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## Education

### **MASTER OF SCIENCE DEGREE IN ENVIRONMENTAL AND LIFE SCIENCES (GPA: 4.3/4.3)**

**Thesis:** Insights into the Population Dynamics and Microbiome of Mosquitoes in Manitoba  
**Brandon University** | 04/2020-06/2022 | Runner up for the Gold Medal Award in Science

### **BACHELOR OF SCIENCE IN BIOLOGY**

**University of Winnipeg** | 09/2014-02/2019 | Dean's Honour List Distinction

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## Experience

### **Public Health Agency of Canada – National Microbiology Laboratory | October 2022-Present**

#### **Quality Analyst & Program Coordinator**

- Oversees two international quality control programs for HIV-1 diagnostics with over 1,000 participants in over 30 countries. Responsible for stakeholder communications, quality assurance sample preparation, program research and development, reporting results to stakeholders, and providing program summaries and progress reports to management and stakeholders such as the World Health Organisation.
- Developed domestic quality control programs for HIV-1, chlamydia, and gonorrhoea to serve marginalized communities in Canada. Responsible for writing training materials and producing stable quality control materials.
- Developed an automated report and document generation process using R, RMarkdown, and Excel, increasing program efficiency and accuracy, and reducing the time spent conducting manual tasks by 160 hours annually.
- Conceived, designed, and deployed a desktop application to increase accessibility for point-of-care test data, enhancing decision-making processes, and reducing time spent entering data internally. The app has been adopted by multiple units within the division.
- Reduced program costs by \$12,000 annually through innovative quality control material development while maintaining high standards of program quality.
- Conducts data analysis using R and Excel for program performance assessment and participant reporting.
- Developed and authored over 100 Standard Operating Procedures (SOPs) to ensure compliance with stringent quality standards and to enhance program resilience by building redundancy into critical processes.

### **Brandon University | April 2020-June 2022**

#### **Graduate Researcher**

- Planned, organized, and managed all facets of several research projects related to mosquito surveillance, including leading a team of research assistants.
- Developed and authored standard operating procedures for mosquito trapping, identification, RNA isolation and RT-PCR.
- Optimized insect RNA isolation and RT-PCR protocols, increasing RNA yield and quality and RT-PCR sensitivity.
- Carried out, trained, and mentored staff on mosquito trapping, identification, RNA isolation and RT-PCR. We trapped, identified and processed ~300,000 mosquitoes over two years, resulting in the detection of Cache Valley Virus in two mosquito pools.
- Led data analysis for mosquito-borne pathogen surveillance, including modelling trap count data and weather (using R), and conducting a mosquito metatranscriptomic analysis (using various bioinformatics tools including R, CLC Genomics Workbench, Bowtie2, Trimmomatic) identifying 66 viruses, including 17 novel viruses, using next-generation sequencing.
- Authored weekly, monthly and annual reports detailing trap counts, virus surveillance results, and recommendations for how the public can protect themselves from mosquito bites to local municipalities, Manitoba Health and the Public Health Agency of Canada.

## Experience, continued

### Brandon University | April 2020-June 2022

#### **Contract Bioinformatician** (January-May 2022)

- Developed bioinformatics workflows for a pilot tick next-generation sequencing project to inform future grant application decisions, resulting in the identification of several viruses and bacteria.

#### **Sessional Instructor**, Diseases Course 15:366 (January-May 2022)

- Prepared laboratory materials, developed and graded quizzes/tests, delivered pre-lab presentations, and supported students during lab sessions.

#### **Graduate Teaching Assistant**, Biodiversity Interactions Course 15:163 (January-May 2021)

- Conducted pre-lab briefings via Zoom, assisted students during lab sessions, and graded assignments/tests.
- Provided written and oral feedback for student improvement and assisted in test creation.

### Cibus | Summer 2022 (Contract)

#### **Research Assistant**

- Analyzed field data and provided statistical insights using R to inform future research site selection and experimental design.

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## Skills

- **Data Analysis Tools:** R (Tidyverse, Shiny, RMarkdown, Quarto), Excel.
- **Laboratory:** Nucleic acid isolation, RT-PCR design and implementation, ELISA, RNAi knockdown, culturing, biosafety level 2+ (enhanced) best practices, insect identification, handling and rearing.
- **Field Work:** CDC Miniature Light Traps, Gravid Traps, New Jersey Light Traps, Tick Dragging.
- **Bioinformatics Tools:** CLC Genomics Workbench, R (Phylotools, Bioconductor), MEGAX, SPADes, Trimmomatic, Bowtie2.
- **Technical Skills:** Automated data processing (Power Automate, GitHub Workflows, package development, RMarkdown and Quarto), statistical modeling (GLMMs), data visualization (ggplot2, Shiny), application development (Shiny).

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## Publications

1. **Cole Baril**, Christophe M R LeMoine, Bryan J Cassone, Black queen cell virus detected in Canadian mosquitoes, *Journal of Insect Science* 23, 2 (2023). <https://doi.org/10.1093/jisesa/lead016>
2. **Baril, C.**, Pilling, B.G., Mikkelsen, M.J. et al. The influence of weather on the population dynamics of common mosquito vector species in the Canadian Prairies. *Parasites Vectors* 16, 153 (2023). <https://doi.org/10.1186/s13071-023-05760-x>
3. **Baril C**, Cassone BJ. Metatranscriptomic analysis of common mosquito vector species in the Canadian Prairies. *mSphere* 9:e00203-24 (2024). <https://doi.org/10.1128/msphere.00203-24>

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## Presentations & Press

- Presented at the JC Wilt 10th Year Anniversary Poster Symposium on "Development of a User-Friendly App to Clean GeneXpert Data," winning an award for "Best Poster Presentation."
- Delivered research presentations at various scientific conferences, including the Entomological Society of America Conference, West Nile Virus Scientific Committee Meeting, and PHAC's National Vector Borne Disease Information Sharing Table.
- Various press appearances including in [Entomology Today](#), [CBC Radio Canada](#), Brandon University's [Research Connection](#), and several local municipal newsletters on topics related to mosquito-borne pathogen research (*What's Up Yellowhead*, *Shoal Lake Newsletter*, and *Cypress River Newsletter*).