to equally turbid waters caused by either suspended sediment or suspended microplastics. Environmental Toxicology. DOI: 10.1002/TOX.24096.

2023 Raza, Y., Mertens, E., **Zink, L**., Lu, Z., Doering, J.A., and S. Wiseman. Embryonic exposure to the benzotriazole UV stabilizer, UV-P, decreases fertility of adult zebrafish (*Danio rerio*). Environmental Toxicology and Chemistry. DOI: 10.1002/etc.5790.

2023 Razmara, P., **Zink, L**., Doering, J., Miller, J., Wiseman, S., and G.G. Pyle. The combined effect of copper nanoparticles and microplastics on rainbow trout (*Onchorynchus mykiss*) hepatocytes. Accepted to Bulletin of Environmental Contamination and Toxicology. DOI: 10.1007/s00128-023-03811-8.

2023 **Zink, L.** Simonis, C., Wiseman, S., and Pyle, G.G. *In vitro* characterization of cadmium transport across the gastro-intestinal membrane of the fathead minnow (*Pimephales promelas*) in the presence and absence of microplastics. Environmental Toxicology and Pharmacology for the Special Issue: Microplastics and their Environmental Effects. DOI: 10.1016/j.etap.2023.104195

2023 Chmilar, S., **Zink, L**., Laird, R. Interactive effects of immediate and ancestral salt stress on fitness in duckweed. International Journal of Plant Sciences. DOI: 10.1086/726083.

2023 Nava, V., Aherne, J., Alfonso, M.B., Antão-Geraldes A.M., Attermeyer, K., Bao R., Bartrons, M., Berger, S.A., Biernaczyk, M., Bissen, R., Brookes, J., Brown D., Cañedo-Argüelles, M., Canle, M., Capelli, C., Carballeira, R., Cereijo, J.L., Chandra, S., Chawchai, S., Chen, G., Christensen, S.T., Christoffersen, K.S., Eyto, E., Delgado, J., Dornan, T.N., Doubek, J.P., Dusaucy, J., Erina, O., Ersoy, Z., Feuchtmayr, H., Frezzotti, M.L., Galafassi, S.L., Gateuille, D., Gonçalves, V., Grossart, H., Hamilton, D.P., Harris, T., Kangur, K., Kankılıç, G.B., Kessler, R., Kiel, C., Krynak, E.M., Leiva-Presa, A., Lepori, F., Matias, M.G., Matsuzaki, S.S., McElarney, Y., Messyasz, B., Mitchell, M., Mlambo, M., Motitsoe, S.N., Nandini, S., Owens, C., Özkundakci, D., Pinnow, S., Pociecha, A., Raposeiro, P., Rõõm, E., Rotta, F., Sartirana, D., Salmaso, N., Sarma, S.S.S., Scordo, F., Sibomana, C., Siewert, D., Stepanowska, K., Tavşanoğlu, U.N., Tereshina, M., Thompson, J., Tolotti, M., Valois, A., Verburg, P., Wesolek, B., Weyhenmeyer, G.A., Wu, N., Zawisza, E., **Zink, L.**, Leoni, B. Plastic debris in lakes worldwide. *Nature.* DOI: 10.1038/s41586-023-06168-4.

2023 **Zink, L.** Wiseman, S., and Pyle, G.G. Single and combined effects of cadmium, microplastics, and their mixture on whole-body serotonin and feeding behaviour following chronic exposure and subsequent recovery in the freshwater leech, *Nephelopsis obscura*. Aquatic Toxicology. DOI: 10.1016/j.aquatox.2023.106538

2023 **Zink, L.,** Shearer, A., Wiseman, S. and G.G. Pyle. The multigenerational effects of cadmium and microplastic mixtures to *Daphnia magna*. Environmental Toxicology and Chemistry. DOI: 10.1002/etc.5628

2023 **Zink, L.** and Pyle, G.G. A proposed reporting framework for microplastic-metal mixtures research, with emphasis on environmental considerations known to influence metals. Ecotoxicology. DOI: 10.1007/s10646-023-02634-x

2022 Pyle, G.G., Plomp, R.D., **Zink, L.,** and Klemish, J.L. Invertebrate metal accumulation and toxicity from sediments affected by the Mount Polley mine disaster. Environmental Science and Pollution Research. DOI:10.1007/s11356-022-20677-1

2019 **Zink, L**. and Pyle, G.G. Contrary to marine environments, common microplastics in freshwater systems do not emit dimethyl sulphide, and important infochemical. Bulletin of Environmental Contamination and Toxicology. DOI: 10.1007/s00128-019-02726-7

## Refereed Journal Articles, under review

2024 **Zink, L.** and Wood, C.M. Experimental and engineering considerations for the development of a gradual hypoxia chamber for use with *Lymnaea stagnalis*. Submitted to Toxicology Mechanisms and Methods. July 28, 2024.

## Refereed Journal Articles, in preparation

Meslo, M., Wood, C.M., and **Zink, L.** Variation in temperature, food availability, and food quality on the hypoxic response of the greater pond snail, *Lymnaea stagnalis*. In preparation for submission to Journal of Toxicology and Environmental Health, Part A.

**Zink, L.** Morris, C., and Wood, C.M. The mode of degradation of microplastics determines their effect to trans-epithelial potential at the gill of goldfish. In preparation for submission to Aquatic Toxicology.

Eriksson, A., **Zink, L.**, Zu, L., and Wiseman, S. Transcriptomic and behavioural alterations of brown trout larvae following exposure to 6PPD-quinone. In preparation for submission to Environmental Toxicology and Chemistry.

Zhou, X., **Zink, L.**, Bogard, M.J. Wiseman, S. Shifts in organic and metagenomic composition across a multi-basin wetland ecosystem. In preparation for submission to PLOS ONE.

Klemish, J.L., Bogart, S.J., Morandi, G., Eickmeyer, D., **Zink, L.,** Wiseman, S., Blais, J., Lannoo, M.J. and G.G. Pyle. Oil sands wetlands toxicity to Wood Frog tadpoles: Lethal and sublethal effects on body condition, activity, and respiration In preparation for submission to Environmental Science and Technology

## Non-Refereed Publications and Technical Reports

2019 Klemish, J.L., S.J. Bogart, **L. Zink**, and G.G. Pyle. Quesnel Lake database construction and assessment. Report No. EQS2019-03. Environmental Quality Series, British Columbia Ministry of Environment and Climate Change Strategy, Victoria, BC. 88 p.

2019 **Zink, L** and Pyle, GG. Convenience Has Its Consequences: Risks of Repurposing Sulphur Waste into Polymers. Society of Environmental Toxicology and Chemistry Globe.

2019 **Zink, L**. The Prairie Northern Chapter of SETAC’s 10th Annual Meeting. Society of Environmental Toxicology and Chemistry Globe.

# Grant and Funding Proposals Under Review

2024 H.L. Holmes Award for Post-Doctoral Studies, National Research Council of Canada, $100000

2024 University of British Columbia Post-Doctoral Fellows Office Travel Award, $1500

2024 Killam Post-Doctoral Fellowship, University of British Columbia, $60000

# Successful Grant and Funding Proposals

2022 Natural Sciences and Engineering Research Council (NSERC) – Department of Fisheries and Oceans Supplement, sole applicant, awarded one of ten in Canada, $10000

2020 Alberta Conservation Association – Grant in Biodiversity, primary applicant, $4780

# Dissemination of Research and Teaching

## Invited Lectures

2024 **Zink, L.** Methods Matter – how clear communication of methods increases research applicability. Invited lecture to the Urban Planning and Policy graduate students at the University of Illinois Chicago, virtual. April 16.

2023 **Zink, L.** Breaking down the “buzz words” – what does a changing environment mean when it comes to water pollution? Invited presentation to the Lethbridge Breakfast Club hosted by the CFO of Charlton & Hill Home Services, Lethbridge, Alberta. March 9.

2023 **Zink, L.** Water worries: Considerations in a changing environment. Invited presentation to the City of Lethbridge hosted by the Natural Leaders Project, Lethbridge, Alberta. January 26.

2020 **Zink, L.** Microplastics and Metals – A Myriad of Mixtures Toxicity. Invited presentation to Water Talks hosted by Water Institute for Sustainable Environments, virtual. November 18.

## Platform Presentations

2024 **Zink, L.** and C.M. Wood. Alterations in transepithelial potential following exposure of fish to differentially degraded microplastics suggests even brief pulse exposures to plastics has ionoregulatory consequences. Society of Canadian Zoologists. Moncton, NB. May 7.

2023 **Zink, L.**, Mertens, E., Zhou, X., Johnston, SE., Bogard, M., Wiseman, S. and GG Pyle. A predictive model created to understand how specific water quality characteristics govern the association of cadmium to microplastics in freshwater systems. Canadian Ecotoxicity Workshop. Ottawa, ON. October 4.

2022 **Zink, L.** and G.G. Pyle. Knowing the parts to understand the whole: Tackling microplastic and metal mixtures toxicity. Biology Graduate Symposium, University of Lethbridge, Lethbridge, AB. January 28.

2021 **Zink, L.** and G.G. Pyle. Water quality influences the binding of metal to microplastic. Meeting of the Minds Interdisciplinary Conference, University of Lethbridge, Lethbridge, AB. March 25.

2021 **Zink, L.** A step back and a step up for peer-led tutorials: Empowering student leaders to embed transferrable skills while putting complex material into perspective. International Society for the Scholarship of Teaching and Learning, virtual. October 26-29.

2021 **Zink, L.** and G.G. Pyle. Impacts of water quality on the interaction of cadmium and microplastics in simulated freshwater environments. Canadian Conference for Fisheries Research and Society of Canadian Limnologists, virtual. February 15-19.

2020 **Zink, L.**, Klemish, J.L., and G.G. Pyle. Laundry-effluent toxicity of copper-treated textiles to freshwater invertebrates. Society of Environmental Toxicology and Chemistry – Prairie Northern Chapter, virtual. (Earned second place platform award). June 15-19.

2019 **Zink, L.** and G.G. Pyle. Variations in cadmium adsorption to weathered and virgin polyethylene microplastics. Presented at the Society of Environmental Toxicology and Chemistry (SETAC) Prairie Northern Chapter (PNC), University of Lethbridge, Lethbridge, AB. June 10-11.

## Poster Presentations

2023 **Zink, L.** Incorporating non-traditional information sources in classroom discussion. Undergraduate Biology Educators of Alberta. Lethbridge, AB. May 18.

2022 **Zink, L.** and G.G. Pyle. Cadmium and microplastics alter leech feeding behaviour via different mechanisms, resulting in additive effects. Society of Environmental Toxicology and Chemistry – North America, Pittsburgh, PA. (Earned third place Ph.D. Best Poster Award). November 14.

2020 **Zink, L.** and G.G. Pyle. Combined effects of microplastics and metals on aquatic invertebrates. Biology Graduate Symposium, University of Lethbridge, Lethbridge, AB. January 29.

2019 **Zink, L.** Red pen potential: Promoting an influential teaching environment through effective feedback. SPARK Teaching Symposium, University of Lethbridge, Lethbridge, AB. April 25.

2019 **Zink, L.** and G.G. Pyle. The effects of chronic exposure to cadmium and microplastics on serotonin levels and feeding behaviour in the leech, *Nephelopsis obscura*. Meeting of the Minds Interdisciplinary Conference, University of Lethbridge, Lethbridge, AB. March 22.

## Media Coverage

2023 Microplastics are found globally in freshwater systems, raising concern. Live radio interview with CBC Edmonton. July 24.

2023 International research collaborations to better understand microplastics in lakes globally. Live radio interview with CBC Calgary – The Homestretch. July 20.

2022 Pride flag ascends at U of L. University advancement media coverage by the Lethbridge Herald. June 21.

2021 **Zink, L**. These aquatic invaders post a big risk in Alberta. Invited interview with CBC news. November 4.

## Campus Talks

2024 **Zink, L.** Foundations of Investigating Mixtures Toxicity. Invited guest lecture for Toxicology. University of Lethbridge, Lethbridge, AB. March 26.

2024 **Zink, L.** Risk Assessment Across Ecosystems. Invited guest lecture for Special Topics in Biology. University of Lethbridge, Lethbridge, AB. March 5.

2023 **Zink, L.** The fundamentals of Environmental Risk Assessment. Invited guest lecture for Toxicology. University of Lethbridge, Lethbridge, AB. October 26.

2023 **Zink, L.** Student life in Lethbridge. Invited talk for the Peer Education Program. University of Lethbridge, AB. January 16.

2022 **Zink, L.** Giving a topic pitch presentation: tips, tricks, and considerations for environmental topics. University of Lethbridge, AB. September 22.

2020 **Zink, L.** Microplastics: A complex pollutant? Invited guest lecture for Current Topics in Environmental Science. University of Lethbridge, Lethbridge, AB. March 6.

2019 **Zink, L.** Microplastic toxicity. Invited guest lecture for Toxicology. University of Lethbridge, Lethbridge, AB. October 16.

## Other Presentations

2021 **Zink, L.** Packed with plastics. Images of Research Competition, virtual. March 11-19.

2019 **Zink, L.** and G.G. Pyle. More than microplastics. Three-Minute Thesis (3MT) Research Competition. University of Lethbridge, Lethbridge, AB. (Earned second place). March 25.

# Teaching Experience

\*Courses marked with an asterisk are courses that I have created the content and structure of

**Red Crow Community College**, Alberta, Canada

Courses Taught (as Instructor of Record**)**

Aquatic and Wetland Ecology (Fall 2024) \*

 Terrestrial Ecology (Fall 2024) \*

Introduction to Environmental Science (Fall 2022, Winter 2023, Winter 2024, *Spring 2025 scheduled*) \*

Introduction to Geography (Fall 2023, Fall 2024) \*

**University of Lethbridge**, Alberta, Canada

Graduate Courses Taught (as Seminar Instructor**)**

 Research and Skill Development: Using R Software (Fall 2023,Fall 2024) \*

 Predictive Analytics I (Spring 2024, *Spring 2025 scheduled*) \*

 Regression Analyses (Spring 2024, *Spring 2025 scheduled*) \*

Undergraduate Courses Taught (as Instructor of Record**)**

Behavioural Ecology (Fall 2022) \*

Animal Physiology Seminar (Fall 2020, Fall 2021) \*

Undergraduate Courses Taught (as Teaching Assistant)

Developmental Biology (Spring 2023)

Vertebrate Zoology (Spring 2023)

Research Internship Concentration (Spring 2020, Spring 2021) \*

Animal Physiology Laboratory (Fall 2019, Fall 2020, Fall 2021, Fall 2023)

Cellular Basis of Life Laboratory (Spring 2019)

**Thompson Rivers University**, British Columbia, Canada

Courses Taught (as Teaching Assistant**)**

Principles of Biology Laboratory (Fall 2016)

# Student Supervision

2024 Brendan Lavery. “Antipredator behaviour in zebrafish under simultaneous copper exposure and hypoxia”, University of British Columbia. Primary supervisor.

2024 Mikaila Meslo, “Alterations in hypoxic response of pond snails under changes in food quality and temperature regimes”, University of British Columbia. Primary supervisor.

2023 Emily Mertens, “Correlating the amount of cadmium sorbed to microplastics and the subsequent toxicity to freshwater algae”, University of Lethbridge. Primary supervisor.

2022-2023 Julia Stroud, “Combined toxicity of maternally transferred PAHs and waterborne selenium to the fathead minnow”, University of Lethbridge. Co-supervisor.

2020-2021 Anna Shearer, “The multigenerational effects of cadmium and microplastic mixtures to *Daphnia magna*”, funded through NSERC, University of Lethbridge. Primary supervisor.

2020-2021 Mikaila Meslo, “Physiological responses of *Daphnia magna* to various microplastics”, funded through University of British Columbia Co-operative Education and BioTalent, University of Lethbridge. Primary supervisor.

2020 Alyssa Hoveling, “Seasonal toxicity considerations of the effects of microplastics to *Hyalella azteca*”, University of Lethbridge. Primary supervisor.

2020 Karen Shamash, “Influence of sediment characteristics to the uptake of microplastics by *Hyalella azteca*”, University of Lethbridge. Primary supervisor.

# Professional Affiliations and Service

2024 – present Canadian Society of Zoologists

 2024 Judge – Battle Award for best poster presentation

2020 – present Society of Environmental Toxicology and Chemistry

2024 Session Chair – “Behavioral Endpoints and Methods as a Line of Evidence in Regulatory Toxicity Testing”

2023 – present Aquatic Toxicity Testing Interest Group, Steering Committee member

2022 – 2023 North American Student Support Committee member

2021 – 2022 World Council, ex-officio member

2021 – 2022 North American Board member

2021 – 2022 Chair, North American Student Advisory Committee

2019 – 2021 Board Member, Prairie Northern Chapter

2019 – present International Society for the Scholarship of Teaching and Learning

2019 – present Society of Canadian Limnologists

# Short Courses and Professional Development

2024 McCall MacBain Postdoctoral Scholars Leadership Certification.

 *Selected as one of 40 postdoctoral fellows to participate from over 200 applicants*

2023 R Workshop: analyzing environmental data with numerous non-detects, Canadian Ecotoxicity Workshop, Ottawa, ON.

2023 Conceptual Site Modelling. AGeoEnviroPro, virtual.

2023 Integrating Western Science and Traditional Knowledge in Restoration Works. GeoEnviroPro, virtual.

2023 Introduction to Assessment and Management of Chemicals. Stockholm University, virtual.

2023 Anti-Racism Response Training. Canadian Association for Graduate Studies, virtual.

2022 Peer Reviewer Training. Young Environmental Scientists Meeting, virtual.

2021 Indigenous Relations Workshop. Canadian Conference for Fisheries Research and Society of Canadian Limnologists, virtual.

2020 Speak Science Simply Series. Concordia University of Edmonton, AB.

Persuasive science storytelling techniques

Science interview toolkit

Navigating scientific controversy

Communicating data and statistics to the public

Communicating science for policy

2019 Instructional Skills Workshop. University of Lethbridge, AB.

2019 Utilizing R. Society of Environmental Toxicology and Chemistry, Prairie Northern Chapter, Lethbridge, AB.

2019 Thesis Writing Bootcamp. University of Lethbridge, AB.

2019 Graduate Teaching Assistant Professional Development Program. University of Lethbridge, AB.

# University Service

**University of Lethbridge**

Coach for 3-Minute Thesis competitors, 2020 - present

Presidential Search Committee, 2022 – 2023

Board of Governors, 2019 - 2023

Strategic Planning Committee, 2019 - 2023

Graduate Council (and Executive), 2019 - 2023

General Faculties Council, 2019 – 2023

School of Liberal Education Advisory Council, 2019 – 2023

Academic Quality Assurance Committee, 2020 – 2023

Academic Standards Committee, 2019 – 2023

Curriculum Coordinating Committee, 2019 – 2023

University of Lethbridge Alumni Association, 2019 – 2023

President, Graduate Students’ Association, University of Lethbridge, 2019 - 2023

Teaching Centre Advisory Council, 2019 – 2021

# Community Activity and Outreach

2022 – 2024 Aquatic Sciences Mentor, Natural Leaders Program, Helen Schuler Nature Center, Lethbridge, AB

2019 - 2023 Visiting Scientist and Program Leader, Destination Exploration Youth Outreach Program, University of Lethbridge, Lethbridge, AB

2023 Judge, Nicholas Sheran Elementary School Science Fair, Lethbridge, AB.

2020 – 2022 Judge, Lethbridge Science Fair, Lethbridge, AB.

2019 Organizer and Volunteer, Annual Biology Graduate Symposium, University of Lethbridge, Lethbridge, AB

2019 Organizer, Society of Environmental Toxicology and Chemistry Prairie Northern Chapter (SETAC PNC), University of Lethbridge, Lethbridge, AB

2019 Judge and Session Chair, Luke Stebbins Undergraduate Research Symposium, University of Lethbridge, AB

# Other Related Experience

2020 – 2024Animal Care Research Technician,University of Lethbridge, Lethbridge, AB

Peer-Reviewed Articles for:

2024-present Journal of Experimental Biology

2023-present Journal of Environmental Chemical Engineering

2023-present Limnology and Oceanography Letters

2023-present Water Research

2022-present The Canadian Journal for the Scholarship of Teaching and Learning

2022-present Environmental Pollution

2021-present Environmental Science and Pollution Research

2020-present Environmental Science and Technology

Technical Document Reviews

Ongoing ASTM E1850-2004(2019) - Standard Guide for Selection of Resident Species as Test Organisms for Aquatic and Sediment Toxicity Tests

Ongoing ASTM E1688-10(2019) - Standard Guide for Determination of the Bioaccumulation of Sediment- Associated Contaminants by Benthic Invertebrates